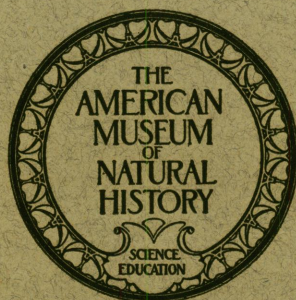


THE MAMMALS OF ANGOLA, AFRICA

BY JOHN ERIC HILL AND T. DONALD CARTER



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Article I.—THE MAMMALS OF ANGOLA, AFRICA

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INTRODUCTION

The mammals collected by the Vernay Angola and the Phipps-Bradley Expeditions of the American Museum in Angola, add considerably to what was known of the fauna of that part of Africa. Several new forms have been described¹ from these collections, and a number of hitherto unrecorded species have been discovered to occur in Angola, but one of the most important results of these collections was the securing of good series of many species and races that were previously poorly represented in the Museums of the world.

In addition to the material in the collections of the American Museum, a number of Angolan mammals were loaned for examination by the Carnegie Museum, Pittsburgh. During the autumn and winter of 1937-1938, Hill, assisted by Mrs. Hill, examined and photographed most of the types and other important material from Angola in five European Museums: The Rijksmuseum van Natuurlijke Historie, Leiden; the Zoologisches Museum der Universität, Berlin; the Museum National d'Histoire Naturelle, Paris; the Musée du Congo Belge, Tervueren; and the British Museum (Natural History), London. This study, extremely helpful in the identification of questionable specimens, was undertaken under a grant from the Carnegie Corporation of New York.

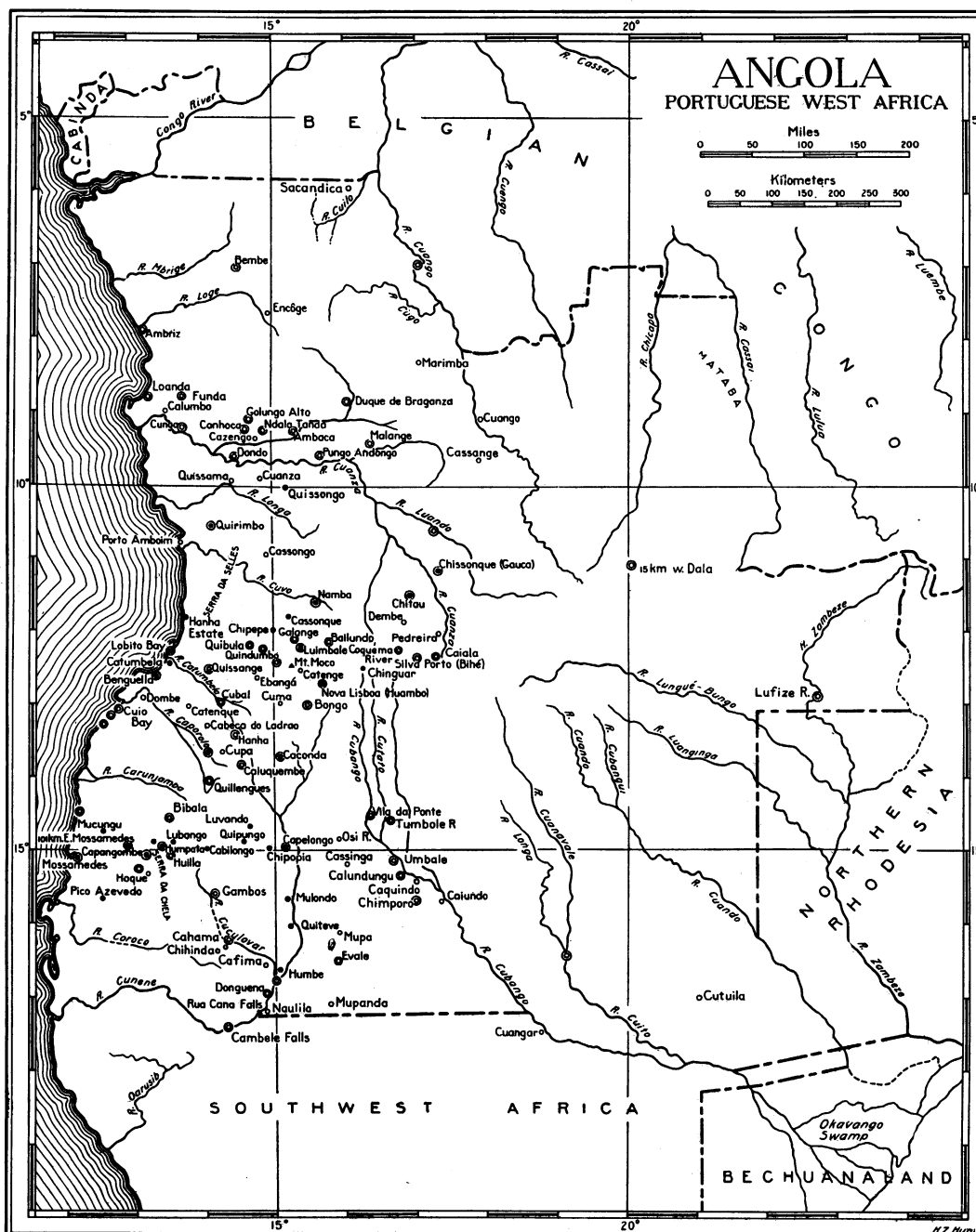
Acknowledgments are due Dr. Harold E. Anthony, Curator of Mammals, The American Museum of Natural History, for the opportunity to work on these collections, and for helpful criticism and advice; Mr. Rudyard Boulton of the Field Museum of Natural History, for assistance in identifying Angolan localities and photographs; Dr. A. Avinoff, Director, and Mr. J. Kenneth Doult of the Carnegie Museum, for the loan of specimens from Angola. Dr. H. Boschma and Dr. G. C. A. Junge of the Leiden Museum; Dr. H. Pohle of the Berlin Museum; Professor E. Bourdelle and Dr. Paul Rode of the Paris Museum; Dr. H. Schouteden of the Congo Museum; Mr. Martin A. C. Hinton, Mr. T. C. S. Morrison-Scott, and Mr. G. W. C. Holt of the

British Museum, extended every courtesy and assistance possible in the studying of type specimens in the collections of those institutions.

The Vernay Angola Expedition was given to the Museum by Mr. Arthur S. Vernay, who has done so much for this institution. Messrs. Herbert Lang and Rudyard Boulton, collectors, went to Angola in April, 1925, and remained there for about three months. Landing at Lobito, near Catumbela, a few animals were secured here. The expedition went to Hanha Estate (not the Hanha usually given on maps), an oil palm plantation near the coast, some thirty-two kilometers north of Lobito. The party then went south by way of Huambo where they were joined by Messrs. A. S. Vernay, Alan and Charles Chapman. Mr. Vernay, with Lang and Charles Chapman, went to Mossamedes and collected at Pico Azevedo and 101 km. east of Mossamedes; they returned eastward over the high escarpment to Capelongo, and side excursions of 40 and 65 km. south of that locality were undertaken for large game by Mr. Vernay and C. Chapman. Mr. Boulton and Alan Chapman went to Quipungo, Chipopia, and Luvando. At the end of August the expedition united at Capelongo and returned by way of Caconda to Huambo, where several animals were secured. At Huambo the party again divided; Mr. Vernay, Lang, and Alan Chapman went to Chitau. Mr. Lang remained in Chitau and collected numerous specimens. Mr. Vernay and his guide, Alan Chapman, went across the Cuanzo and hunted sable antelope and other species in the region around Chissonque, 20 to 35 km. east of the river. A few small mammals were secured near this locality also. Meanwhile Boulton and Charles Chapman went to Namba in the Mombolo region.

The Phipps-Bradley Expedition was donated by Mr. John H. Phipps, who also organized and managed the expedition. Mr. Lee S. Bradley, collector, went first to Angola and began working at Caporolo, inland from Benguela, July 2, 1932, and remained there for about two weeks. He

¹ Amer. Mus. Novitates, Nos. 913, 916, 937.



went from Caporolo to Chitau, where he began collecting August 18. Leaving there near the end of September, he went to Mulondo and collected from October 17 to 24. From Mulondo, Mr. Bradley went to Humpata, where a large collection of small mammals was made in the period between October 26 and December 8. He returned to Chitau and stayed there from February 9 to March 17. Returning to the coast, Mr. Phipps joined the party and they went to Mossamedes region where a few gemsbok were secured. A trip was made to the higher part of Mount Moco the first part of June, and several specimens were collected at the Hanya River on July 2 and 3. In August the party hunted near Quissongo, Libolo region.

The Vernay Angolo Expedition secured approximately 1300 specimens, and the Phipps-Bradley Expedition brought back more than 1000. The two collections combined give a very representative picture of the mammalian fauna of Angola, at least of the southwestern quarter of that country. In addition several specimens were donated by Mr. H. F. Varian and fifty mammals were purchased from Mr. C. P. Chapman, collected at Chipepe, Namba, and Monte Victoria Verdun.

Throughout this paper the color nomenclature used is that of Ridgway, 1912, "Color Standards and Nomenclature," except for color names in lower case. Comparisons were made in diffused daylight with his standards. Measurements are of adults, unless otherwise noted, and were taken with dial calipers reading to tenths of a millimeter in the case of the smaller measurements (under 150 millimeters). Larger measurements were taken with outside calipers and steel tape. Measurements of head and body were usually obtained by subtracting tail length from total length as recorded by the collector. Where questions existed as to the accuracy of the original measurements of the hind foot, checks were made on the dried skins. And, if greater discrepancy was found than that to be expected from shrinkage, the measurements from the dried specimen were substituted with a note to that effect.

Photographs of specimens and several of the types of country in which collections were made, were those taken by Mr. Herbert Lang, Mr. Rudyerd Boulton, and Mr. Arthur Vernay on the expedition. The line drawings were made by Miss Helen Hunt, and were made possible by generous financial assistance from Mr. Vernay.

GAZETTEER OF LOCALITIES

Ambaca (Ambacca), alt. 800 m.	9°15' S., 15°15' E.
Amboiva (M'Boiva, N'Boiva)	11°25' S., 14°45' E.
Ambriz	7°50' S., 13° 5' E.
Andulo (Andulu)	11°30' S., 16°45' E.
Anha (see Hanha)	
Bahia dos Tigres	16°40' S., 11°50' E.
Bailundo (Bailunda, Bailonda, Vila Teixeira de Silva), alt. 1366 m.	12°10' S., 15°50' E.
Bango	9°38' S., 14°45' E.
Bembe	7° 5' S., 14°30' E.
Bembe, 300 mi. E.	7° S., 17° E.
Benguela (Benguella)	12°35' S., 13°25' E.
Bibala (Biballa, Biballe), a region in Mossamedes District, alt. 500 m.	About 14°30' S., 13°30' E.
Bihé (see Silva Porto)	12°20' S., 17° E.
Bimbe (Bimbi)	11°50' S., 15°50' E.
Bingondo, Bihé District	
Bombone, alt. 3200 ft., Mossamedes District	15°15' S., 13° 5' E. (?)
Bongo, about 100 miles E.S.E. Benguela	13° S., 15°20' E.
Bumba (Bumbo, probably also Bombone)	15°15' S., 13° 5' E.
Bunhe River, Benguela District	
Busola, near Usolo River, Benguela District	
Cabeça de Ladrão (Ladros)	13°20' S., 14°15' E.
Cabanga (Kawanga, Kavanga)	16°50' S., 18°15' E.

Caconda (Kadonda), alt. 5700 ft.	13°42' S., 15° 5' E.
Cacuhi (see Cazengo)	
Caculovar River (Kakulovar)	14°45' to 16°50' S., 13°45' to 15° E
Cafima (Kafima)	16°35' S., 16°30' E.
Cahama (Kahama)	16°15' S., 14°20' E.
Cahata	12°20' S., 14°50' E.
Caiala, alt. 5600 to 6000 ft., Bihé District	12°20' S., 17°15' E.
Caiundo (Kayundu)	15°40' S., 17°25' E.
Calolo (Kalolo)	10° 5' S., 14°50' E.
Calongo (Kalongo), Bihé District	
Caluquembe Mission (Kalukembé)	13°45' S., 14°30' E.
Caluquembe	13°45' S., 14°42' E.
Calundungu (Kalundungu, Colundungu)	15°20' S., 16°45' E.
Cambele Falls (Kambebe)	17°15' S., 14°15' E.
Cambisa (Kambissa), about 20 km. from Cassinga	
Campulu (Kampulu), about 20 km. from Cassinga	
Cangela (Kangela)	15°20' S., 15°50' E.
Canhoca	9°15' S., 14°40' E.
Capango	11°45' S., 17°15' E.
Capangombe (Capongombe, Kapangombe)	15° 5' S., 13°10' E.
Cabilongo	15° S., 14° 5' E.
Capelongo	14°55' S., 15° 5' E.
Caporolo (Coporolo, Coporollo)	12°20' S., 14° 5' E.
Caporolo River (Coporole)	12°50' to 13°35' S., 12°55' to 14°10' E.
Caquindo (Kakindo)	15°25' S., 17° E.
Cassange (Kassandje)	9°35' S., 17°55' E.
Cassinga (Kasinga)	15°10' S., 16° 5' E.
Cassoalala (Casualalla)	9°30' S., 14°20' E.
Cassongue	11°50' S., 15°15' E.
Catengue (Catenge, Katenge, Katengue)	13° S., 13°45' E.
Catete (Cotete)	9°10' S., 13°40' E.
Catumbela (Catumbella, Katumbella)	12°25' S., 13°35' E.
Cazengo (Kasengo, also Cacuhi)	9°25' S., 14°50' E.
Chibemba (see Gambos)	
Chibia	15°10' S., 13°45' E.
Chiffame, Bihé district	
Chihinda	16°25' S., 14°10' E.
Chimporo (Tyimpolo)	15°40' S., 17° E.
Chingoroi	13°35' S., 14° E.
Chinguar (Chingwari)	12°35' S., 16°20' E.
Chipepe, near Cassongue	12° S., 15° E.
Chipopia	14°58' S., 14°55' E.
Chisongua (Chisongwe) on the Luando River, probably	
Chissonque	
Chissamba (Chisamba)	12°15' S., 17°20' E.
Chissonque	11° 5' S., 17°15' E.
Chitau	11°15' S., 17° 1' E.
Chitanda River (also Cului, part)	14° to 16° S., 15°15' to 16°10' E.
Chiumbe River (Tyihumbwé), branch of Cassai River	6°30' to 11° 5' S., 19°40' to 20°10' E.
Chiyuke, Bihé district, alt. 6000 ft.	
Cholende, 20 mi. N.E. Bihé	
Choso (Chouse, Chuzo)	11°45' S., 17°35' E.
Cokue, see Coque	
Côle, Rio	9°15' S., 16°15' to 16°45' E.
Columbo	9° S., 13°30' E.
Congulu, fazenda near Quirimbo, alt. 700 to 800 m.	
Coque (Cokue)	10° S., 16°40' E.
Coquema River (Kukema), alt. 5900 ft.	12°15' S., 16°45' E.
Coroca, Rio (Koroka, Caroca)	15°40' to 16°25' S., 11°45' to 13°35' E.
Cotete (see Catete)	
Cuando	12°45' S., 15°50' E.
Cuando River (Kuando)	12°45' to 13°25' S., 15°45' to 16° 5' E.
Cuanga	17°25' S., 18°45' E.
Cuango	9°10' S., 18° E.
Cuango, Rio (Capello and Ivens' locality)	10° to 11° S., 18°30' to 19° E

Cuanza River (Quanza)	9° to 13°50' S., 13° to 17°35' E.
Cuanza, 20 mi. S. Caconda	13°55' S., 15° 3' E.
Cuatiri River (Quatiri)	16° to 16°50' S., 17°55' to 18°20' E.
Cubal	13° S., 14°20' E.
Cubal, Rio	12°40' to 13°40' S., 13°55' to 14°45' E.
Cubango and Cubango Mission (see Vila-da-Ponte)	14°25' S., 16°15' E.
Cubango River (Kubango, Kuvango, Okovango)	12°30' to 19° S., 16° to 23° E.
Cubicula, near Cazengo	
Cuce, Rio (Cusse, Cu-se)	13°30' to 14° 5' S., 15°15' to 15°35' E.
Cuelio (Kuelio), near Caquindo	
Cului River (Kului), upper part of the Chitanda River	14°15' to 16° 5' S., 15°10' to 16° 5' E.
Cuio Bay	13° S., 12°56' E.
Cuilo River (Kuillo), Congo district	5°50' to 6°40' S., 15°40' to 16°40' E.
Cuito River (Kuito, Kwito)	15°10' to 17°50' S., 19° 5' to 20°45' E.
Cuito River, below Longo River Junction	16°25' S., 19° 5' E.
Cuito (Quito, Kwito)	12°25' S., 15°15' E.
Cuje River (Cujo)	11° 5' to 11°10' S., 17°30' to 18°15' E.
Cuma	12°55' S., 15° 5' E.
Cunene River (Kunene)	12°40' to 17°30' S., 11°40' to 15°50' E.
Cunene—Caculovar Junction	16°50' S., 15° E.
Cunene Falls (see Rua Cana Falls)	
Cunga	9°10' S., 13°45' E.
Cupa (Kupa), Benguela district	13°40' S., 14°20' E.
Cutato River (Kutato)	12°30' to 14°50' S., 16°30' to 16°45' E.
Cutuila (Cutwila)	17° S., 21° E.
Cuvelai River (Kuvelai)	15°10' to 16° S., 15°40' to 16°40' E.
Dala, Lunda province	10°58' S., 20°15' E.
Dala Tando (Ndala Tando)	9°15' S., 14°55' E.
Danda River (Dange)	8°25' S., 13°15' to 15°10' E.
Dando (Dande)	11°10' S., 17°10' E.
Dombe Grande (Dombe)	12°55' S., 13°10' E.
Dombe Grande, 50 mi. S.,	13°40' S., 14° E.
Dombodola	17°22' S., 14°50' E.
Dondi, alt. 5600 ft.	12°30' S., 16°15' E.
Dondo (Ndondo), alt. 93 m.	9°40' S., 14°30' E.
Donguena (Dongoena, Dongwenna)	17° S., 14°50' E.
Duque de Bragança (Braganza, Duque)	8°55' S., 16°10' E.
Ebanga (Ebango)	12°43' S., 14°42' E.
Ediva	16°20' S., 14°15' E.
Egito (Ejito)	12° S., 13°50' E.
Elands Water, Benguela district, 4-5 days S.E. Usolo	
River on Benguela Road	
Elephant Bay, Benguela district	13°15' S., 12°45' E.
Elende	12°48' S., 15° 5' E.
Encoge (Enkoje, Encoje)	7°40' S., 14°50' E.
Equimina, south of Benguela	13°10' S., 12°50' E.
Etongo (Etonga)	12°20' S., 15° 8' E.
Evale	16°25' S., 15°50' E.
Forte Roçadas	16°40' S., 15° 5' E.
Funda	8°50' S., 12°40' E.
Galanga	12° 5' S., 15°15' E.
Galangue	13°50' S., 16° 5' E.
Gambos (Gambo, also Chitemba)	15°45' S., 14° 5' E.
Ganguella country	14° S., 17° E.
Gauca River, 20 km. E. Dande	11° 5' S., 17°15' E.
Golungo Alto	9° 5' S., 14°40' E.
Goudkopje (also Ompopo)	15°10' S., 16° 5' E.
Habunga River (Habungu)	17°30' to 18° 5' S., 19°15' E.
Hanha Estate	13°30' S., 14°30' E.
Hanha (Hanya, Anha)	12°15' S., 13°45' E.
Hanya River	12° 8' to 12°18' S., 13°45' to 14° E.
Huambo (= Nova Lisboa)	12°45' S., 15°45' E.
Huila (Huilla)	15° 5' S., 13°30' E.
Humbe (Humbi, also Mutano)	16°40' S., 14°55' E.
Humbo country, district around Humbe	

Humpata	15° S., 13°20' E.
Indungo (Indungu)	14°45' S., 16°25' E.
Jonkoa River	16°15' S., 19° to 19° 5' E.
Kafima (see Cafima)	
Kakonda (see Caconda)	
Kakulovar (see Caculovar)	
Kakindo (see Caquindo)	
Kalolo (see Calolo)	
Kalongo, Bihé district	
Kalukembe (see Caluquembe)	
Kamba (see Cambo)	
Kambele Falls (Cambele)	17°15' S., 14°15' E.
Kambissa (see Cambisa)	
Kampulu (see Campulu)	
Kapangombe (see Capangombe)	
Kasengo (see Cazengo)	
Kasinga (see Cassinga)	
Kassandje (see Cassange)	
Katenge (see Catengue)	
Katumbella (see Catumbela)	
Kawanga, Kavanga (see Cabanga)	
Killenges (see Quilengues)	
Koelo-ei-Kasinga R., probably the Cuvelai R., near Cassinga	
Koroca, Rio (see Coroca R.)	
Kripa, Benguela District	
Krokkie, Mossamedes District, possibly Rio Coroca	
Kuando (see Cuando)	
Kuango (see Cuango)	
Kuanyama (see Mupanda)	
Kuanza River (see Cuanza R.)	
Kuelio (see Cuelio)	
Kuito (Kwito) River (see Cuito R.)	
Kukema River (see Coquema R.)	
Kupa (see Cupa)	
Kutato River (see Cutato R.)	
Kuvelai River (see Cuvelai R.)	
Lasingua (Luassinga)	15°45' S., 18°45' E.
Libolo (district)	About 9°50' to 10°40' S., 14°50' to 16°10' E.
Linghonung	About 15°50' S., 17°50' E.
Loanda (São Paulo de Loanda)	8°50' S., 13°15' E.
Loando River (Luando R.)	
Lobito (Lobito Bay)	12°20' S., 13°35' E.
Loge River (Lodje R.)	7°25' to 7°50' S., 13° 5' to 15°30' E.
Longa River	14° to 16°20' S., 18°10' to 19° 5' E.
Luacenda River	14°20' to 15°40' S., 17°30' E.
Luando River (Loando R.)	10°15' to 11°30' S., 16°35' to 17°45' E.
Luando and Cuje Junction	11°10' S., 17°30' E.
Lubango (Lobango), alt. 5900 ft.	14°50' S., 13°30' E.
Lucala River	8°30' to 9°40' S., 14°15' to 16°10' E.
Lucinda (Lucinje)	12°30' S., 13°55' E.
Lufize River (Lefuje R.)	12°15' to 12°55' S., 22°55' to 23°30' E.
Luiana River (Lujana R.)	16°55' to 17°30' S., 21°45' to 23°15' E.
Luimbale	12°15' S., 15°20' E.
Lunda, Province between Congo Province and Belgian Congo	
Luvando	14°10' S., 14°40' E.
Maconge (Maconjo, Makonjo)	15° S., 13°10' E.
Macolu, near Bembe	
Macuju Pan (Makuju)	16°25' S., 18°45' E.
Maiombo River	15° S., 12°30' E.
Malange (Malanje)	9°35' S., 16°20' E.
Marimba	8°20' S., 17° E.
Matungue River	15°50' S., 17°40' E.
Mbale, Rio (Umbale R.)	15° 5' S., 16°45' E.
Mombolo (see Namba)	
Mombola region	About 11° to 12° S., 14° to 15° E.

Monte Victoria Verdun	12° 5' S., 15° E.
Monte Moco (Moko, Moku)	12°30' S., 15°10' E.
Marro des Cruces, Luanda District	
Mossamedes	15°10' S., 12°10' E.
“ , 101 km. E.	14°55' S., 13° E.
“ , 70 km. N.	14°30' S., 12°15' E.
Mucoti Mountains (Mukoti)	14°10' S., 16° E.
Mucungu (Mucungo)	14°50' S., 12°25' E.
Muleke, native village in valley of Cutato R.	
Mulondo (Mulando)	15°40' S., 15°10' E.
Munhino	14°55' S., 13° E.
Mupa	16° 5' S., 15°55' E.
Mupanda (also Ompana, Kuanyama)	17° 5' S., 15°45' E.
Mupopo, on Cului River	
Mussumba, country of Muata Yambo, eastern Lunda Province	
Namba (Mombolo)	11°35' S., 14°25' E.
Naulila	17°10' S., 14°50' E.
Ndala Tando (see Dala Tando)	
Ndongo, Benguela District	
Ngara (N'Gara)	11°15' S., 14° 5' E.
Nova Lisboa (Huambo)	12°45' S., 15°45' E.
Novo Redondo	11°10' S., 13°50' E.
Nyemba	About 14°50' S., 15°50' E.
Okovango River (see Cubango R.)	
Ompanda (see Mupanda)	
Osi River (Oci)	About 14°50' S., 15°50' E.
Otjipahe, Huila District	
Otjipompenima, near Humbe	
Otjipungo (see Quipungo)	
Pedras Negras (see Pungo Andongo)	
Pedreira, Bihé District (Pedroera)	12° 1' S., 17° E.
Pico [do] Azevedo	15°25' S., 12°30' E.
Ponanghuma, near Donguena	
Pungo Andongo (also Pedras Negras), alt. 1200 m.	9°40' S., 15°40' E.
Quanza River (see Cuanza R.)	
Queta (Alto Queta)	9°20' S., 14°40' E.
Quibula (Chibula)	12°15' S., 14°40' E.
Quilengues (Quillengues, Fort Quilengues, Killengues)	14° 5' S., 14° 5' E.
Quindumbo, Benguela District (Chindumbo)	12°30' S., 15° 5' E.
Quipampala, near Ambriz	About 7°50' S., 13° 5' E.
Quipungo (also Otjipungo)	14°50' S., 14°35' E.
Quirimbo, alt. 300 m.	10°35' S., 14°10' E.
Quissama	13° S., 15° E.
Quissange	12°30' S., 14° 5' E.
Quissongo (Quiçongo, Quissango)	10° S., 15°10' E.
Quiteve	16° S., 15°10' E.
Rua Cana Falls	17°20' S., 14°40' E.
Sacandica	5°55' S., 16° 5' E.
Sanguave (Sangevé)	13°50' S., 15°55' E.
Sansamande, near Pungo Andongo	
Santa Amara, near Huambo	
Serra de Seles, Coastal range inland from Nova Redondo	
Serra de Chela, “ “ “ “ Mossamedes	
Silva Porto (Bihé)	12°20' S., 17° E.
Suppe, near Huila	
Tala Kilau, near Donguena, alt. 3000 ft.	
Tumbolé River (tributary of Cutato R.) 40 km. E.	
Vila da Ponte	14°35' S., 16°35' E.
Tunda, Quanza District = Funda	8°50' S., 12°40' E.
Tyihumbwe (see Chiumbe)	
Tyimpolo (see Chimporo)	
Umpata (see Humpata)	
Usolo River, north of Huambo	About 12° S., 15°45' E.
Vila Arriaga	14°45' S., 13°20' E.
Vila da Ponte (see also Cubango, Kubango, Kawanga)	14°25' S., 16°15' E.
Vila Teixeira da Silva (Bailundo)	12°10' S., 15°50' E.

FAUNAL CONSIDERATIONS

The Colony of Angola (excluding the province of Cabinda, north of the Congo River) is extremely interesting faunally. The West African Subregion (Compare Chapin, J. P., "Birds of the Belgian Congo," part I, Bull. Amer. Mus. Nat. Hist., LXV, pp. 85-93) roughly includes the northern third of Angola and is represented chiefly by the South Congo Savanna District, with several patches of rain forest, and gallery forest along the rivers. The southern two-thirds of the colony are primarily of the East-South African Subregion. The interior plateau, north of about 16° south, belongs to the Rhodesian Highland District, and the rest of the colony, west of the Cubango River along the southern border, and the coastal region, west of the coastal range belongs to the Southwestern Arid District.

None of the Museum's collections were made in the part of the colony that is unequivocally in the West African Subregion, but representatives of this fauna occur in suitable habitats (Pl. XIV) some distance outside of their typical districts as far south as Chitau, Caconda, Bailundo, and Hanha.

Characteristic West African mammals found in Angola are the following:

<i>Potomogale</i>	River Shrew
<i>Myonycteris</i>	Dwarf Fruit Bat
<i>Cercopithecus talapoin</i>	Dwarf Guenon Monkey
<i>Colobus</i>	Guereza Monkey
<i>Mungos ansorgei</i>	Mongoose
<i>Galeriscus nigripes</i>	Mongoose
<i>Anomalurus</i>	"Flying Squirrel"
<i>Protoxerus</i>	Giant Squirrel
<i>Funisciurus pyrrhopus</i>	Red-legged Squirrel
<i>Claviglis monardi</i>	Large Gray Dormouse
<i>Lophuromys</i>	Red-bellied Mouse
<i>Oenomys</i>	Yellow-bellied Mouse
<i>Hylomyscus</i>	Climbing Wood Mouse
<i>Pelomys campanae</i>	Creek Rat
<i>Grammomys surdaster</i>	Thicket Rat
<i>Loxodonta africana cyclotis</i>	West African Elephant
<i>Cephalophus sylvicultrix</i>	Yellow-backed Duiker
<i>Syncerus caffer nanus</i>	Bush Cow

Records of these species are shown on a map, figure 2.

Animals of the East-South African Subregion which occur in Angola, constitute a

large part of the fauna. Characteristic examples are:

<i>Elephantulus</i>	Elephant Shrew
<i>Nasilio</i>	Elephant Shrew
<i>Pipistrellus rüppellii</i>	White-bellied Pipistrelle Bat
<i>Cercopithecus aethiops</i>	Black-faced Guenon
<i>Ictonyx</i>	African Skunk
<i>Poecilogale</i>	African Striped Weasel
<i>Lycaon</i>	Hunting Dog
<i>Otocyon</i>	Big-eared Fox
<i>Canis (Thos) mesomelas</i>	Black-backed Jackal
<i>Helogale</i>	Dwarf Mongoose
<i>Proteles</i>	Aard-wolf
<i>Crocuta</i>	Spotted Hyaena
<i>Acinonyx</i>	Cheeta
<i>Lynx caracal</i>	Caracal
<i>Smutsia temminckii</i>	Giant Pangolin
<i>Paraxerus</i>	Bush Squirrel
<i>Pedetes</i>	Springhaas
<i>Tatera</i>	Gerbil
<i>Steatomys</i>	Fat Mouse
<i>Lemniscomys griselda</i>	One-striped Grass Mouse
<i>Rhabdomys pumilio</i>	Four-striped Grass Mouse
<i>Procavia</i>	Cape Hyrax
<i>Phacochoerus</i>	Wart Hog
<i>Girafa</i>	Giraffe
<i>Alcelaphus</i>	Hartebeest
<i>Gorgon</i>	Brindled Gnu
<i>Ourebia</i>	Oribi
<i>Raphicerus</i>	Steinbok
<i>Kobus</i>	Water Buck
<i>Redunca</i>	Reed Buck
<i>Aepyceros</i>	Impalla
<i>Hippotragus niger</i>	Sable Antelope
<i>Strepsiceros</i>	Koodoo
<i>Diceros</i>	Rhinoceros
<i>Equus</i>	Zebra

Localities from which these are recorded are shown in figure 2.

Species characteristic of the Rhodesian Highland District (see Pls. XV, XVI) of the East-South African Subregion are:

<i>Paracynictis selousi</i>	Selous Mierkat
<i>Onotragus leche</i>	Lechwe
<i>Adenota vardoni</i>	Puku
<i>Limnotragus selousi</i>	Sitatunga

Certain mammals of Angola are typical of the Southwestern Arid District (see Pl. XVII):

<i>Cynictis</i>	Mierkat
<i>Hyaena brunnea</i>	Brown Hyaena
<i>Geosciurus</i>	Cape Ground Squirrel
<i>Malacothrix</i>	Mouse Gerbil
<i>Petromyscus</i>	Rock Mouse
<i>Rhabdomys bechuanae</i>	Desert Striped Mouse

<i>Oryx gazella</i>	Gemsbok
<i>Antidorcas marsupialis</i>	Springbok
<i>Rhynchotragus damarensis</i>	Dikdik
<i>Damaliscus lunatus</i>	Sassaby
<i>Equus hartmanni</i>	Hartmann Zebra

Records of these mammals are shown on map, figure 3.

Finally, species or distinct races appear to be restricted to the Angolan plateau, which may be considered a subdistrict of the Rhodesian:

<i>Plerotes anchietae</i>	Anchieta Fruit Bat
<i>Eptesicus flavescens</i>	Serotine Bat

<i>Claviglis angolensis</i>	Angolan Dormouse
<i>Dendromus ansorgei</i>	Yellow Tree Mouse
<i>Steatomys bocagei</i>	Fat Mouse
<i>Steatomys angolensis</i>	Fat Mouse
<i>Steatomys minutus</i>	Dwarf Fat Mouse
<i>Aethomys thomasi</i>	African Rat
<i>Aethomys avunculus</i>	African Rat
<i>Myomys angolensis</i>	Meadow Rat
<i>Otomys cuanzensis</i>	Swamp Rat
<i>Cryptomys mechowii</i>	Mole Rat
<i>Hippotragus niger variani</i>	Giant Sable Antelope
<i>Aepyceros melampus petersi</i>	Peters' Impalla

Localities from which these are recorded are shown in figure 4.

KEY TO ORDERS OF ANGOLAN MAMMALS

The land mammals of Angola represent twelve orders. Two of these orders, the Tubulidentata and the Hyracoidea, are now restricted to the Ethiopian region or the immediately neighboring Asia Minor.

The following brief definition of each of these major groups is made with Angolan mammals in mind, and is not intended to be complete.

WITH CLAWS OR NAILS:

- ORDER INSECTIVORA.—Small, five-toed mammals, with face pointed. Front teeth sharply pointed, cheek-teeth with cusps and crests forming V- or W-patterns. (For skulls, see Figs. 5-7.) Jumping shrews, hedgehogs, river shrews, golden moles, and shrews belonging to this group are found in Angola. p. 16.
- ORDER CHIROPTERA.—Small, winged mammals. Teeth as in the Insectivora or molars without pattern. (For skulls, see Figs. 8-12.) Fruit bats or flying foxes, and insectivorous bats of several families. p. 27.
- ORDER PRIMATES.—Medium-sized to rather large mammals, with flat nails, at least on several fingers and toes. First digit of fore or hind feet, or both opposable (thumb a vestige in *Colobus*). Skull with orbit enclosed by bony ring. Cheek-teeth usually with two, four, or five tubercles, adapted for crushing. Lemurs, monkeys, apes and man. p. 61.
- ORDER NOMARTHRA.—Scaled mammals, without teeth. Skull with facial portion lengthened. Scaly anteaters or pangolins. p. 123.
- ORDER LAGOMORPHA.—Short-tailed, moderately small mammals, with the ears long as the head or longer. Skull with supraorbital processes and with vacuities on sides of rostrum. Incisor teeth $\frac{2-2}{1-1}$, no canine; cheek-teeth $\frac{6}{5}$, separated widely from the incisors. (See Fig. 33.) Rabbits and hares. p. 121.
- ORDER RODENTIA.—Small to medium-sized mammals. Incisors $\frac{1-1}{1-1}$; no canine; cheek-teeth $\frac{5-4, \text{ or } 3}{4 \text{ or } 3}$, separated widely from incisors. Condyles of lower jaw slide back and forward in longitudinal glenoid fossae in the skull. (See Figs. 14-32.) Squirrels, dormice, mice and rats, mole rats or blesmols, springhaas, cane rats and porcupines are found in Angola. p. 68.
- ORDER CARNIVORA.—Medium-sized to large mammals. Incisors small, canine teeth large, cheek-teeth shearing. Skull with postorbital process, but orbit usually incomplete. (See Figs. 34-36.) Genets and civets, mongooses and meerkats, aardwolf, hyaenas, cats, ratel, muishonds, and dogs represent this order in Angola. p. 124.

WITH HOOF, OR HOOF-LIKE CLAWS:

- ORDER TUBULIDENTATA.—Moderately large mammals, poorly covered with hair. Face and ears long. No incisor or canine teeth; the cheek-teeth usually $\frac{6}{5}$, without enamel, composed of many columns of dentine, and ever-growing. Aardvark or ant bear. p. 124.
- ORDER PROBOSCIDEA.—Very large, five-toed mammals with pillar-like legs and a trunk, and nearly naked. Cheek-teeth $\frac{6-6}{6-6}$, only one at a time fully in use and with transverse, lozenge-shaped ridges. Elephant. p. 147.
- ORDER HYRACOIDEA.—Medium-sized, rodent-like mammals, with vestigial tail. Toes 5-4, the outer ones small in the fore foot. Incisor teeth $\frac{1-1}{2-2}$; canines absent; cheek-teeth $\frac{7-7}{7-7}$ when all present, modified for grinding, the upper ones with II-shaped crests. Conies or dassies. p. 146.
- ORDER PERISSODACTYLA.—Large mammals, with the central toe in each foot the main or only one. Cheek-teeth separated from incisors by a diastema, high-crowned and with complicated II-pattern. Rhinoceros and zebras. p. 148.
- ORDER ARTIODACTYLA.—Large or medium-sized mammals, with two main toes in each foot (cloven-hoofed). Teeth variously developed: tubercular, transversely ridged, or with longitudinal, crescentic crests. Pigs, hippopotamus, giraffes, antelopes, and buffalo occur in Angola. p. 150.

ORDER INSECTIVORA

There are five families of insectivores found in Angola, which the following key may serve to characterize briefly.

- 1.—(a) Skull with zygomatic arches complete (Fig. 6).....2.
- (b) Skull with zygomatic arches incomplete (Fig. 5).....4.
- 2.—(a) Braincase relatively large. Hind feet and legs elongate; adapted for leaping.....
 ...MACROSCOLIDIDAE (p. 23).
- (b) Braincase small. Both fore and hind limbs short.....3.
- 3.—(a) Molar teeth broad; cusps of M^{1-2} form a W-pattern. Pelage of stout quills and coarse hairs.
 ERINACEIDAE (p. 17).
- (b) Molar teeth very narrow; cusps of M^{1-2} form V-pattern. Pelage fine, soft.....
 ...CHRYSOCHLORIDAE (p. 16).
- 4.—(a) Size larger (head and body more than 280 mm.; skull length more than 60 mm.). Cusps of M^{1-2} form a V-pattern.....
 POTAMOGALIDAE (p. 16).
- (b) Size smaller (head and body less than 100 mm.; skull length less than 40 mm.). Cusps of M^{1-2} form a W-pattern.....
 SORICIDAE (p. 17).

POTAMOGALIDAE

POTAMOGALE DU CHAILLU

Potamogale DU CHAILLU, 1860 (Nov.), Proc. Boston Soc. Nat. Hist., VII, p. 363. Genotype: *Cynogale velox* Du Chaillu (monotypy).

The single known species of this genus ranges throughout the rain-forest region of Western Africa.

Potomogale velox (Du Chaillu)

Cynogale velox DU CHAILLU, 1860 (Nov.), Proc. Boston Soc. Nat. Hist., VII, pp. 361-363. Type locality: Gaboon. The type is in the British Museum.

Bayonia velox (Du Chaillu). Bocage, 1865.

The Vernay Angola Expedition obtained three native skins without skulls at Chitau. *P. velox* has been recorded from Duque de Bragança (Bocage, 1865); Rio Côle, a

tributary of the Lucala (Peters, 1881); Caconda (Bocage, 1882); Ambaca (Bocage, 1889); near Loanda in Serra de Seles (Seabra, 1905). The species is probably found in the streams throughout northern Angola.

EXTERNAL CHARACTERS.—Pelage short, otter-like; underfur dense, downy; guard hairs shiny and moderately stiff. Tail long and compressed; base furred, distal end with short adpressed hairs. Hind foot with digits II and III united almost to ends. Postaxial border of hind foot with a wide cutaneous fold.

COLORATION.—Upperparts near Clove Brown; underfur and underparts whitish. Lateral sides of limbs like the back; dorsal sides of feet and hands paler brown.

SKULL.—(From Congo specimens.) Skull long and slender, much like that of a large shrew. Interorbital constriction slightly wider than rostrum behind I^2 (about 9.8), elongate. Infraorbital canal wide, rounded. Zygomatic arches incomplete. Ptergoids bent medially at their posterior ends, almost meeting under the nasopharynx. Tympanic a ring; the angular bulla, formed apparently by the basisphenoid.

DENTITION.—First upper incisor large, triangular in section; the next four teeth arrowhead-like. Last premolar nearly molariform. M^{1-2} V-shaped, paracone and metacone very slightly separated.

CHRYSOCHLORIDAE

Chrysochloris LACÉPÈDE, 1799, "Tableau des Mammifères," VII, p. 158. Genotype: *Talpa asiatica* Linnaeus.

Golden moles are found from Gaboon to the Cape of Good Hope and Mozambique, but are absent from the desert areas.

Chrysochloris leucorhina Huet

Chrysochloris leucorhina HUET, 1885, Nouv. Arch. Mus. Hist. Nat. Paris, (2) VIII, pp. 8-16, Pl. I. Type locality: "Gulf of Guinea," probably Gaboon. The type specimen is in the Paris Museum.

Chrysochloris albirostris Wagner. Peters, 1881.

The single specimen secured by Major von Mechow from Kuango (Cuango), in-

terior Angola, referred by Peters (1881) to *C. albirostris*, is the only record found of *Chrysochloris* in Angola. It is probable that the golden mole from Cuango is *C. leucorhina* rather than *C. albirostris* since specimens from Luluabourg, Belgian Congo, agree fairly well with Huet's description (*loc. cit.*). The faunal relationships between these two localities are close, while there is little in common faunally with Kafferland.

COLORATION.—Dark brown, slightly richer than Clove Brown, with a yellowish-white facial mask extending laterally almost to the ear. The latter emarginate in a broad angle medially above. Small nasal pad flesh-colored.

SKULL.—Skull short and broad. Temporal region with cellular walls. No vesicle in the temporal fossa.

DENTITION.— I_3^3 , C_1^1 , P_3^3 , M_3^3 = 40. I_2^2 separated from I_1^1 . P^4 - M^2 with basal medial cusp (protocone). Paracone and metacone not separate, represented by the chief medial cusp. Crowns of P^2 - M^2 very narrowly triangular.

ERINACEIDAE

ATELERIX POMEL

Atelerix POMEL, 1848 (Nov.), Arch. Sci. Phys. Nat. Bibliothèque Univ. Genève, IX, p. 251 (named as a subgenus of *Erinaceus*). Genotype: *Erinaceus pruneri* Wagner (see Allen, 1922, pp. 9-13).

Atelerix occurs throughout Africa; the species occurring in Angola is a South African form.

Atelerix frontalis angolae (Thomas)

Aethechinus angolae THOMAS, 1918 (March), Ann. Mag. Nat. Hist., (9) I, p. 230. Type locality: Benguela, Angola. The type specimen is in the British Museum.

Erinaceus frontalis. Jentink, 1887.

Erinaceus diadematus. Bocage, 1889.

The Phipps-Bradley Expedition collected 4 specimens of *A. f. angolae*: Lu-vando, 3 (including 2 young); Humpata, 1. *A. f. angolae* is reported from Huila (Bocage, 1889), in addition to the localities given above.

COLORATION.—Quills basally near Fuscous, followed by a wide band of white then by one of Fuscous-Black, tipped with

whitish or pale brownish; scattered quills entirely white. A broad, irregular band of white on the forehead along the sides, below the quills. Most of the anterior underparts white, connecting irregularly with the white of the sides below the ear and behind the fore leg. Muzzle, cheeks, areas on the sides, part of belly, and limbs, Fuscous-Black (about 15''i), with a sprinkling of white hairs.

The young are nearly naked except for the quills, which are Hair Brown and white.

SKULL.—Skull broad and flattened, with rostrum heavy, braincase small, and zygomatic arches widely spreading. Palatine vacuities large. A deep pit in the basisphenoid. Auditory bullae incomplete, formed apparently by the basisphenoid.

DENTITION.— I_3^3 , C_1^1 , P_3^3 , M_3^3 . Second upper premolar (P^3) minute. M^{1-2} with a W-pattern.

MEASUREMENTS.—See table, p. 165.

The specimens in the American Museum are larger than the type, with slightly larger teeth.

SORICIDAE

There are two genera of shrews known to occur in Angola.

- (a) Upper unicuspid teeth 4; tail short-haired, without long bristle-like hairs..... *Sylvisorex* (p. 17).
- (b) Upper unicuspid teeth 3; (Fig. 5) tail with bristle-hairs, at least at the base..... *Crocidura* (p. 18).

SYLVISOREX THOMAS

Sylvisorex THOMAS, 1904 (Nov.), Abstr. Proc. Zool. Soc. London, No. 10, p. 12; 1905, Proc. Zool. Soc. London, II, p. 190. Genotype: *Crocidura morio* Gray. (Characters are given in the key to the Soricidae.)

Sylvisorex is a Central African genus, being found from the Sudan to Angola and Tanganyika Territory.

Sylvisorex angolensis Roberts

Sylvisorex angolensis ROBERTS, 1929 (July), Ann. Transvaal Mus., XIII, p. 84. Type locality: Mombolo (Namba), Angola. The type specimen is in the Transvaal Museum, Pretoria.

This species is known at present only from the original description, which is here condensed.

EXTERNAL CHARACTERS.—Small. Tail longer than head and body, nearly naked, prehensile.

COLORATION.—Upperparts near Sepia. Throat and chest whitish. Inner two toes on fore and hind feet paler than outer toes.

DENTITION.—Posterior cusp of I¹ about half height of I². I³ and first premolar about half the height of canine.

MEASUREMENTS.—See table, p. 165.

CROCIDURA WAGLER

Crocidura WAGLER, 1832, Oken's Isis, p. 275. Genotype: *Sorex leucodon* Hermann.

A number of species of *Crocidura* are recorded from Angola. The following key, partly based on Dollman (1915, Ann. Mag. Nat. Hist., (8) XV, pp. 507–527; XVI, pp. 66–80, 124–146, 357–380, 506–514; 1916, idem, XVII, pp. 188–209) may serve to differentiate these shrews.

This genus has a very wide range, including Europe, Africa, and Asia.

- 1.—(a) Size large (head and body more than 100 mm.; condylo-incisive length of skull more than 26 mm.).....2.
- (b) Size moderate (head and body 68 to 110 mm., condylo-incisive length of skull 18 to 26 mm.).....4.
- (c) Size small (head and body less than 68 mm., condylo-incisive length of skull less than 18 mm.)...*C. bicolor* (p. 22).
- 2.—(a) Upper tooth-row more than 14 mm. Darker, near Mummy Brown above.....*C. o. herero* (p. 19).
- (b) Upper tooth-row less than 14 mm. Paler than Mummy Brown.....3.
- 3.—(a) Tail short, less than 65 mm. Underparts yellowish gray.....*C. o. anchietae* (p. 19).
- (b) Tail longer. Underparts darker than Mouse Gray.....*C. o. occidentalis* (p. 18).
- 4.—(a) Head and body more than 98 mm.; condylo-incisive length of skull more than 24 mm. Color pale grayish brown.....*C. luimbaleensis* (p. 19).
- (b) Head and body 80 to 98 mm.; condylo-incisive length of skull 20.5 to 24 mm.....5.
- (c) Head and body less than 80 mm.; condylo-incisive length of skull 20 mm. or less.....10.
- 5.—(a) Color blackish or blackish brown...6.
- (b) Color pale buffy or cinnamon.....8.
- (c) Color dull grayish brown.....*C. erica* (p. 20).
- 6.—(a) Caudal bristle-hairs present on basal three-fourths of tail.....7.
- (b) Caudal bristle-hairs few, restricted to

base of tail, which is nearly naked. Head and body about 80 mm.; condylo-incisive length of skull 20.5 to 22.5 mm.....*C. neavei* (p. 20).

- 7.—(a) Size larger (head and body usually more than 85 mm.; condylo-incisive length of skull usually more than 22.5 mm.) Caudal bristle-hairs numerous....*C. turba angolae* (p. 20).
- (b) Head and body about 82 mm.; condylo-incisive length of skull less than 22.0 mm. Caudal bristle-hairs fewer....*C. shortridgei* (p. 19).
- 8.—(a) Tail short (less than 40 mm.), whitish above and below. Hind foot about 12 mm. (c.u.). Tooth-row less than 9.5 mm.....*C. cuanzenensis* (p. 22).
- (b) Tail longer, colored like the body. Hind foot and tooth-row longer....9.
- 9.—(a) Color of upperparts cinnamon brown; underparts grayish....*C. hirta* (p. 21).
- (b) Upperparts pale grayish buff; underparts whitish.....*C. deserti* (p. 21).
- 10.—(a) Color blackish.....*C. nigricans* (p. 23).
- (b) Color pale grayish buff.....*C. chitauensis* (p. 22).

Crocidura occidentalis occidentalis (Pucheran)

Pachyura occidentalis PUCHERAN, 1855, Rev. Mag. Zool., (2) VII, p. 154. Type locality: Gaboon, Africa. The type specimen is in the Paris Museum.

Crocidura aequatorialis. Bocage, 1889.

This species has been recorded from Duque de Bragança by Bocage (1889), and probably occurs in northern Angola. No specimens were secured by the Angolan Expedition.

EXTERNAL CHARACTERS.—Tail long, more than two-thirds body length, with bristle-hairs fairly numerous on basal half; other hairs few and short.

COLORATION.—Upperparts (August), near Clove Brown, overlying Deep Neutral Gray. Underparts darker than Mouse Gray. In bleached pelage, according to Dollman (1915a); upperparts near Prout's Brown, paler on the flanks.

SKULL.—Skull elongate, with heavy rostrum and almost parallel-sided interorbital region. Interpterygoid fossa narrow (1.2 mm.). Palate extends behind M³ for more than the anteroposterior length of that tooth.

DENTITION.—Second upper incisor large. I³ and canine about equal in size.

MEASUREMENTS.—See table, p. 165.

***Crocidura occidentalis anchietae* Bocage**

Crocidura anchietae BOCAGE, 1889, Journ. Sci. Math. Phys. Nat., Lisbon, (2) I, p. 26. Type locality: Caconda, Angola. The types are in the Museu Bocage, Lisbon, and the British Museum.

This shrew is recorded only from the type locality, and was not secured by the expeditions of the American Museum. The following is based on the original description and Dollman's (1915b).

EXTERNAL CHARACTERS.—Tail shorter than in *occidentalis*, more coarsely haired.

COLORATION.—Dark reddish brown, paler on flanks and limbs. Underparts yellowish gray, the bases dark gray.

SKULL.—Elongate. Upper profile of facial portion slightly convex. Crests well developed. Mandible with deep horizontal ramus and high coronoid.

DENTITION.—Third upper incisor (I^3) about half size of I^2 , slightly larger than canine. Lower molars decrease in size rapidly from front to rear.

MEASUREMENTS.—See table, p. 165.

***Crocidura occidentalis herero* St. Leger**

Crocidura nyanzae herero ST. LEGER, 1932 (July), Ann. Mag. Nat. Hist., (10) X, p. 85. Type locality: Mbambi, Okavango River near junction with the Cuito, South West Africa. The type specimen is in the British Museum.

No specimens of this shrew were secured by the expeditions of the American Museum in Angola, but it is probably present along the Cubango River in the south-eastern region.

EXTERNAL CHARACTERS.—Much as in *C. o. occidentalis*, but feet more hairy.

COLORATION.—Near Mummy Brown above, Fuscous below. Hairs basally slaty gray.

SKULL.—Skull resembles that in *C. o. occidentalis*, but braincase broader, inter-orbital region tapering anteriorly and interptergoid fossa wider (1.4 mm.).

MEASUREMENTS.—See table, p. 166.

***Crocidura luimbalensis* Hill and Carter**

Crocidura luimbalensis HILL AND CARTER, 1937 (July), Amer. Mus. Novit., No. 937, pp. 1-2. Type locality: Luimbale, Angola. The type specimen is in the American Museum.

This species is known only from the type, collected by C. P. Chapman.

EXTERNAL CHARACTERS.—Ears relatively large. Tail about half length of head and body; its basal three-fourths with scattered long hairs. Lateral glands well marked, covered with short, dirty whitish hairs.

COLORATION.—New pelage (October): upperparts near Drab, faintly overlaid by Bister; underparts near Light Grayish Olive, sharply set off from color of upperparts on the sides.

Worn Pelage (molting): Upperparts slightly duller than Cinnamon-Buff; underparts brighter than Deep Olive-Buff. Feet pale. Tail, brownish above, dirty whitish below; "bristles" whitish.

SKULL.—Relatively massive. Inter-orbital region and rostrum broad. Greatest width at an angular ridge lateral to the petromastoid bones. Palate extends behind M^3 for more than the anteroposterior length of that tooth. Mandible heavy, with slender angular process.

DENTITION.—First upper incisor with "hook" nearly vertical, rather than procumbent. Third upper unicuspid slightly larger than second, but lower; the entire posterior side closely approximated to P^4 , separated by a slit-like space rather than a medial angular "bay." M^3 moderately developed. Lower unicuspid large.

MEASUREMENTS.—See table, p. 166.

REMARKS.—This species appears to be most closely related to *Crocidura beirae* Dollman.¹ The color is different from *beirae* (described as "sepia mottled with neutral gray," worn pelage "near raw umber"), the tail shorter, braincase narrower and shallower, and the teeth smaller.

***Crocidura shortridgei* St. Leger**

Crocidura shortridgei ST. LEGER, 1932 (July), Ann. Mag. Nat. Hist., (10) X, p. 84. Type locality: Popa Falls, West Caprivi, South West Africa. The type specimen is in the British Museum.

This shrew, as yet known only from the type locality, will probably be found to occur in the Cubango region in Angola.

EXTERNAL CHARACTERS.—Tail moderately long. Caudal bristle-hairs numerous, on basal two-thirds of tail.

¹ 1915b, Ann. Mag. Nat. Hist., (8) XVI, pp. 69-70.

COLORATION.—Upperparts near Mummy Brown slightly more brownish than usual in *C. t. angolae*. Underparts near Hair Brown.

SKULL AND DENTITION.—Smaller than in *C. t. angolae*, with narrower facial portion. Upper tooth row shorter.

MEASUREMENTS.—See table, p. 166.

Crocidura neavei Wroughton

Crocidura neavei WROUGHTON, 1907 (Mar.), Manchester Mem., LI, No. 5, p. 7. Type locality: Kafue River, Northern Rhodesia, alt. 4000 ft. The type specimen is in the British Museum.

A single specimen from Humpata appears to belong with this species. *C. neavei* has not been recorded from Angola previously.

EXTERNAL CHARACTERS.—Tail long, with only a few bristle-hairs at the base, covered with fine short hairs. Hind feet large. Rhinarium strongly bifid. Pelage (November) somewhat woolly in texture. Lateral glands well marked in males.

COLORATION.—Upperparts near Fuscous; underparts near Hair Brown. Many hairs with a silvery sheen. Upper sides of feet dark grayish.

SKULL.—Skull not very different from that of *C. t. angolae* but braincase slightly higher and narrower, and interpterygoid fossa constricted posteriorly rather than nearly parallel-sided.

DENTITION.—First upper incisor with posterior cusp well separated from I². M³ of moderate size.

MEASUREMENTS.—See table, p. 166.

As might be expected, this Angolan specimen does not agree precisely with the type of *neavei*. It is slightly paler, larger, with relatively higher braincase and larger teeth. The differences, however, are within the expected range of variation.

Crocidura turba angolae Dollman

Crocidura turba angolae DOLLMAN, 1915, Ann. Mag. Nat. Hist., (8) XV, p. 510; XVI, p. 136. Type locality: "Bailundu Country," Angola. The type specimen is in the British Museum.

Crocidura ansorgei DOLLMAN, 1915, Ann. Mag. Nat. Hist., (8) XV, p. 511; XVI, pp. 138–139. Type locality: Duque de Brangança, Angola. The type specimen is in the British Museum.

The American Museum has 23 specimens of this shrew from Angola: Chitau, 22;

Humpata, 1. *C. t. angolae* was previously known only from the original description. It probably occurs throughout central and southern Angola.

EXTERNAL CHARACTERS.—Tail short, with bristle-hairs very numerous on basal three-fourths. Pelage long, soft and fine.

COLORATION.—In the series from Chitau coloration varies from almost black with purple iridescence to near Mummy Brown. Underparts paler, more grayish; there may be a grayish streak down the mid-ventral line.

SKULL.—Skull elongate, braincase relatively high (height about 61 per cent of mastoid breadth). Well-marked lambdoidal and sagittal crests in old males. Palate extends behind M³ more than anteroposterior length of that tooth.

DENTITION.—Second and third unicuspid (I³ and C) about equal in size. Hinder margin of canine overlapped by anterior cusp of P⁴. M³ of moderate size.

REMARKS.—The great variation in coloration and tail length, exhibited by our series from Chitau, and the absence of distinguishing cranial characters, indicate that *C. ansorgei* is not more than an extreme individual of *C. t. angolae*.

MEASUREMENTS.—See table, p. 166.

Crocidura erica Dollman

Figure 5

Crocidura erica DOLLMAN, 1915, Ann. Mag. Nat. Hist., (8) XV, p. 514; XVI, pp. 145–146. Type locality: Pungo Andongo, Angola. The type specimen is in the British Museum.

The Vernay Angola Expedition secured 12 specimens of this species, at Hanha; 3 more were included in the Chapman collection, from Luimbale. In addition to the type, Dollman had a specimen from Benguela. *C. ansorgei* probably occurs throughout northern Angola.

EXTERNAL CHARACTERS.—Caudal bristle-hairs few in number; other hairs of tail short. Feet nearly naked.

COLORATION.—Dull, upperparts between Olive-Brown and Fuscous (May); near Chaetura Drab (October). Underparts only slightly paler, near Hair Brown. Tips of hairs with a silvery sheen.

SKULL.—Braincase moderately broad

and shallow (height about 55 per cent of mastoid breadth). Palate extends behind M^3 more than anteroposterior length of that tooth.

DENTITION.—Second upper unicuspid (I^3) about size of canine. Latter usually separated from P^4 . M^3 moderately large.

MEASUREMENTS.—See table, p. 167.

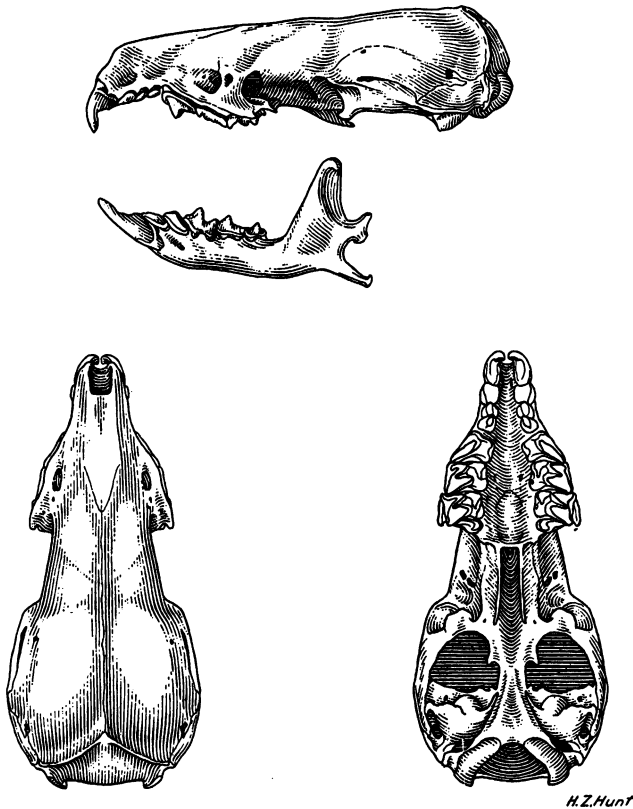
REMARKS.—These specimens compare closely with the type in the British Museum in coloration and proportions.

species by Bocage (1889). Dollman (1915b) reported a specimen from Angola, and Shortridge (1934) records specimens from the Kaokoveld, South West Africa.

COLORATION.—Upperparts cinnamon brown often with a banded appearance. A darker stripe on side of muzzle in front of eye. Underparts buffy gray, the hairs basally dark gray.

DENTITION.—Canine about size of I^3 .

MEASUREMENTS.—See table, p. 167.



A.M. 85565

Fig. 5. *Crocidura erica*, skull and mandible.

Crocidura hirta Peters

Crocidura hirta PETERS, 1852, "Reise nach Mossambique, Zool., I, Säugethiere," pp. 78-81, Pl. XVIII, fig. 2. Type locality: Tette, Mozambique. The type series is in the Berlin Museum.

Specimens from Caconda, Mossamedes, and Bihé were questionably referred to this

Crocidura deserti Schwann

Crocidura deserti SCHWANN, 1906 (June), Proc. Zool. Soc. London, I, p. 103. Type locality: Molopo, west of Morokwen, Bechuanaland. The type specimen is in the British Museum.

One specimen, with badly broken skull, from Capelongo, secured by the Vernay Angola Expedition, is referred to this

species. No other record is known for Angola, but *C. deserti* is reported from the Caprivi, South West Africa (Shortridge, 1934), and doubtless occurs in southeastern as well as south central Angola.

EXTERNAL CHARACTERS.—Tail short, about half the length of head and body; bristle-hairs numerous. Pelage soft and silky. Lateral glands distinct in male.

COLORATION.—Upperparts (July specimen from Capelongo) between Vinaceous-Buff and Avellaneous. Underparts whitish washed with Tilleul Buff. Feet and under side of tail whitish. A "mask" of near Wood Brown on the muzzle.

DENTITION.—Second and third unicuspid (I³ and C) about equal in size. Canine approximated to anterior side of P⁴; apex of canine about on a level with anterior cusp of P⁴.

MEASUREMENTS.—See table, p. 167.

REMARKS.—The Angola specimen described above compares closely with the type in the British Museum. The tail is slightly less hairy and the underparts less whitish in our specimen.

***Crocidura cuanzensis* Hill and Carter**

Crocidura cuanzensis HILL AND CARTER, 1937 (July), Amer. Mus. Novit. No. 937, pp. 2-3. Type locality: Chitau, alt. 4930 ft., Angola. The type specimen is in the American Museum.

This species is known from the type and a topotype, collected by the Vernay Angola Expedition (Mr. Herbert Lang).

EXTERNAL CHARACTERS.—Tail short, white, its "bristles" numerous, very fine and present nearly to the end. Lateral glands conspicuous.

COLORATION.—Upperparts near Wood Brown, overlying Slate Gray. Underparts and lower sides near Grayish Olive (the olive color may be stain although it is present in both specimens). Feet and tail sparsely covered with whitish hairs. Dorsal mystacial vibrissae blackish, ventral ones whitish.

SKULL.—Skull, although small, relatively broad and massive; rostral, interorbital, and mastoid breadths being as great as in *C. turba*. Palate extends a short distance behind M³, less than the greatest anteroposterior length of the latter. Interpterygoid region relatively broad.

DENTITION.—First upper incisor moderately recurved, with a poorly developed talon. Third upper unicuspid slightly smaller than second, about height of anterior cusp of P⁴. A large right-angled "bay" between canine and P⁴ on medial side.

MEASUREMENTS.—See table, p. 167.

***Crocidura chitauensis* Hill and Carter**

Crocidura chitauensis HILL AND CARTER, 1937 (July), Amer. Mus. Novit., No. 937, p. 3. Type locality: Chitau, alt. 4930 ft., Angola. The type is in the American Museum.

This species is known only from the type, collected by the Vernay Angola Expedition (Mr. Herbert Lang).

EXTERNAL CHARACTERS.—Feet small. Tail short, with extremely delicate "bristle-hairs" almost to tip. Pelage short, soft.

COLORATION.—Upperparts Fawn Color overlying Drab-Gray, Dark Neutral Gray of bases of the hairs showing through. Underparts Pale Olive-Gray, this color extending up on the sides and including limbs. Feet whitish. Tail bicolored, above near Hair Brown, below dirty whitish.

SKULL.—Skull about size of that in *C. jacksoni denti* but more slender in interorbital region and rostrum. Palate short, ending on a level with posterior margin of M³ (extending considerably behind this in most species). Interpterygoid region long, narrow. Braincase smaller, less rounded than in *C. j. denti*.

DENTITION.—First upper incisor with talon in contact with anterior side of first unicuspid. M³ shorter in longitudinal axis, larger in transverse axis than in *C. j. denti*.

MEASUREMENTS.—See table, p. 167.

Externally this form is much like *C. cuanzensis* in coloration and appearance. It is smaller, however, with shorter bicolored tail; the palate does not extend behind M³; the teeth are smaller. *C. chitauensis* is considerably darker than reported for *C. katharina*, the tail is shorter, but the cranial measurements are quite similar; possibly it may prove to be a race of *C. katharina*.

***Crocidura bicolor bicolor* Bocage**

Crocidura bicolor BOCAGE, 1889, Journ. Sci. Math. Phys. Nat., Lisbon, (2) 1, p. 29, Fig. 1.

Type locality: Gambos, Mossamedes District, Angola. The type is in the Museu Bocage, Lisbon.

Fourteen specimens of *C. b. bicolor* were secured in Angola: Chitau, 11; Capelongo, 3. It was previously reported from Caconda (Dollman, 1916) and from the type locality.

EXTERNAL CHARACTERS.—Tail more than half of head and body length, with numerous fine bristle-hairs on basal two-thirds.

COLORATION.—Upperparts (July and August) from near Hair Brown to slightly darker; underparts Smoke Gray or slightly paler. A February specimen from Chitau is Fuscous-Black above, silvery grayish below. Tail bicolored, upper side like back, under side pale.

SKULL.—Skull small, with narrow rostrum and broad braincase. Bony palate extends behind M^3 less than anteroposterior length of that tooth.

DENTITION.—Second and third unicuspid about equal. Anterior cusp of P^4 only a little more than half height of canine. M^3 relatively large.

MEASUREMENTS.—See table, p. 168.

Crocidura nigricans Bocage

Crocidura nigricans BOCAGE, 1889, Journ. Sci. Math. Phys. Nat., Lisbon, (2) I, p. 28. Type locality: Quindumbo, Angola. The type specimen is in the Museu Bocage, Lisbon.

This species was not collected by the Museum's expeditions to Angola, but has been reported from Mombola (Roberts, 1929). The following is based on Bocage's description (*loc. cit.*).

EXTERNAL CHARACTERS.—Ears relatively large, naked. Tail long, almost two-thirds the length of head and body.

COLORATION.—Upperparts are uniform brownish black. Below paler, with plumbeous bases. Tail blackish above, brownish below.

DENTITION.—First upper incisor with large posterior cusp. I^2 higher than posterior cusp of I^1 . I^3 half the size of I^2 and larger than canine. I_1 with small cusp in upper third of its posterior border.

MEASUREMENTS.—See table, p. 168.

MACROSCOLIDIDAE

There are two genera of elephant shrews recorded from Angola. They are quite similar, but may be distinguished by the number of teeth in the lower jaw.

- (a) Mandible with M_3 present (11 lower teeth). Auditory bullae with posterior chamber hardly more inflated than anterior. *Nasilio* (p. 23).
- (b) Mandible without M_3 (10 teeth). Auditory bullae with posterior chamber appreciably more inflated than anterior. *Elephantulus* (p. 24).

NASILIO THOMAS AND SCHWANN

Nasilio Thomas and Schwann, 1906 (June), Abstr. Proc. Zool. Soc. London, No. 33, p. 10; Proc. Zool. Soc. London, p. 578. Genotype: *Macroscelides brachyrhynchus* A. Smith.

Two races of *N. brachyrhyncha* are found in Angola.

- (a) Tail length less than 100 mm.; hind foot short (c.u.) 29 to 30.5 mm. *N. b. brachyura*.
- (b) Tail 100 to 120 mm.; hind foot (c.u.) 30 to 33 mm. *N. b. schinzi*.

Nasilio is found from Angola to the Transvaal and north to Uganda. Only the single species is known; local variants are hardly distinct enough for specific rank and are here considered as subspecies.

Nasilio brachyrhyncha brachyura (Bocage)

Figure 6

Macroscelides brachyura BOCAGE, 1882 (July), Journ. Sci. Math. Phys. Nat., Lisbon, (1) IX, p. 27. Type locality: Caconda, Angola. The type specimen is in the Museu Bocage, Lisbon.

The American Museum has a series of 177 specimens from Chitau, Angola. This race has been recorded from Quindumbo (Bocage, 1889) in addition to the type locality: Vila da Ponte, Tumbolê, Muleke, Rio Mbalê, and Caquindo, in the Cubango region (Monard, 1931).

EXTERNAL CHARACTERS.—Proboscis shorter and broader than in *Elephantulus*; ears and hind feet smaller. Tail shorter than head and body, rather than about the same length.

COLORATION.—General coloration changes markedly with the season. February pelage: back near Natal Brown, the basal Blackish Slate showing through.

Sides becoming near Buffy Brown with the underlying slaty color showing through clearly. August pelage: considerably paler, back between Fawn Color and Army Brown with light overlay and underlay of blackish. Sides becoming near Vinaceous-Buff. In both pelages the underparts are white, with basal slaty showing through; white under and in front of eye, rest of circumocular ring buffy; a small white tuft at base of ear; whitish upper lip, feet, and under side of tail. Upper side of tail near Fuscous or Fuscous Black.

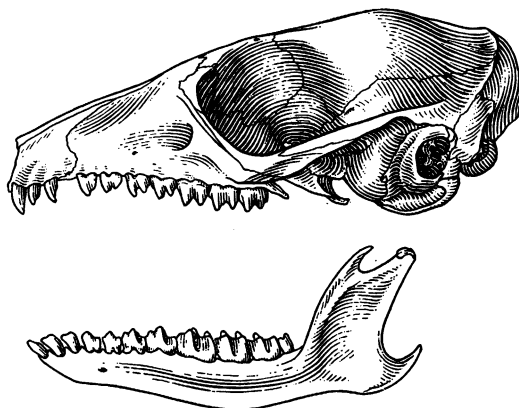
SKULL.—Rostrum long, slender; braincase large, swollen in cerebral and cerebellar region. Zygomata complete, widely

recorded specimens from Fort Quillenges (Quilengues).

EXTERNAL CHARACTERS.—Snout, tail, and hind foot longer than in *N. b. brachyura*. Mammae 2-1 = 6.

COLORATION.—November and December specimens: upperparts near Saccardo's umber, paler above and slightly more grayish than in *N. b. brachyura*. Upper side of tail decidedly paler than in that race. White circumocular ring almost complete, rather than restricted to under the eye. Underparts with a heavier overlay of white.

SKULL AND DENTITION.—Except for being slightly larger, skulls of *N. b. schinzi*



A.M. 85602

Fig. 6. *Nasilio brachyrhyncha brachyura*, skull and mandible.

spreading. Palate with large, variable fenestrations.

DENTITION.— I_3^3 , C_1^1 , P_4^4 , M_3^2 (rarely $\frac{3}{5}$) = 42 (or 44). P_2^2 - M_2^2 with four cusps. P_4 - M_2 , W-shaped; M_3 simple, pointed.

MEASUREMENTS.—See Table, p. 169.

***Nasilio brachyrhyncha schinzi* (Noack)**

Macroscelides brachyrhynchus, var. *schinzi* NOACK, 1889, Zool. Jahrb., Abt. Syst. Geog. Biol. Tiere, IV, p. 198. Type locality: Odongastamm, Ovamboland, South West Africa. The type specimen is in the Senckenberg Museum, Frankfurt.

The American Museum has 28 specimens of this jumping shrew from Humpata, Angola. Thomas and Wroughton (1905)

agree closely with those of *N. b. brachyura*.

MEASUREMENTS.—See table, p. 169.

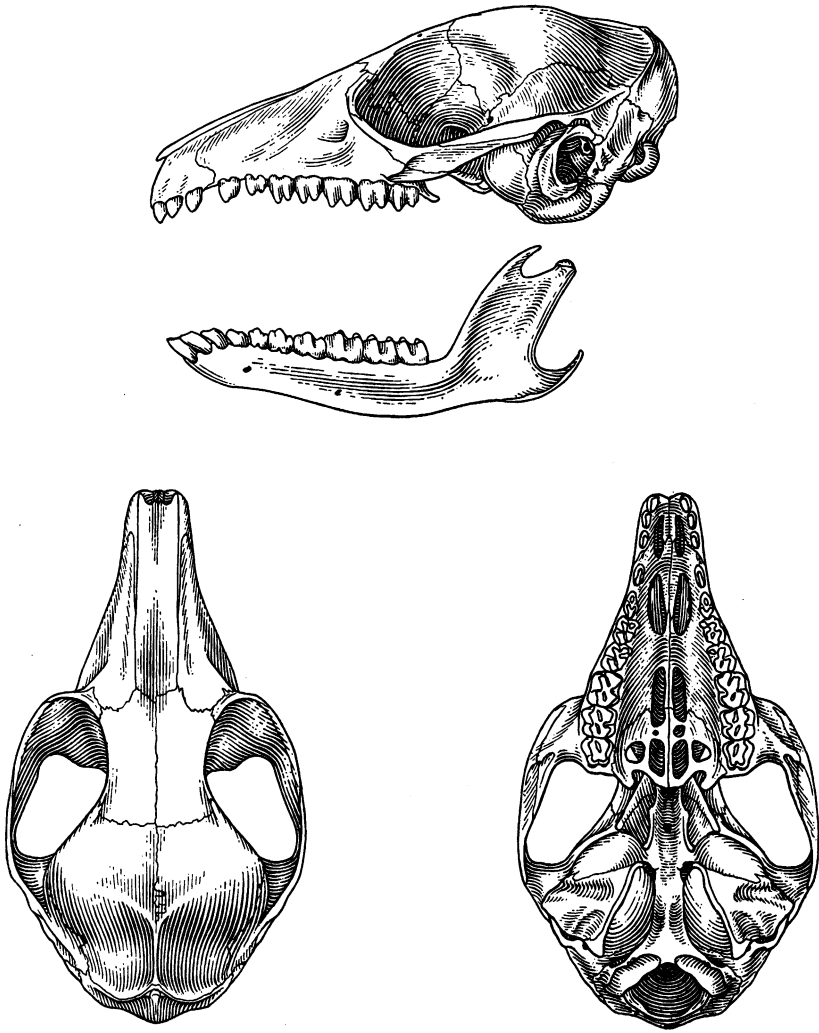
ELEPHANTULUS THOMAS AND SCHWANN

Elephantulus THOMAS AND SCHWANN, 1906 (June), Abstr. Proc. Zool. Soc. London, No. 33, p. 10; 1906, Proc. Zool. Soc. London, p. 577. Genotype: *Macroscelides rupestris* Smith.

Elephantulus occurs from Angola to Northern Cape Colony and north to Uganda.

Two races of *Elephantulus intufi* (Smith) occur in Angola:

- (a) Darker in general coloration; in July pelage, sides grayer than Pinkish Buff...
.....*E. i. alexandri*



A.M. 85656

H.Z. Hunt

Fig. 7. *Elephantulus intufi alexandri*, skull and mandible.

(b) Pale; in July pelage, sides near Cartridge Buff.....*E. i. mossamedensis*.

***Elephantulus intufi alexandri* (Ogilby)**

Figure 7

Macroscelides alexandri OGILBY, 1838, Proc. Zool. Soc. London, p. 5. Type locality: Damaraland, South West Africa. The type specimen is in the British Museum.

Macroscelides intufi. Peters, 1870.

Macroscelides rupestris. Bocage, 1889.

The American Museum has 72 specimens

from Angola: Hanha, 43; Caporolo, 6; Hanya R., 2; Humpata, 2; Mulondo, 18; Capelongo, 1. *Elephantulus i. alexandri* has been recorded from the following localities: Bibale and Capangombe (Peters, 1870), Suppe (Jentink, 1887); Benguela, Catumbela, and Quilengues (Bocage, 1889).

EXTERNAL CHARACTERS.—Externally quite like *Nasilio*, but proboscis longer, more slender, and ears larger.

COLORATION.—July specimens: upper-

parts near Cinnamon-Buffer, mixed with Pinkish Buff and black; sides near underparts becoming grayer than Pinkish Buff. Postauricular patch between Pinkish Cinnamon and Cinnamon-Buffer. May pelage: upperparts near Vinaceous-Buffer to near Cinnamon-Buffer mixed with blackish; sides becoming near Tilleul Buff to near Cream-Buffer. In both pelages, underparts white with Dark Plumbeous bases; feet, under side of base of tail, upper lip, prominent circumocular ring (usually interrupted above the eye), tuft of hairs at anterior bases of ears, and hairs on insides of ears, white.

SKULL.—Skull much like that of *Nasilio* but posterior chamber of auditory bullae considerably more inflated.

DENTITION.—As in *Nasilio* but M_3 absent.

MEASUREMENTS.—See table, p. 170.

***Elephantulus intufi mossamedensis* Hill and Carter**

Elephantulus intufi mossamedensis HILL AND CARTER, 1937, Amer. Mus. Novit. No. 937, p. 1. Type locality: 101 km. E. Mossamedes, Angola. The type specimen is in the American Museum.

This race is known only from the type locality, from which the American Museum has four specimens. These were collected by Mr. Herbert Lang, Vernay Angola Expedition.

COLORATION.—Back paler than Cinnamon-Buffer, more grayish, the individual hairs Plumbeous-Black basally, followed by a narrow band of Tilleul Buff, a band of blackish, then two bands of near Cinnamon-Buffer, separated by a blackish band. Toward the rump the bands become less distinct and paler, the light bands near Tilleul Buff. Naked rump patch bordered with numerous pure white hairs. Sides paler than back, becoming nearly Cartridge Buff next the white of the underparts. Postauricular patch near Cinnamon-Buffer. Underparts white, gray-based except around mammae in females; lips white; an extensive white circumocular ring and a white tuft at the anterior base of the ear-conch. Feet white. Underside of tail whitish to tip.

SKULL.—Agrees closely with that of *E. i. alexandri*.

MEASUREMENTS.—See table, p. 170.

FIELD NOTES.—All specimens "had fed on small black ants and termites." Number 85661 "has a gland on lower side of tail; when pressed from the sides there appears a fatty excretion in a series of little yellowish dots, equally large and an equal distance from each other." (H. Lang.)

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ORDER CHIROPTERA

The several revisions of this order by Dobson (1876) and Miller (1907), and that of the Megachiroptera by Andersen (1912), have been of invaluable assistance in the identification of the bats of Angola. Miller's careful and exhaustive treatment of the superspecific groups has been followed, with only minor exceptions.

The following key briefly characterizes the families of bats found in Angola.

- 1.—(a) Cheek-teeth simple, without definite cusp-patterns. Digit II of wing with three phalanges, relatively independent from digit III
SUBORDER MEGACHIROPTERA
PTEROPIDAE (p. 28).
- (b) Cheek-teeth with triturating cusps, forming a W-pattern in M^{1-2} . Digit II with only two phalanges, closely bound to digit III
SUBORDER MICROCHIROPTERA
2.
- 2.—(a) Skull with well-developed postorbital processes; premaxillae free, with palatal processes absent. Muzzle without fleshy growths; tail piercing uropatagium (interfemoral membrane) above; digit II of wing with metacarpal only, digit III with two phalanges
... EMBALLONURIDAE (p. 35).
- (b) Postorbital processes absent or rudimentary 3.
- 3.—(a) Premaxillae distinct, represented by palatal processes only. . . . 4.
- (b) Premaxillae united with maxillae. 5.
- 4.—(a) Nasals inflated; premaxillae incompletely ossified, strap-like, separated laterally from the maxillae. Muzzle with fleshy leaf-like processes; ear large, with tragus vestigial or absent. RHINOLOPHIDAE (p. 38).
- (b) Frontal region of skull flattened and depressed; nasals depressed medially; premaxillae well ossified, in contact laterally with the maxillae. Muzzle with a deep, elongate pit; ear large, tragus well developed. NYCTERIDAE (p. 36).
- 5.—(a) Palate widely emarginate between incisors, which are separated by a space; interorbital region of skull wide. Tail contained in large interfemoral membrane or only slightly longer; ears separated; tragus well developed. VESPERTILIONIDAE (p. 42).
- (b) Palate normal or slightly emarginate between incisors, which are close together; interorbital region narrow. Tail projecting beyond reduced interfemoral membrane; ears approximated or united above eyes; tragus small or absent. MOLOSSIDAE (p. 53).

SUBORDER MEGACHIROPTERA

PTEROPIDAE

The fruit bats of Angola belong to seven genera, which are briefly characterized by the following key.

- 1.—(a) Cheek-teeth $\frac{5}{5-6}$2.
 (b) Cheek-teeth $\frac{5}{5}$4.
 (c) Cheek-teeth $\frac{4}{5-6}$. Size small (forearm about 53 mm.; skull length 29.7 mm.). Tail absent. White tufts of hair before and behind ears. Interfemoral membranes rudimentary; "spurs" absent.....*Pterotes* (p. 30).
- 2.—(a) Basicranial axis of skull forming an angle with facial axis (a line drawn through bases of upper cheek-teeth usually passes above occipital condyle). Size larger (forearm more than 65 mm.).....3.
 (b) Alveolar line passes below or through occipital condyle. Size small (forearm 56 to 60 mm.; skull length 31 to 32 mm.).....*Myonycteris* (p. 30).
- 3.—(a) Tympanic bulla with well-developed, bony auditory meatus. Size large (forearm 110 to 132 mm.; skull length 54 to 62 mm.). Color yellowish.....*Eidolon* (p. 28).
 (b) No bony external auditory tube. Size smaller (forearm 72 to 100 mm.; skull length 42 to 46 mm.). Color blackish brown.....*Rousettus* (p. 28).
- 4.—(a) Rostrum of skull long (front of orbit to tip of nasals greater than palatal width across last molars). Size larger (forearm more than 75 mm.; skull longer than 38 mm.).....5.
 (b) Rostrum about equal in length to width of palate. Size small (forearm less than 55 mm.; skull shorter than 32 mm.).....*Micropteropus* (p. 35).
- 5.—(a) Skull with palate broad, flattened or arched. Fourth metacarpal shorter than fifth, in *E. dobsonii* considerably so.....*Epomops* (p. 31).
 (b) Palate more narrow, deeply depressed. Fourth metacarpal subequal to or longer than fifth.....*Epomophorus* (p. 33).

EIDOLON RAFINESQUE

Eidolon RAFINESQUE, 1815, "Analyse de la Nature," p. 54. Genotype: "*Pteropus à queue*" (= *Vespertilio vampyrus helvus* Kerr, 1792).

Eidolon occurs throughout Africa south of the Sahara, in Arabia, and in Madagascar.

Eidolon helvum (Kerr)

Vespertilio vampyrus helvus KERR, 1792, "Animal Kingdom," p. 91. Type locality: Senegal (designated by Andersen, 1908).

Pterocyon stramineus. Peters, 1872b.

Cynonycteris straminea. Bocage, 1889b.

Cynonycteris straminea. Bocage, 1892, 1898; Seabra, 1905.

The American Museum has no specimens of this species from Angola, but it has been recorded from the following localities: Benguela (Peters, 1872b); Rio Cuilo and Caconda (Bocage, 1889b); Lucinda (Seabra, 1905). *E. helvum* probably occurs in scattered localities throughout northern and central Angola.

EXTERNAL CHARACTERS.—Ears long, narrow, hairy basally. Wings large, naked except for an area from the elbow to the distal third of femur above and from the wrist to the knee below. Wing inserts on base of first digit of foot. Tail present, short, free from interfemoral membrane. Pelage short, closely adpressed to body, except in neck region.

COLORATION.—There is a difference in color between the sexes, as remarked by Thomas (1904b). Upperparts in females near Chamois, lightly overlaid by Tawny-Olive; underparts near Honey Yellow; neck with a "collar" of Yellow Ocher. Males have more Yellow Ocher above in the shoulder region; elsewhere above they have a heavy overlay of Mummy Brown. Underparts less heavily overlaid with Saccardo's Umber; "collar" richer in color than in the females. The membranes are between Clove Brown and Chaetura Black in both sexes.

SKULL.—Rostrum narrow, tapering, and fairly high; zygomatic arches widely spreading; postorbital processes strong. Temporal ridges separate, or united only in the cerebellar region, the area between them elevated. Front of orbit above middle or posterior part of M^1 . Postdental palate considerably wider than long, depressed medially but flattened. Tympanic bullae better ossified than usual in this family, with tubular auditory meatus.

DENTITION.— I_2^3 ; P_3^3 ; M_3^3 . First premolar and last molar above and below, reduced. Cheek-teeth with a medial furrow; outer ridge higher than medial one.

MEASUREMENTS.—See table, p. 171.

ROUSETTUS GRAY

Rousettus GRAY, 1821, London Med. Reposit., XV, p. 299. Genotype: *P[teropus] aegyptiacus* Geoffroy (original designation).

Rousettus is a wide-ranging genus, occurring throughout Africa, Southern Asia, and the New Guinea region.

Two species of *Rousettus* occur in Angola:

- (a) Four simple palatal ridges, three broken and curved. First lower premolar (P_2) much larger than a lower incisor. Basicranial axis forms an angle with facial axis (line joining bases of cheek-teeth passes through upper part of occipital condyle). Pelage short, reduced in middorsal region to narrow band. *R. aegyptiacus*
- (b) Three simple palatal ridges, four broken. P_2 subequal to a lower incisor. Basicranial axis nearly on same plane as facial axis. Pelage longer, more abundant on the back. *R. angolensis*

Rousettus aegyptiacus (Geoffroy)

Pteropus aegyptiacus E. GEOFFROY, 1810 (emended to *aegyptiacus*, 1818), Ann. Mus. Hist. Nat. Paris, XV, p. 96. Type locality: Lower Egypt, "one of the chambers of the Great Pyramid." The type specimen, mounted, is in the Paris Museum (Andersen, 1912).

Cynonycteris aegyptiaca, part. Bocage, 1889b.

Cynonycteris collaris. Bocage, 1892.

Rousettus collaris. Thomas, 1904a.

The Vernay Angola Expedition secured a single specimen of *R. aegyptiacus* at Hanha. It has been recorded from the following other localities: Pungo Andongo and Quindumbo (Bocage, 1889b, 1892). The specimen recorded by Thomas in the British Museum has been examined.

EXTERNAL CHARACTERS.—Ears narrow, naked except the base. Wings long, naked above; below, with woolly hairs between the wrist and knee; notopatagium naked. Wings insert between first and second digits. Legs thinly haired. Pelage short; nape of neck nearly naked; arms above and basal half of forearm haired. Face poorly clothed with hairs.

COLORATION.—Upperparts, except neck and naked areas, near Clove Brown. (This is darker than Andersen, 1912, indicates as typical for the species.) Underparts darker than Hair Brown. Nape of neck and hairs on under side of wings grayish. Membranes near Chaetura Drab, as are the ears and naked areas of the legs.

SKULL.—Rostrum heavy, a dorsal medial groove in its posterior portion. Zygomatic arches widely spreading. Interorbital

region wider than intertemporal. Braincase convex, basal axis deflected. Palate less broad than in *Eidolon*. Tympanic bulla without a tubular external meatus.

DENTITION.—As in *Eidolon*, but first upper premolar smaller, last molars, above and below, relatively larger. M_2 more than 75 per cent of M_1 . M^2 rather small. The specimen in the British Museum from Angola has a minute M^3 on both sides.

MEASUREMENTS.—See table, p. 171.

FIELD NOTES.—"Shot flying to banana flowers, not the fruit, which was still green." (Herbert Lang, Vernay Angola Expedition.)

Rousettus angolensis (Bocage)

Cynonycteris angolensis BOCAGE, 1898, Journ. Sci. Math. Phys. Nat., Lisbon, (2) V, pp. 133-135, 138, Fig. 1. Type locality: Pungo Andongo (restricted by Hollister, 1918). The type specimen is in the Museu Bocage, Lisbon.

Cynonycteris aegyptiaca, part. Bocage, 1889b.

Cynonycteris aegyptiaca. Bocage, 1892.

Rousettus angolensis. Troussart, 1904.

The American Museum has no specimens of this species, but it has been recorded from several places in Angola in addition to the type locality. Cahata and Quibula (Bocage, 1892, 1898); Congulu (St. Leger, 1936). The specimens in the British Museum have been examined. *R. angolensis* is probably rare throughout northern Angola, north of Mossamedes District.

EXTERNAL CHARACTERS.—Like *R. aegyptiacus* but pelage longer, more woolly; notopatagium covered with hair; limbs more hairy; interfemoral membrane with medial hairy band; no naked area on nape of neck; ears longer; wings shorter.

COLORATION.—"The hairs of the back and upper surface of the wings are brown, the color of tobacco; below, the head is of a slightly paler color, but the muzzle is darker. The neck and throat are pale brown, mixed with grayish; the color of the ventral side approaches that of the back, but is paler, grayish, medially." (Bocage, 1898, translation.)

SKULL.—Skull like that of *R. aegyptiacus* but basicranial axis little deflected; alveolar line passes through or below occipital

condyle as in *Epomophorus*. Supraoccipital region of skull flattened.

DENTITION.—Dental formula as in *R. aegyptiacus*, but greater spaces between canine, first premolar and second premolar, both above and below. Molariform teeth short and broad.

MEASUREMENTS.—See table, p. 171.

MYONYCTERIS MATSCHIE

Myonycteris MATSCHIE, 1899, "Fledermäuse Berliner Mus. Naturkunde, I, Megachiroptera," pp. 61, 63–64. Named as a subgenus of *Xantharpyia* [= *Rousettus*]. Genotype: *Cynonycteris torquata* Dobson, 1878.

Myonycteris occurs from Liberia to Angola and the upper Congo. *M. torquata* is known only from the lower Congo and Angola.

Myonycteris torquata (Dobson)

Cynonycteris torquata DOBSON, 1878 (June), "Catalogue of the Chiroptera," p. 76, Pl. v, fig. 1. Type locality: Angola. The type specimen is in the British Museum.

Xantharpyia (*Myonycteris*) *torquata*. MATSCHIE, 1899.

Rousettus (*Myonycteris*) *torquatus*. TROUSSART, 1904.

Myonycteris collaris, part. ANDERSEN, 1907.

The American Museum has no specimen of *M. torquata*, but the type of the species in the British Museum has been examined.

EXTERNAL CHARACTERS.—Ears short, reaching the eyes when pressed forward; antitragus distinct, triangular. Wings about as in *Rousettus*. Above, basal two-thirds of forearm, thigh, basal two-thirds of leg, notopatagium, and most of interfemoral membrane covered with hairs. Below, limbs and wings between elbow and thigh covered with woolly hairs.

COLORATION.—Upperparts near Prout's Brown, head paler (near Broccoli Brown). Underparts paler (near Hair Brown) except the ruff, which is bright reddish yellow.

SKULL.—Rostrum short, the distance from orbit to prosthion¹ about half the zygomatic breadth. Postorbital processes long, slender, directed posterolaterally. Orbit large, its front above posterior part of P⁴ or anterior part of M¹. Basicranial axis only slightly deflected.

¹ Prosthion—the most anterior point of premaxillary bone.

DENTITION.—As in *Rousettus*, but cheek-teeth shorter; last molars small, subequal in size to first premolars.

MEASUREMENTS.—See table, p. 171.

PLEROTES ANDERSEN

Plerotes ANDERSEN, 1910 (Jan.), Ann. Mag. Nat. Hist., (8) V, p. 97. Genotype: *Epomophorus anchietae* Seabra (monotypy).

Plerotes anchietae (Seabra)

Epomophorus anchietae SEABRA, 1900, Jorn. Sci. Math. Phys. Nat., Lisbon, (2) VI, pp. 116–117; (figure of palate, idem, V, Pl. 1). Type locality: Galanga, Angola. The type specimen is in the Museu Bocage, Lisbon.

Epomophorus, n. sp., Seabra, 1898b.

Plerotes anchietae, Andersen, 1910.

A specimen of this rare species was secured at Chitau, Angola, by the Pulitzer Angola Expedition of the Carnegie Museum, apparently the second specimen known. It is subadult, a male, skin and skull, the latter somewhat damaged. The following description is based on this specimen, except where certain details are unavailable from it.

EXTERNAL CHARACTERS AND MOUTH.—Ears small, narrow, with borders nearly parallel and tip rounded. Eyes large, situated nearer the ears than the nares. Wings moderately long, the metacarpals subequal and 68 per cent or more of the forearm in length. Wing membrane inserts to the end of first phalanx of second toe. Interfemoral membrane greatly reduced, less than 3 mm. wide; "spur" or calcar absent. Tail absent. Pelage long and fine, especially in the interfemoral region, extending on the forearm for the basal three-fourths, on the leg to the ankle. Base of pollex and upper side of prepatagium, except the anterior border, covered with hair; dorsal surface of wing between ankle and end of fifth metacarpal with scattered hairs. Below: prepatagium, area along the basal two-thirds of forearm, along flanks and leg covered with hair; distal half of interfemoral membrane naked.

A cheek-pouch on each side of the muzzle surrounds the eyes, according to Seabra (1900c). Palatal ridges extremely primitive in form; four are simple, convex

anteriorly: first runs between P^1 - P^1 ; second behind P^2 - P^2 ; third behind P^4 - P^4 ; fourth behind M^1 - M^1 . Four postdental ridges progressively closer together, slightly angular, and strongly denticulate (Seabra, 1900c; Andersen, 1912).

SKULL.—Braincase strongly deflected; the alveolar line passes above foramen magnum. Rostrum broad and moderately elongate. Postorbital processes weak, directed posterolaterally. Front of orbit some distance behind M^1 . Occiput low, flattened. Temporal ridges weak, widely separated. Palate broad, ovoid anteriorly, truncate behind; postdental region flattened. Pterygoids continued as low ridge to front of bullae. Bullae as in *Rousettus aegyptiacus*.

DENTITION.—Extraordinarily weak teeth; cheek-teeth linear. I_2^1 , C_1^1 , P_3^1 , M_{2or3}^1 .

MEASUREMENTS.—The species is so little known that the following measurements were taken in addition to the usual ones (see table, p. 172). Skull: length nasals, 7.2; length frontal, 14.1; length sagittal suture, 5.8; length palation to basion, 10.35; greatest length postdental palate, 6.7; front of orbit to tip of nasals, 9.1; width braincase above roots of zygomatics, 12.1; greatest height braincase, 8.4; lacrimal width, 7.5; width interpterygoid fossa, 3.8; width palate between P^4 - P^4 , 6.3; diameter orbit, 6.6. Mandible: length, 20.3; height between P_4 and M_1 , 1.3; height condyle, 3.6. Dentition: C_1 - M_2 , 9.2; P^3 , 1.6×0.7 ; P^4 , 1.8×0.75 ; M^1 , 1.4×0.7 ; P_4 , 1.5×0.7 ; M_1 , 1.4×0.65 ; M_2 , 1.0×0.5 .

EPOMOPS GRAY

Epomops GRAY, 1866, Proc. Zool. Soc. London, p. 65. Genotype: *Epomophorus franqueti* Tomes.

This genus is found in central Africa from Liberia to Angola and east as far as Lake Victoria. Two species of *Epomops* occur in Angola.

- (a) Four palatal ridges, one running between canines, one between each pair of cheek-teeth, followed by five or more irregular ridges. Skull shorter; zygomatic arches widely spreading (zygomatic breadth 56 to 58 per cent of skull length).....*E. franqueti* (p. 31).

- (b) Three palatal ridges: one, with ends bifurcate, between first two pair of cheek-teeth; the two postdental ridges thick, with free anterior edges, and bear papillae (these palatal folds leave ridges on the bony palate; opposite roots of zygomatics). Skull with rostrum long and slender; zygomatic arches narrowly spreading (zygomatic breadth about 50 per cent of skull length).....*E. dobsonii* (p. 33).

Epomops franqueti franqueti (Tomes)

Epomophorus franqueti TOMES, 1860, Proc. Zool. Soc. London, pp. 54-55, Pl. LXXV. Type locality: Gaboon. The type specimen is in the Paris Museum.

Epomophorus (Epomops) comptus. Matschie, 1899.

Epomophorus comptus. Seabra, 1909.

The American Museum has no specimens of *E. franqueti* from Angola, but it has been reported from Malange (Matschie, 1899) and from Mossamedes (Seabra, 1909). The species occurs from the Gold Coast to Angola and throughout the Congo region.

Specimens from Lukolela and Mistandunga, Belgian Congo, have formed the basis for the following description. The type specimen in Paris has been examined.

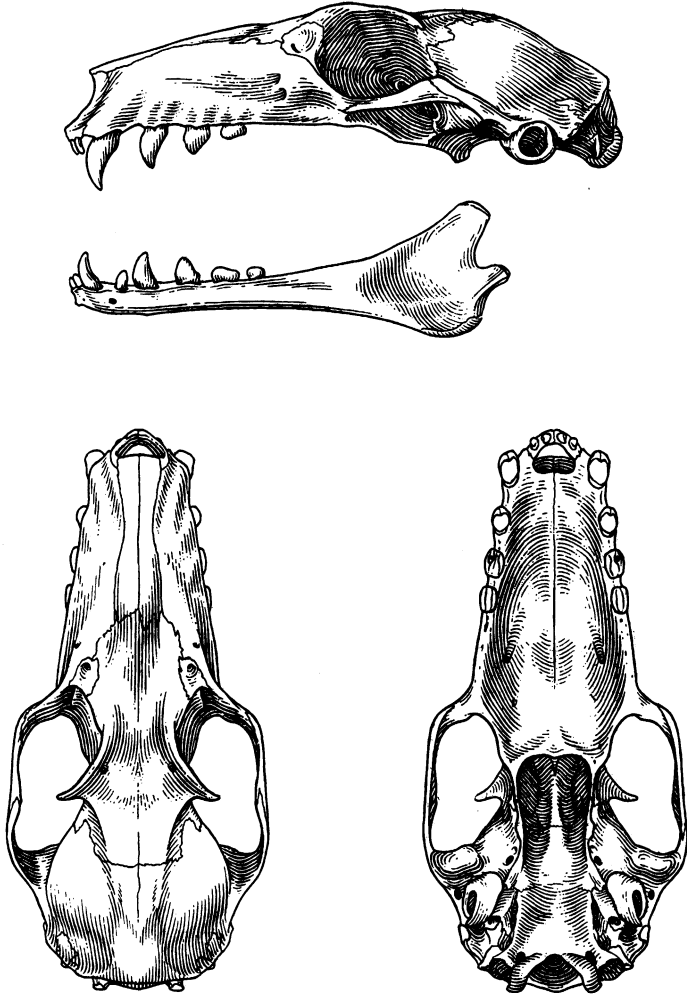
EXTERNAL CHARACTERS.—External nares prominent; lips large; eyes of moderate size, nearer the ears than the nares. Ears moderately large, naked except at the base; tips roundly pointed; lateral border slightly emarginate; antitragus minute, angular. Wings inserting to end of first phalanx of second toe; prepatagium including basal third of first phalanx of pollex. Fourth digit with metacarpal about twice the length of first phalanx. Pelage fine, woolly; leg above covered with hair almost to ankle; forearm furred above for its basal half or two-thirds, but only scantily beyond the basal third; below, leg and forearm less extensively furred. Upper surface of wing, including prepatagium, naked, except for narrow bands of hairs along the furred parts of the limbs, and a triangular area between knee, second digit, and margin of wing opposite knee. Under surface of prepatagium, margins of wing along forearm, flank and thigh scantily haired.

COLORATION.—Variable; the upperparts from near Wood Brown to near Clay Color, paler on the head and shoulders. Under-

parts from paler than Fuscous to near Avellaneous, with a large, roughly quadrangular area of white midventrally. Wings and ears near Benzo Brown or Fuscous.

SKULL.—Basicranial axis little deflected;

equal to its length). Pterygoid, with poorly developed, blunt hamulus, ends in an elevated swollen area opposite anterior third of bulla. Front of orbit just posterior to M¹. Temporal ridges unite in a low



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Fig. 8. *Epomops dobsonii*, skull and mandible.

alveolar line passes through occipital condyle. Rostrum broad and moderately short; orbit large; supraorbital crests raised, interorbital region strongly concave; zygomatic arches widely spreading. Braincase flattened. Palate broad and flat (least width of postdental palate about

sagittal crest in old males, but apparently they are separate in females.

DENTITION.—Incisors usually reduced to $\frac{1}{2}$, the lower ones bilobed; cheek-teeth $\frac{3}{5}$, evenly spaced, with a large diastema between canine and first upper premolar (P³). First lower premolar (P₂) slightly

larger than an incisor; lower teeth, except incisors, evenly spaced.

MEASUREMENTS.—See table, p. 172.

***Epomops dobsonii* (Bocage)**

Figure 8

Epomophorus dobsonii BOCAGE, 1889 (March), Journ. Sci. Math. Phys. Nat., Lisbon, (2) I, pp. 1-2, Fig. 1. Type locality: Quindumbo, Benguela District, Angola. The type specimen is in the Museu Bocage, Lisbon.

Epomops dobsoni. Andersen, 1912.

The American Museum has a series of 25 of these fruit bats, from Chitau, Angola. Of these 5 are adult males and 4 adult females. *E. dobsonii* has previously been recorded in Angola, in addition to the type locality, from: Hanha (Bocage, 1896); Galanga (Bocage, 1898); Kalongo, Bihé District (Thomas and Wroughton, 1905); near Bailundo (Andersen, 1912). It has also been found in Katanga Province, Belgian Congo, so that it probably occurs throughout central Angola.

EXTERNAL CHARACTERS.—Externally like *E. franqueti* but with fourth metacarpal less than twice the length of first phalanx, considerably shorter than fifth metacarpal. Pelage extends farther on forearm, above and below, and more abundantly on the wings and interfemoral membranes both above and below.

COLORATION.—In the 23 specimens taken in March there is a high degree of uniformity. Upperparts more grayish than Army Brown. Males have long white epaulettes; the throat is dark, near Fuscous; the belly is darker than Cinnamon-Drab, overlaid by pale gray. In females the shoulders and throat are covered with long grayish hairs, the belly with shorter ones with Fawn bases. In all, the wings, ears, and rhinarium are darker than Natal Brown. Two August examples are much paler and duller, near Wood Brown on head, fore limbs, and middle of the back; the rest of the upperparts, grayish Pinkish Buff. The underparts and wings are about as in the spring series.

SKULL.—Rostrum elongate, broad. Pre-maxillae do not taper dorsally. Zygomatic arches narrowly spreading, expanded dorsally and flattened from side to side near the middle. Interorbital region con-

cave, narrower than behind the postorbital processes. Braincase flattened. Palate strongly arched anteroposteriorly and from side to side, emarginate posteriorly. Hamulae of pterygoids large. Front of orbit considerably behind last cheek-tooth (M^1).

DENTITION.—Lateral upper incisor permanent. First upper premolar (P^3) caniniform, P^4 and M^1 close together, narrow and small, smaller than in other species of *Epomops* or *Epomophorus* of corresponding size.

MEASUREMENTS.—See table, p. 172.

This species combines characters of *Epomops* and *Epomophorus* which raises the question of the validity of the former genus.

EPOMOPHORUS BENNETT

Epomophorus BENNETT, 1835, Proc. Zool. Soc. London, pt. III, p. 149. Genotype: *Pteropus epomophorus* Bennett (= *Pteropus gambianus* Ogilby, 1835).

Epomophorus is externally similar to *Epomops*, but the posterior border of the palate is elevated, the region in front of this depressed. *Epomophorus* is found throughout the Ethiopian region, from Sennaar and Nigeria to the Cape of Good Hope. Two species of *Epomophorus* are known to occur in Angola:

- (a) Only one postdental palatal ridge, the fourth ridge running between second pair of cheek-teeth (P^4 - P^4), the fifth between M^1 - M^1 . Rostrum shorter (outside breadth across M^1 - M^1 in males more than 72 per cent of distance from front of orbit to tip of nasals, 82 per cent in females). Size smaller (forearm 77 to 87 mm. in males, 72 to 82 mm. in females; skull length 47 to 51 mm. in males, 43 to 49 mm. in females).....*E. w. haldemani*.
- (b) Two postdental palatal ridges, the fourth ridge between P^4 - P^4 , the fifth immediately behind M^1 - M^1 . Rostrum relatively much longer. Size larger (forearm 87 to 91 mm. in males, about 82.6 mm. in females; skull length 58.5 to 61.5 mm. in males).....*E. angolensis*.

(Data for key partly from Andersen, 1912.)

***Epomophorus wahlbergi haldemani* (Hallowell)**

Pteropus haldemani HALLOWELL, 1846, Proc. Acad. Nat. Sci. Phila., III, pp. 52-53. Type

locality: West Africa. The type specimen is in the Museum of the Academy of Natural Sciences of Philadelphia.

Epomophorus gambianus (not of Ogilby, 1835). Peters, 1865, 1872b; Gray, 1870; Dobson, 1876; Bocage, 1889b, 1898; Seabra, 1898b, 1905, 1909.

Epomophorus macrocephalus (?). Peters, 1870a.

Epomophorus zenkeri Matschie, 1899.

Epomophorus angolensis, part. Matschie, 1899.

Epomophorus sp. Thomas, 1904a.

The American Museum has 4 specimens of *E. w. haldemani* from Chitau, only one of these, however, is fully adult. Other localities in Angola from which specimens have been recorded are: Loanda (Peters, 1865); Benguela (Peters, 1872b); Caconda (Bocage, 1882); Ambaca, Pungo Andongo, Rio Cuila, and Quindumbo (Bocage, 1889); Quissange (Bocage, 1898); Duque de Bragança (Thomas, 1904a); Cubicula and Serra de Seles (Seabra, 1905); Mossamedes (Seabra, 1909). It probably occurs throughout Angola, and from here to the Cameroons and Tanganyika.

EXTERNAL CHARACTERS AND PALATE.—Externally very like *Epomops dobsonii* but fourth metacarpal subequal to fifth or slightly longer, and wings insert on basal half of first phalanx of second toe. The palatal ridges have been described above (p. 33).

COLORATION.—The adult female, taken in August, is very pale. Upperparts near Pinkish Buff; bases slightly darker; head and face with more Cinnamon. Underparts near Avellaneous. Wings and ears darker than Natal Brown. Immature females taken in March are Wood Brown above, the hairs whitish below the terminal band and with dark bases, between Buffy Brown and Natal Brown. Underparts between Avellaneous and Deep Olive-Buff (about 19''6).

SKULL.—Rostrum relatively short; slender. Interorbital region convex, supra-orbital crests high. Braincase flattened, especially posteriorly. A low, broad sagittal crest developed in old males. Front of orbit above posterior part of M¹. Palate arches from side to side; postdental palate long, markedly depressed just in

front of the raised posterior margin, which is nearly straight.

DENTITION.—Upper incisors terate, slightly recurved. Canine large, hook-like, flattened posteriorly. First upper premolar (P³) partly caniniform; P⁴ and M¹ large, with central groove and higher lateral ridge. Lower incisors bilobed. First lower premolar (P₂) small; P₃ caniniform but much broader than canine.

MEASUREMENTS.—See table, p. 172.

Epomophorus angolensis Gray

Epomophorus macrocephalus var. *angolensis* GRAY, 1870, "Catalogue of Monkeys, Lemurs, and Fruit-eating Bats," p. 125. Type locality: Benguela, Angola. The type specimen is in the British Museum.

Epomophorus macrocephalus (not of Ogilby, 1835). Peters, 1872b.

Epomophorus gambianus (not of Ogilby, 1835), part. Dobson, 1878.

Epomophorus angolensis. Matschie, 1899.

The Vernay Angola Expedition secured 2 immature specimens of *E. angolensis* at Hanha, and 1 at Chitau. This species has been recorded from Mûpa and Cubango by Monard (1933); its range probably includes most of the southwestern third of Angola; elsewhere it is known only from northern South West Africa.

EXTERNAL CHARACTERS AND PALATE.—Externally, except for the larger head in male specimens and slightly greater extent of pelage on the forearm, *E. angolensis* agrees with *E. w. haldemani*. Due to the lengthening of the facial portion, the fifth palatal ridge is placed posteriorly to last cheek-tooth (M¹), but otherwise the palate agrees with that in the other species.

COLORATION.—In May specimens: near Avellaneous dorsally, between Tilleul Buff and Pale Olive-Buff ventrally. Hairs on lower legs and adjacent parts of wings near Chamois. Wings pale, near Sepia mottled with dark lines above, corresponding to the pale lines below.

SKULL.—Rostrum elongate, slender (in males width across M¹–M¹, usually less than 66 per cent of the distance from front of orbit to tip of nasals). Postdental palate long (nearly equal to width across M¹–M¹). Zygomatic arches narrowly spreading. Braincase flattened, especially

occiput. Front of orbit situated some distance behind M^1 .

DENTITION.—As in *E. w. haldemani*.

MEASUREMENTS.—See table, p. 172.

MICROPTEROPUS MATSCHIE

Micropteropus MATSCHIE, 1899 (July), "Die Fledermäuse Berliner, Mus. für Naturk. I, Megachiroptera," p. 57. Named as a subgenus of *Epomophorus*. Genotype: *Epomophorus pusillus* Peters (by monotypy).

This genus is typically West African, being found along the west coast from Gambia to northern Angola.

Micropteropus pusillus (Peters)

Epomophorus pusillus PETERS, 1867, Monatsber. Königl. Preuss. Akad. Wissen. Berlin, p. 870. New name for *E. schoensis* Tomes, 1860 (not of Rüppell, 1842), Proc. Zool. Soc. London, pp. 56-58; idem, 1861, Pl. I, fig. 4. Type locality: Gambia, West Africa (Andersen, 1912). The types were in Tomes's collection, now lost.

M. pusillus has been recorded from Malange (Peters, 1881), and Canhoca (Thomas, 1904a); it probably occurs only in northern Angola, from which region the American Museum has no collections.

The following description is based on a specimen from Luluabourg, Belgian Congo, with additional information from Tomes (*loc. cit.*) and Andersen (1912).

EXTERNAL CHARACTERS AND PALATE.—Externally like a small *Epomophorus* but muzzle much shorter; ears broader and shorter. Metacarpals III, IV, and V sub-

equal. Tail rudimentary. Pelage extends more abundantly on upper side of the wing, between basal two-thirds of forearm and ankle. First palatal ridge undivided, bracket-shaped, with point directed posteriorly; second to fifth ridges divided by a deep groove, broadest anteriorly.

COLORATION.—Upperparts from near Saccardo's Umber to paler than Wood Brown, the bases of the hairs are pale. Underparts near Drab. White tufts at bases of ears, and in the males, white "epaulettes." Wings and ears near Clove Brown.

SKULL.—Rostrum short, weak. Orbits large; postorbital processes small, directed posterolaterally; interorbital and intertemporal regions relatively broad. Braincase large and rounded, smooth; occiput relatively high. Postdental palate long, with posterior margin elevated.

DENTITION.—Cheek-teeth $\frac{3}{3}$. Upper incisors terate, pointed; canine short, excavate posteriorly; first upper premolar (P^3) somewhat caniniform, almost touching P^4 ; P^4 and M^1 relatively large, closely approximated. Lower incisors faintly bilobed; first and second lower premolars (P_2 and P_3) close together, the former about half the height of latter; last lower molar only slightly longer than wide.

MEASUREMENTS.—See table, p. 172.

SUBORDER MICROCHIROPTERA

EMBALLONURIDAE

This group has been briefly characterized in the key to the families of the Chiroptera (p. 27). Only a single genus and species are known to occur in Angola.

TAPHOZOUS GEOFFROY

Taphozous GEOFFROY, 1813 (1818), "Description de l'Égypte," II, p. 113, Pl. III, fig. 1. Genotype: *Taphozous perforatus* Geoffroy.

Taphozous is found in Africa, south and east of the Sahara, in southern Asia, and on the islands east as far as Australia.

Taphozous mauritanus Geoffroy

Taphozous mauritanus GEOFFROY, 1813 (1818), "Description de l'Égypte," II, p. 127. Type locality: Ile du France, Mauritius.

Taphozous mauritanus var. *cinerascens* SEABRA, 1900, Jorn. Sci. Math. Phys. Nat., Lisbon, (2) VI, pp. 77, 121.; Type locality: Benguela, Angola. The type series is in the Lisbon Museum, a cotype is in the British Museum collection.

The American Museum expedition failed to secure any specimens of this species in Angola. However, it has been reported several times: Duque de Bragança and Catumbela (Peters, 1870a); Humbe (Bocage, 1889b); Benguela (Seabra, 1900b); Loanda (Thomas, 1904b); Mossamedes (Seabra, 1909); Caiundo (Monard, 1933). *T. mauritanus* is found throughout Africa.

A cotype of Seabra's variety was examined in the British Museum.

EXTERNAL CHARACTERS.—Ears large, pointed; medial margin nearly straight, lateral side encised opposite end of tragus. The latter with expanded tip, somewhat hatchet-shaped. Antitragus low, shelf-like. Wings long and narrow, attaching to lower third of tibia. A membrane from forearm to base of first phalanx of thumb. Uropatagium hairy above, considerably longer than tail which perforates it dorsally. Pelage mouse-like. Inside of ears, hairy; wings along the forearm, and between elbow and middle of the thigh, haired.

COLORATION.—Upperparts near Hair Brown overlaid with whitish, the bases of the hairs paler, near Drab. Underparts white, except under side of head, which is grayish. Wing membranes whitish, with an irregular Drab spot between digit III and end of digit IV. Uropatagium colored about as the back.

SKULL.—Skull short and broad. Rostrum with marked depression in front of braincase. Well-developed postorbital processes and dorsally directed processes from the zygomata. Premaxillae without palatal parts, free from maxillae. Deep and large basisphenoidal pits. Interpterygoid region V-shaped; hamular processes long.

DENTITION.—Upper incisors rudimentary; canine large, procumbent, with a well-marked cingular cusp. First upper premolar (P_2) small. M^{1-2} large, but M^3 with a V-pattern, metacone and meta-style vestigial (see Miller, 1907, p. 30). Lower premolars (P_2 and P_4) subequal, large.

MEASUREMENTS.—See table, p. 173.

NYCTERIDAE

NYCTERIS GEOFFROY

Nycteris E. GEOFFROY, 1803, "Cat. Mamm. Mus. National Hist. Nat.," pp. 64-65. Genotype: *Vespertilio hispidus* Schreber. Placed on official list of genera by the Committee on Nomenclature, International Congress of Zoology, Opinion 111.

Nycteris is found throughout Africa east and south of the Sahara and in the Malayan region of Asia.

Three species of *Nycteris* are found in Angola:

- (a) Smaller (forearm 40 to 41 mm.; skull length about 17.5 mm.); ears relatively short (22 to 23 mm.); upper incisors trifold. *N. hispida* (p. 36).
- (b) Larger (forearm about 45 mm.; skull length about 19 mm.); ears large (31 to 35 mm.); upper incisors bifid. Second lower premolar (P_4) minute. *N. c. damarensis* (p. 37).
- (c) Agreeing closely with *N. c. damarensis*, but second lower cheek-tooth (P_4) larger, placed internally to the tooth-row, overlapping P_2 and M_1 *N. t. angolensis* (p. 38).

Nycteris hispida (Schreber)

Vespertilio hispida SCHREBER, 1775, "Säugthiere," I, pp. 169-170, Pl. LVI. Type locality: Senegal.

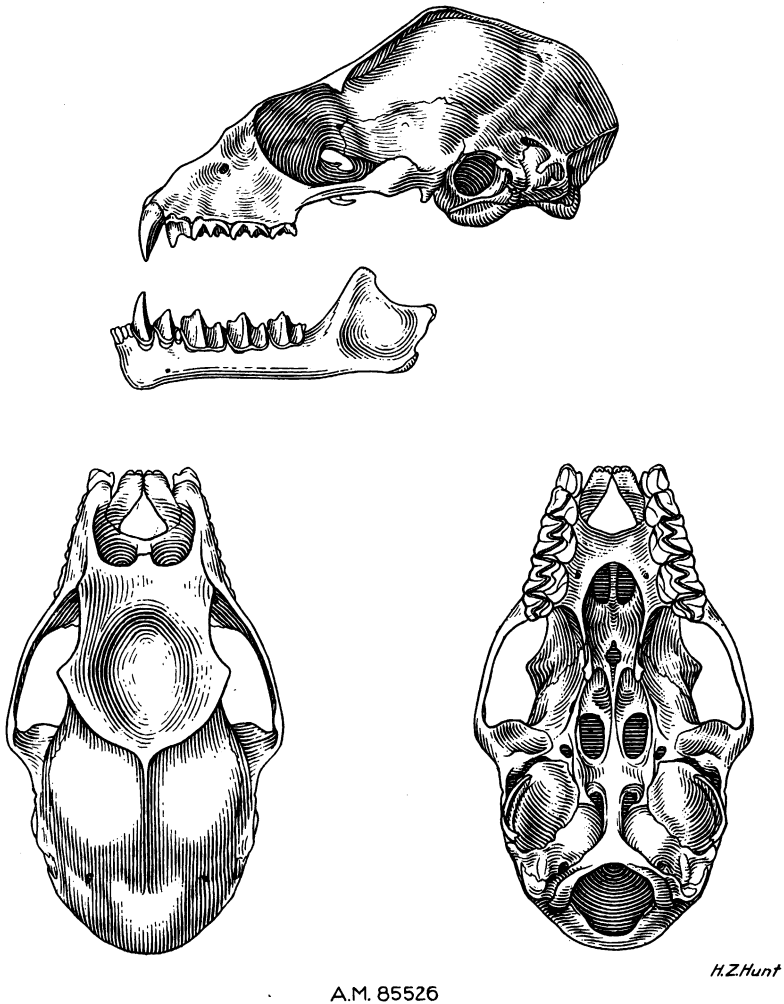
This species was not secured by the American Museum expeditions to Angola, but it has been recorded from the following localities: Mossamedes (Seabra, 1909) and Mount Moco (St. Leger, 1936). The latter specimen was examined. *N. hispida* is found from Senegal to Cape Colony, east to the Sudan and Kenya.

EXTERNAL CHARACTERS.—Ears small for the genus, ovoid, covered with fine papillae. Nostrils opening at the bottom of a groove that extends up to the forehead. Metacarpal of thumb enclosed in wing membrane; prepatagium large; two phalanges of third digit subequal; fourth and fifth metacarpals longer than third; tail included in uropatagium; last vertebra with terminal lateral processes; fibula absent. Pelage fine, woolly, abundant; extending on basal half of uropatagium, between knee and elbow, and along basal two-thirds of forearm.

COLORATION.—Upperparts dark dull brown, near Prout's Brown, becoming near Cinnamon-Buff in the flank region. Underparts near Wood Brown. Membranes near Sepia.

SKULL.—Postorbital processes well marked; frontal region flattened, with deep depression; premaxillae lacking nasal processes. Pterygoid processes slender, projecting ventrally and curved medially, situated only slightly behind last molar. Bullae small.

DENTITION.—Upper incisors trifold. M^{1-2} with large "heel" but no distinct hypocone; M^3 with well-marked metacone, situated



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Fig. 9. *Nycteris thebaica angolensis*, skull and mandible.

near mesostyle. Second lower premolar (P_4) small, in tooth-row.

MEASUREMENTS.—See table, p. 173.

***Nycteris capensis damarensis* Peters**

Nycteris damarensis PETERS, 1870, Monatsber. Königl. Preuss. Akad. Wissen. Berlin, p. 905. Type locality: Otjimbingue, South West Africa. The type specimen is in the British Museum (Dobson, 1878).

Nycteris thebaica, part. Bocage, 1889b.

Nycteris thebaica, var. *damarensis*. Seabra, 1900a.

Nycteris capensis. Seabra, 1909.

A single specimen was secured by the

Vernay Angola Expedition at Capelongo. *N. c. damarensis* has been recorded from the following Angolan localities: Gambos and Humbe (Bocage, 1889b); Mossamedes (Seabra, 1909); Mupanda and Sangueve (Monard, 1935). *N. capensis* is a South African species reaching the limits of its northern range in Angola and, in the east, Zanzibar.

EXTERNAL CHARACTERS.—Ears much longer than in *N. hispida*. Uropatagium less hairy above.

COLORATION.—Upperparts (in the An-

golan specimen examined) darker than Wood Brown; bases of the hairs pale, tips near Verona Brown; underparts near Pale Smoke Gray with bases near Light Mouse Gray. The membranes and ears are near Sepia.

SKULL AND DENTITION.—Skull much like that of *N. hispida*, but bullae larger and pterygoid processes directed posteriorly rather than ventromedially. Upper incisors bifid. Second lower premolar (P_4) minute, slightly internal to tooth-row.

MEASUREMENTS.—See table, p. 173.

Nycteris thebaïca angolensis Peters

Figure 9

Nycteris angolensis PETERS, 1870, Monatsber. Königl. Preuss. Akad. Wissen. Berlin, p. 903. Type locality: Angola (specimens from Caconda, Bibale, and Rio Coroca). It is here proposed that Caconda be made the type locality. The types are in the Museu Bocage, Lisbon.

Nycteris fuliginosa. Peters, 1870b.

Nycteris angolensis. Bocage, 1882.

Nycteris thebaïca. Bocage, 1889b, 1896; Seabra, 1905, 1909.

Nycteris thebaïca, var. *angolensis*. Seabra, 1900a.

Nycteris thebaïca, var. *fuliginosa*. Seabra, 1900a.

The American Museum has 3 specimens from Hanha, secured by the Vernay Angola Expedition. *N. t. angolensis* has been recorded from other localities in Angola: Rio Coroca, Bibale, and Caconda (Peters, 1870b); Quissange (Bocage, 1889b); Hanha (Bocage, 1896); Catumbela (Seabra, 1900a); Serra de Seles (Seabra, 1905); Mossamedes and Cazengo (Seabra, 1909). It probably occurs throughout most of Angola. *N. thebaïca* is found from Egypt to Mozambique and Angola.

EXTERNAL CHARACTERS.—Ears large, but smaller than in *N. c. damarensis*; tragus more elongate than Dobson (1878, Pl. XI, fig. 5) indicates as characteristic of the species, but shape the same. Uropatagium nearly naked, wings between middle of forearm and knee covered with woolly hair.

COLORATION.—Upperparts slightly darker than Drab, head pale, dirty whitish. Underparts dirty whitish with bases of hairs near Mouse Gray. Membranes near Mouse Gray.

SKULL AND DENTITION.—Agree closely with those of *N. c. damarensis* but second lower premolar (P_4) is slightly larger, situated internally to tooth-row, overlapping P_2 and M_1 on their medial sides.

MEASUREMENTS.—See table, p. 173.

RHINOLOPHIDAE

Here are included Miller's (1907) two families, Rhinolophidae and Hipposideridae, each represented by a genus in Angola.

- (a) Three phalanges in each toe except hallux; nose-leaf extends dorsally in a point. Cheek-teeth usually $\frac{5}{6}$ *Rhinolophus* (p. 38).
- (b) Two phalanges in each toe; nose-leaf truncate dorsally. Cheek-teeth $\frac{5}{5}$ *Hipposideros* (p. 40).

Rhinolophinae

RHINOLOPHUS LACÉPÈDE

Rhinolophus LACÉPÈDE, 1799, "Table des Divisions, Soudivisions, Ordres et Genres des Mammifères," p. 15. Genotype: *Vespertilio ferum-equinum* Schreber.

There are four or five species of *Rhinolophus* in Angola, which the following key may serve to distinguish. This genus is widespread in Europe, Africa and Asia, extending east as far as Australia.

- 1.—(a) Nose-leaf with posterior connecting process pointed, projecting markedly. Size small (forearm 42 mm.). P_4 separated from canine *R. angolensis* (p. 39).
- (b) Nose-leaf with posterior connecting process rounded 2.
- 2.—(a) Size larger (forearm more than 50 mm.; skull length more than 21 mm.) 3.
- (b) Size smaller 4.
- 3.—(a) Palatal bridge of skull short (1.8 mm.), evenly emarginate posteriorly. Nose-leaf not covering muzzle, with posterior process high, rounded *R. geoffroyi augur* (p. 39).
- (b) Palatal bridge longer, with cordate posterior margin. Nose-leaf large, covering front of muzzle; posterior process low, rounded *R. aethiops* (p. 39).
- 4.—(a) General coloration pale gray. Size small (forearm 42 mm.; skull length 17 mm.). Second upper premolar (P_4) separated from canine by small laterally placed P^2 *R. denti* (p. 40).
- (b) Coloration brownish gray. Size larger

(forearm 46 to 48 mm.; skull length 20 mm.). P⁴ in contact with canine. *R. darlingi* (p. 40).

Rhinolophus aethiops Peters

Rhinolophus aethiops PETERS, 1868, Monatsber. Königl. Preuss. Akad. Wissen. Berlin, pp. 637-638. Type locality: Otjimbingue, Damaraland, South West Africa. The type specimens are in the Berlin Museum.

The American Museum has 4 specimens from Angola: Monte Victoria Verdun, Luimbale, 1; Chitau, 3. *R. aethiops* has been recorded from the following localities: Benguela (Dobson, 1878); Otjipompenima and Humpata (Jentink, 1887); Maconjo and Huila (Bocage, 1889b); Quindumbo, Quissange, Quibula, and Cahata (Seabra, 1898c); Vila da Ponte (Monard, 1933); and Cuvelai R., Humbe, Osi R., and Cas-singa (Monard, 1935). It occurs probably throughout Angola, exclusive of the rain-forest area, and is found in South West Africa and Northern Rhodesia.

EXTERNAL CHARACTERS.—The nose-leaf is large, covering the muzzle, discoidal; lancet with straight sides. Ears large, pointed but not attenuated; lateral margin broadly emarginate. Tragus absent, antitragus large, rounded, scarcely separated from lateral margin of ear. Wings naked, attaching to ankle; metacarpal of thumb included in antebrachial membrane. Uropatagium finely haired above and below. Legs slender; tail short with tip free. Pelage moderately long, silky.

COLORATION.—Upperparts near Smoke Gray, overlaid with Deep Mouse Gray; underparts paler than upperparts, mid-ventrally with a whitish wash. Wings near Dark Mouse Gray. Ears and uropatagium Mouse Gray.

SKULL.—Long and narrow. Premaxillae incomplete, represented only by palatal portions. Rostrum short, dome-like. Sagittal crest well developed from inter-orbital to cerebellar regions, but it does not reach lamdoidal crests. Palate ends opposite posterior edge of M². Cochlea of ear large, constricting basioccipital.

DENTITION.—Upper incisor vestigial, as is also first premolar (P²); the latter is less than height of cingulum of P⁴. P⁴ and M¹⁻³ large; M³ with well-developed meta-

cone but vestigial metastyle and posterior commissure. Hypocones of M¹⁻² low but distinct. Lower incisors small, trifold. First lower premolar (P₂) about half the height of P₄.

MEASUREMENTS.—See table, p. 173.

Rhinolophus geoffroyii augur Andersen

Rhinolophus augur K. ANDERSEN, 1904, Ann. Mag. Nat. Hist., (7) XIV, pp. 380-383. Type locality: Kuruman, alt. 4000 ft., Bechuanaland. The type specimen is in the British Museum.

Rhinolophus capensis. Jentink, 1887.

There is only one Angolan record for the large species of *Rhinolophus*, that from Otjipahe (Jentink, 1887) but it is recorded by Thomas (1929) from the Kaokoveld, a few miles south of the Angolan boundary. The type specimen in the British Museum has been examined.

EXTERNAL CHARACTERS.—Horseshoe much smaller than in *R. aethiops*, not covering entire muzzle; lateral margins of lancet deeply emarginate and posterior process high. Ears pointed and attenuate; outer margin strongly concave below tip. Wings inserted at tarsal joint. Tail short.

COLORATION.—Drab above, with a tinge of fawn (near Avellaneous); middle of back with ill-defined horseshoe-shaped patch approaching Wood Brown. Under side bright Ecru-Drab, tinged with Vinaceous-Buff on the breast and sides of body. Membranes dark brown.

DENTITION.—P⁴ and canine closely approximated, cingula touching. P² minute, blunt, placed laterally. P₂ one-third size of P₄; P₃ often absent.

MEASUREMENTS.—See table, p. 173.

Rhinolophus angolensis Seabra

Rhinolophus angolensis SEABRA, 1898c, Jorn. Sci. Math. Phys. Nat., Lisbon, (2) V, p. 250. Type locality: Hanha, Angola. The type specimen is in the Museu Bocage, Lisbon.

This bat is known only from the original description, which is translated and rearranged below.

EXTERNAL CHARACTERS.—Ears large, slightly shorter than head; the tip recurved laterally; inner border haired; antitragus well developed. Central lobe of nasal appendage bifurcate as in *R. blasii*

Peters; the base of this cutaneous appendage completely covers the tip of the muzzle; it is discoidal.

COLORATION.—General color a light ashy, darker on the back. Wings blackish.

DENTITION.—As in *R. hipposideros*, second upper premolar separated from canine.

MEASUREMENTS.—See table, p. 173.

This species may be the same as *R. denti* Thomas in which case it would have the priority.

Rhinolophus denti Thomas

Rhinolophus denti THOMAS, 1904 (May), Ann. Mag. Nat. Hist., (7) XIII, p. 386. Type locality: Kuruman, alt. 1300 m., Bechuanaland. The type specimen is in the British Museum.

This species has not been recorded from Angola but specimens were secured by Shortridge on the southern side of the Rua Cana Falls and *R. denti* doubtless occurs in the Cunene region of Angola. The American Museum has no examples of this bat, but the type in the British Museum has been examined. *R. denti* is a South African species found from Kaffraria and Pondoland to South West Africa.

EXTERNAL CHARACTERS.—“Horseshoe” large, covering most of muzzle, circular, middle of its anterior edge notched; lancet covered with fine fur; central process about as in *R. landeri* (Dobson, 1878, Pl. VII). Ears of medium size, medial margin evenly convex, tip acute; antitragical notch shallow and lobe little convex. Wing from lower third of tibia. Interfemoral membrane finely fringed posteriorly. Fur close and fine.

COLORATION.—Above pale gray, individual hairs dull whitish with dark brown tips. Below nearly white. Membranes brown, edged with whitish.

SKULL.—Nasal convexity more strongly developed than in *R. g. augeti*. Palate ends opposite posterior edge of hypocone of M².

MEASUREMENTS.—See table, p. 173.

Rhinolophus darlingi Andersen

Rhinolophus darlingi ANDERSEN, 1905 (Jan.), Ann. Mag. Nat. Hist., (7) XV, pp. 70–72. Type locality: Mazoe, alt. 4000 ft., Mashonaland, Southern Rhodesia. The type specimen is in the British Museum.

In the original description Andersen (*loc. cit.*) mentions a single specimen from Benguela, which is the only record from Angola of this species. It (examined, 1937) agrees closely with the type but the skull is fragmentary. This species probably occurs from Nyasaland to Angola.

EXTERNAL CHARACTERS.—“Horseshoe” covering most of muzzle; sella naked, slightly constricted below middle, broadly rounded off at summit. Lancet long, lateral margins evenly converging to tip. Ears reach tip of muzzle when laid forward, tip blunt, lateral border strongly emarginate. Fifth metacarpal as long as fourth, or slightly longer. First phalanx of fourth digit about two-thirds length of second phalanx. Wings attach to tarsus.

COLORATION.—Dark brownish above, much darker than the *R. denti* or *R. aethiops*, drab-gray beneath; bases of hairs drab-gray.

SKULL.—Cochlea of ear almost as large as in *R. aethiops*.

MEASUREMENTS.—See table, p. 173.

Hipposiderinae

HIPPOSIDEROS GRAY

Hipposideros GRAY, 1831, “Zoological Miscellany,” No. 1, p. 37. Genotype: *Vespertilio speoris* Schreber.

Hipposideros is found throughout Africa and tropical Asia, east to Australia. There are two species of *Hipposideros* known to occur in Angola:

- (a) Small (forearm 46 to 52 mm.; skull length about 16.2 mm.). Color grayish, overlaid with blackish brown. *H. caffer angolensis*.
- (b) Larger (forearm more than 90 mm.; skull length more than 35 mm.). A dark Y-pattern dorsally. *H. commersonii gigas*.

Hipposideros caffer angolensis (Seabra)

Phyllorhina angolensis SEABRA, 1898, Jorn. Sci. Math. Phys. Nat., Lisbon, (2) V, p. 256. Type locality: Angola (it may be here restricted to Benguela, from which Seabra had a series of 4 adults). The type series is in the Museu Bocage, Lisbon, except for one from Rio Coroca which is in the British Museum.

Phyllorhina caffa. Peters, 1870a; Dobson, 1878; Bocage, 1889b.

Phyllorhina fuliginosa. Jentink, 1887.

Phyllorhina n. sp. Bocage, 1897a,b.

Hipposideros caffer angolensis. Andersen, 1906d.

Hipposideros caffer angolensis. St. Leger, 1936.

The Vernay Angola Expedition secured 1 specimen of this bat at Lobito and 1 at Hanha; these agree closely with the cotype in London. It is recorded from the following additional Angolan localities: Rio Coroca (Peters, 1870a); Capangombe, Gambos, and Humbe (Bocage, 1889b); Hanha (Bocage, 1896); Ambaca (Thomas, 1904a); Caiala (Thomas and Wroughton, 1905); Mossamedes (Seabra, 1905); and Congulu (St. Leger, 1936). It thus appears to be widely distributed in Angola. *H. caffer* is found throughout Africa south of the Sahara and Sudan.

EXTERNAL CHARACTERS.—Ears short and broad, only tip naked; medial margin evenly convex; lateral margin deeply emarginate in upper half; antitragus rounded. Nose-leaf rounded below, truncate above; there are two lateral leaflets which meet ventrally. Membranes naked above and below except along the flanks; thumb included in membrane to base of first phalanx; wings inserted at ankle or slightly higher; uropatagium shorter than legs. These extraordinarily long, slender. Pelage long, silky, densest on the head.

COLORATION.—Paler than Pearl Gray, overlaid dorsally with Hair Brown, ventrally with bases near Fuscous. Membranes slightly darker than Hair Brown. Nose-leaf apparently flesh-colored in life.

SKULL.—Rostrum inflated, divided by a shallow medial groove. Interorbital region narrow. Braincase ovoid, tapering posteriorly. Mastoid region broader than the zygomatic breadth. Basioccipital broad. Sagittal crest well developed but does not extend posteriorly beyond the parietals.

DENTITION.—Upper canine with lateral side knife-like. First upper premolar (P²) minute, overlapped by cingula of canine and P⁴, but these do not meet. First lower premolar (P₂) long but low. Last upper molar with cusps forming a reduced N-pattern.

MEASUREMENTS.—See table, p. 173.

Hipposideros commersonii gigas (Wagner)

Rhinolophus gigas WAGNER, 1845, Archiv f. Naturg., I, p. 148. Type locality: Benguela, Angola. The type specimen is in the Munich Museum.

Phyllorhina gigas. Peters, 1865.

Phyllorhina commersonii. Peters, 1870a.

Hipposideros commersoni gigas. Thomas, 1904a.

Hipposideros commersoni, part. Andersen, 1906d.

Hipposideros gigas. St. Leger, 1936.

The expeditions of the American Museum secured no specimen of this bat in Angola. It is recorded from Loanda (Peters, 1865); Catumbela (Peters, 1870a); Malange (Peters, 1881); Caconda (Bocage, 1882); Humbe (Seabra, 1898c); Canhoca (Thomas, 1904a); and Congulu (St. Leger, 1936). These last specimens have been examined. *H. commersonii* is widely distributed from Madagascar north to Angola and Kenya.

EXTERNAL CHARACTERS.—Muzzle blunt, horseshoe large, with three (or four) cutaneous leaflets on either side, widely separated ventrally. Posterior leaf broad, half-oval. Frontal sac present. Ears long, slender, with acutely pointed tips. At the base the sides of the ears are covered with wool. Wings naked for the most part but with fine hairs bordering the upper half of the forearm, the region between elbow and ankle and the under side of the uropatagium. The latter much reduced. Tail about length of tibia. Pelage dense, woolly, moderately short.

COLORATION.—General color of upperparts near Cinnamon-Drab or Olive-Brown, frosted with pale grayish, except for a prominent Fuscous Y-shaped marking on the back. Head paler, as is the belly, near Pale Olive-Buff, the bases of the hairs near Fuscous. A whitish spot at anterior base of wing, with an area of Clove Brown in front of this. Membranes Fuscous or near Fuscous-Black, as are the ears.

SKULL.—Rostrum heavy and squarish; braincase relatively small. A high sagittal crest in old males. Zygomatic arches heavy.

DENTITION.—Anterior face of upper canine with a strong groove; its broad cingulum overlapped by that of P⁴. M³

with metacone much reduced, the cusp-pattern V-shaped. Lower incisors large, trilobate; the lateral one set transversely in jaw, overlapped anteriorly by the medial. M_3 with reduced posterior triangle.

MEASUREMENTS.—See table, p. 173.

There seems little doubt but what *H. gigas* is a race of *H. commersonii*, and that specimens referred to the latter species from Angola and South West Africa are young, or females. A good series of adults of both sexes is still to be brought together, however.

VESPERTILIONIDAE

The following key briefly characterizes the genera of this family recorded from Angola, and in addition two genera not yet reported but probable members of the fauna.

- 1.—(a) Cheek-teeth $\frac{6-6}{6-6}$2.
 (b) Cheek-teeth $\frac{6-5}{6-6}$ or fewer.....4.
- 2.—(a) Skull with high, dome-like braincase and slender, depressed rostrum. Forearm, legs and feet, hairy; pelage long, woolly. Ear funnel-like, emarginate laterally....*Kerivoula* (p. 53).
 (b) Skull with heavier rostrum, braincase less dome-like. Forearm and legs nearly naked. Ears not funnel-like. 3.
- 3.—(a) Wing without glands....*Myotis* (p. 42).
 (b) Wing with peculiar glands on outer side of forearm distally....*Cistugo* (p. 43).
- 4.—(a) Cheek-teeth $\frac{5-5}{6-6}$, first phalanx of digit III short, less than half the length of the second....*Miniopterus* (p. 52).
 (b) Cheek-teeth $\frac{5-5}{6-6}$, first phalanx of digit III longer than second.....*Pipistrellus* (p. 43).
 (c) Cheek-teeth $\frac{4-4}{5-5}$5.
- 5.—(a) Incisors $\frac{2-2}{3-3}$6.
 (b) Incisors $\frac{1-1}{3-3}$8.
- 6.—(a) Rostrum extremely shortened, broad; height of braincase (including bullae) more than two-thirds basilar length....*Glauconycteris* (p. 52).
 (b) Height of braincase (including bullae) considerably less than two-thirds basilar length.....7.
- 7.—(a) Skull flattened; rostrum broad, lacrimal region projecting laterally beyond maxillary. Wings greatly reduced in size, 3rd finger not longer than length of head and body.....*Mimetillus* (p. 51).
 (b) Skull elongate, rounded. Wings normal. Ears longer than head.....*Laephotis* (p. 49).
 (c) Skull normal, not especially flattened, or

elongate. Wings large; ears small (less than length of head).....

-*Eptesicus* (p. 46).
 8.—(a) M^1 and M^2 with mesostyle reduced and middle part of W-pattern short; M_1 and M_2 with anterior triangle larger than posterior....*Scotophilus* (p. 50).
 (b) M^1 and M^2 with normal W-pattern; M_1 and M_2 with anterior triangle smaller than posterior.....9.
 9.—(a) Crowns of M^3 with N-pattern complete.....*Scotoecus* (p. 52).
 (b) Crowns of M^3 with V-pattern.....*Scoteinus* (p. 50).

Vespertilioninae

MYOTIS KAUP

Myotis Kaup, 1829, "Entwicklungs-Geschichte u. Natürl. Syst. Europ. Thierwelt," I, pp. 105, 106, 188. Genotype: *Vespertilio murinus* Schreber (= *Vespertilio myotis* Bechstein).

Two species of *Myotis* are known to occur in Angola: *M. bocagei* and *M. welwitschii*. *Myotis* is found almost throughout the world—the genus of bats with the widest distribution.

- (a) Forearm about 33 mm.; wings uniform dark brown.....*M. b. bocagei*.
- (b) Forearm about 54 mm.; wings variegated with yellowish.....*M. welwitschii*.

Myotis bocagei bocagei (Peters)

Vespertilio bocagei PETERS, 1870, Journ. Sci. Math. Phys. Nat., Lisbon, III, p. 125. Type locality: Duque de Bragança, Angola. The type specimen is in the Museu Bocage, Lisbon.

Myotis bocagei. Thomas, 1904a.

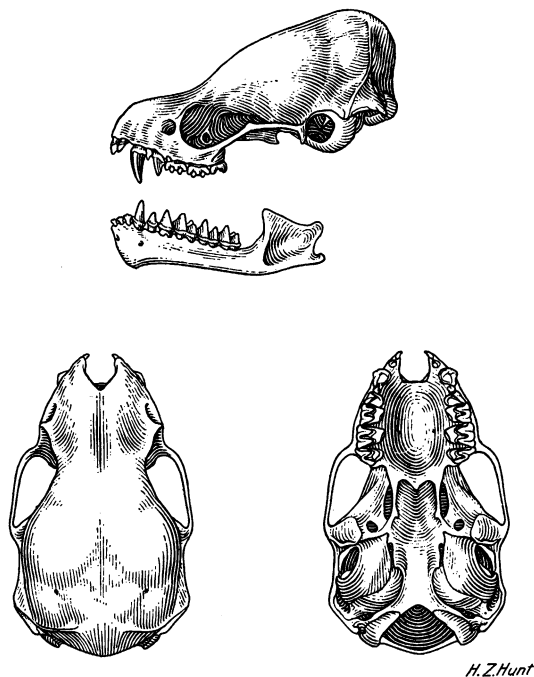
The American Museum has no specimens of this bat from Angola. The only Angolan records refer to the type locality, but it is probably to be found throughout northern Angola; three topotypes have been examined in the British Museum. *M. bocagei* occurs from Angola to Kenya and the Cameroons.

EXTERNAL CHARACTERS.—Ears moderately long, medially convex, laterally emarginate; tip rounded; tragus less than half the height of ear, convex posteriorly, almost straight anteriorly. Wings extend to base of toe; tip of tail free from uropatagium. Pelage long, woolly, extending onto base of uropatagium dorsally.

COLORATION.—Upperparts near Cinnamon-Rufous, though paler. Underparts dirty whitish, all hairs with black bases. Ears and wings near Fuscous-Black, uropatagium paler.

- medial incisor. Underparts bicolor, basally black, terminally buffy. . . . 2.
- 2.—(a) Tragus with basal lobule, followed by an emargination; above this the sides nearly parallel. Skull flattened, broad, first upper premolar (P^2) minute, not visible laterally.
 *P. anchietae* (p. 45).
- (b) Tragus without basal lobule, expanded posteriorly at beginning of upper quarter. Skull narrow, high; P^2 visible laterally. 3.
- 3.—(a) Larger (forearm 30 to 35 mm.; skull length about 12 mm.); tail about

The American Museum has 13 specimens of this bat from Angola: Monte Victoria Verdun, 1; Chitau, 12. *Pipistrellus nanus* is reported to occur at Duque de Bragança (Peters, 1870a); Caconda (Bocage, 1889b), and Pungo Andongo (Thomas, 1904a). It probably occurs throughout Angola, north of Mossamedes district. Outside of Angola, *P. nanus* is found from Mozambique to Uganda and the Congo.



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Fig. 10. *Pipistrellus nanus*, skull and mandible.

- length of head and body. Color dark brown. *P. nanus* (p. 44).
- (b) Smaller (forearm 29 mm.; skull length about 11 mm.); tail considerably shorter than head and body. Color pale brown. *P. fouriei* (p. 45).

Pipistrellus nanus (Peters)

Figure 10

Vespertilio nanus PETERS, 1852, "Reise nach Mossambique, Säugethiere," I, pp. 63–64. Type locality: Inhambane, Mozambique, 24° S.

Vesperugo nanus. Peters, 1870a, and authors.

Pipistrellus nanus. Thomas, 1904a.

EXTERNAL CHARACTERS.—In addition to those given in the key: lateral margin of ear emarginate; tail about as long as head and body; uropatagium covered on basal half dorsally by short fine hairs, ventrally on basal two-thirds, the hairs along transverse lines; wings extending to bases of digits of foot.

COLORATION.—Upperparts near Prout's Brown, underparts near Olive-Buff, all hairs with blackish bases. Alar membranes

and uropatagium near Chaetura Black, under side of forearm whitish.

SKULL.—High and narrow (occipital height about 64 per cent of mastoid breadth), with braincase rising rather high above rostrum; sides of latter only slightly excavated. Lambdoidal crests well developed, but supraoccipital region rounded.

DENTITION.—Medial upper incisor only slightly higher than lateral one (I^3), lower cusp poorly marked; I^3 simple, set transversely in jaw. First upper premolar (P^2) small, displaced medially but visible from the side. M^3 with Z-pattern, but metastyle and posterior commissure obsolete. Lower incisors placed longitudinally in mandible. First lower premolar (P_2) smaller than P_4 .

MEASUREMENTS.—See table, p. 174.

Pipistrellus fouriei Thomas

Pipistrellus fouriei THOMAS, 1926, Proc. Zool. Soc. London, I, pp. 288–289. Type locality: Ukualukasi, Ovamboland, South West Africa. The type specimen is in the British Museum.

A single specimen of this pipistrelle was collected at Capelongo by Mr. Lang, Vernay Angola Expedition. This is the first record of this bat in Angola, although doubtless it occurs throughout the area east of the coastal range of mountains in Huila District.

The type in the British Museum has been examined and compared with our example.

EXTERNAL CHARACTERS.—In addition to characters given in the key to the species of *Pipistrellus*, the wing membranes attach to the ankle.

COLORATION.—Upperparts are between Buffy Brown and Tawny-Olive; underparts Pale Olive-Buff; bases of all hairs near black. Ears and alar membranes Fuscous-Black, uropatagium near Fuscous.

SKULL AND DENTITION.—As in *P. nanus*, but smaller.

MEASUREMENTS.—See table, p. 174.

Pipistrellus anchietae (Seabra)

Vesperugo anchietae SEABRA, 1900 (Feb.), Jorn. Sci. Math. Phys. Nat., Lisbon, (2) VI, p. 26. Type locality: Cahata, Angola. The types are in the Museu Bocage, Lisbon. A cotype is in the Paris Museum.

(?) *Vesperugo kuhlii*. Bocage, 1882.

Pipistrellus anchietae. St. Leger, 1936.

The American Museum collection contains 9 specimens from Angola: Chitau, 6; Humpata, 3. The Carnegie Museum has 3 examples from Gauca R. (= Chissongue). It has been reported from Congulu, 85 km. E. of Porto Amboim (St. Leger, 1936), and there are records probably referring to this species, under the name *Vesperugo kuhlii*, from Caconda (Bocage, 1882) and Rio Cuango (Bocage, 1889b). It occurs probably throughout the northern and highland portions of Angola, but is not known outside of this country.

EXTERNAL CHARACTERS.—In addition to those given in the key to the species of *Pipistrellus* (p. 44): Wings attach to base of toes; basal half of uropatagium dorsally covered with long hairs, much more noticeable than in *P. nanus* and *P. fouriei*.

COLORATION.—Upperparts near Saccardo's Umber; underparts Pale Olive-Buff; all hairs bicolor, basally blackish. Wings and ear blackish; uropatagium near Hair Brown, contrasting decidedly with wings.

SKULL.—Flattened and broad (occipital height about 60 per cent mastoid breadth). Frontal region very slightly elevated. Supraoccipital region triangular. Rostrum broad, with marked antorbital excavation. Shape of skull much as in *Eptesicus*, this placing the species in the group named by Roberts (1926) *Eptesicops*. Shape of skull seems an insufficient basis for generic status, however.

DENTITION.—Lateral upper incisor (I^3) minute, scarcely exceeding cingulum of I^2 ; lateral cusp of I^2 about four-fifths as high as medial cusp. P^2 minute, wedged medially between canine and P^4 , not visible laterally. P^4 usually in contact laterally with canine. Incisors placed transversely in lower jaw, overlapping.

MEASUREMENTS.—See table, p. 175.

Pipistrellus rüppellii (Fischer)

Vespertilio rüppellii FISCHER, 1829, "Synopsis Mammalium," p. 109. New name for *V. temminckii* Cretzschmar, 1826 (not of Horsfield, 1824). Type locality: Dongola, Sudan. The type specimen is in the Senkenburg Museum, Frankfurt.

Vesperugo temminckii. Peters, 1870a; Bocage, 1889b; Seabra, 1900a.

Scotozous rüppellii. Miller, 1907.

Pipistrellus leucomelas MONARD, 1933, Bull. Soc. Neuchâtel. Sci. Nat., LVII, pp. 47-49. Type locality: Vila da Ponte (Cubango), Angola.

The American Museum has no specimen of this species from Angola. Peters (1870a) reports one specimen from Duque de Bragança and Monard (1933) had specimens from Cubango. *P. rüppellii* is found from Egypt to Angola, including part of the Congo, but does not appear to occur south of Ngamiland.

EXTERNAL CHARACTERS.—Muzzle broad. Ears triangular, rounded at tips, when laid forward they reach nearly to nostrils. Tragus foliate, tip broad and rounded, with concave medial border. Wings extend to base of first digits of feet, covered with fur near the body; basal half of interfemoral membrane hairy above, without postcalcaral lobe, but looped.

COLORATION.—Upperparts dark brown with pale gray overlay; underparts pure white or tinged with yellowish. Membranes pale brown.

SKULL AND DENTITION.—Braincase elevated above rostrum. Medial upper incisor deeply bifid; I³ simple, minute, not exceeding in height the cingulum of I². P² minute, inside tooth-row.

MEASUREMENTS.—See table, p. 175.

EPTESICUS RAFINESQUE

Eptesicus RAFINESQUE, 1820, Ann. Nat. (Lexington, Kentucky), I, pp. 2-3. GENOTYPE: *Eptesicus melanops* (= *Vespertilio fuscus* Beauvois), by subsequent designation, Miller, 1897.

Eptesicus occurs throughout temperate and tropical Africa, Asia (except the Malayan region), America (except the Lesser Antilles), and Australia.

There are probably five species of *Eptesicus* in Angola. The following key differentiates these forms briefly.

- 1.—(a) Wings dark.....2.
- (b) Wings pale, translucent.....4.
- 2.—(a) Pelage with bases dark; forearm less than 35 mm.....3.
- (b) Pelage yellowish brown, without dark bases; forearm usually more than 35 mm.....*E. flavescens* (p. 47).
- 3.—(a) Skull with dorsal outline nearly straight,

flattened. Forearm (adults) 32 mm. or more.....

.....*E. capensis damarensis* (p. 46).

- (b) Skull with braincase elevated above rostrum. Forearm less than 32 mm.

.....*E. pusillus* (p. 48).

- 4.—(a) Membranes pale yellowish.....
-*E. tenuipinnis* (p. 48).

- (b) Membranes pale reddish brown.....

.....*E. bicolor* (p. 48).

Eptesicus capensis damarensis (Noack)

Figure 11

Vesperus damarensis NOACK, 1889, Zool. Jahrb., Abt. Syst. Geol. Biol. Tiere, IV, pp. 213-216, Pl. v, fig. 59. Type locality: Damara-land, Omburo, and Golabu. The type specimen is in the Senkenburg Museum, Frankfurt.

Vesperus minutus. Peters, 1870a.

Vesperus capensis. Bocage, 1889b.

Eptesicus capensis. Monard, 1933.

Eptesicus bicolor. St. Leger, 1936.

The American Museum has five specimens of this bat from Angola: Chitau, 2; Humpata, 3. It has been recorded from Bibala and Caconda (Peters, 1870a); Huila (Seabra, 1900a); Vila da Ponte or Cubango (Monard, 1933); and Mount Moco (St. Leger, 1936). *Eptesicus capensis* occurs from the Cape, north to Somaliland and Angola.

EXTERNAL CHARACTERS.—Ears moderately large, with medial margin nearly straight, except for extremely convex base; lateral margin emarginate; tragus nearly straight medially, convex laterally. Third and fifth metacarpals subequal; wings extend to bases of first toes. Tail almost completely included in uropatagium. Pelage long and silky.

COLORATION.—Hairs of upperparts with blackish-brown bases and shiny light brownish-drab tips. Tips of hairs on the ventral surface near Tilleul Buff. Alar membranes blackish; ears and uropatagium near Fuscous. Dorsally, there is some variation in the amount of the pale overlay.

SKULL.—Moderately broad, flattened, with broad rostrum. Sagittal crest poorly developed, the lambdoidal crests strong. Occiput triangular, height less than 60 per cent of mastoid breadth.

DENTITION.—Medial upper incisor (I²) faintly bicusate; I³ simple, much smaller, only slightly exceeding the cingulum of I²

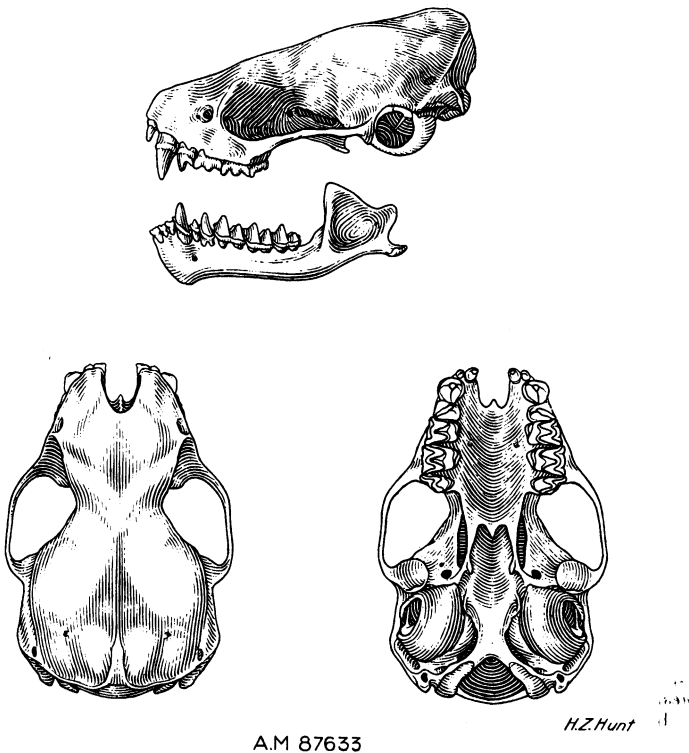
in height. Molars agree closely with those in *Pipistrellus*. I_{1-3} trilobate, set transversely in jaw, overlapping.

MEASUREMENTS.—See table, p. 175.

***Eptesicus flavescens* (Seabra)**

Vesperugo (Vesperus) flavescens SEABRA, 1900 (Feb.), *Jorn. Sci. Math. Phys. Nat.*, Lisbon, (2) VI, pp. 23–24 (also 119–120), Fig. 20. Type locality: Galanga, Angola. The type series is in the Museu Bocage, Lisbon, two are in the Paris Museum.

margin strongly convex basally, then less strongly; lateral margin nearly straight, becoming convex basally. Tragus about half the height of ear, with small basal lobe separated from upper part by a deep incision; medial margin nearly straight, lateral margin above incision gently convex. Membranes nearly naked above, below some hair extends along forearm to wrist, and from elbow to knee. Calcar long, with a narrow postcalcaneal mem-



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Fig. 11. *Eptesicus capensis damarensis*, skull and mandible.

Eptesicus capensis angolensis HILL, 1937 (April), *Amer. Mus. Novitates*, No. 916, pp. 1–2. Type locality: Chitau, Angola. The type specimen is in the American Museum, collected by H. Lang, Vernay Angola Expedition.

The American Museum has a series of 18 from Chitau; there are two skulls only from the same locality in the Carnegie Museum, Pittsburgh. The species is known only from central Angola.

EXTERNAL CHARACTERS.—Ears relatively short, rounded at the tip; medial

brane. Pelage abundant, 6 mm. or more on shoulders; somewhat woolly on forehead.

COLORATION.—Upperparts darker than Tawny-Olive, the bases of the hairs paler. Below near Avellaneous. Wing membranes blackish (in dry skins), uropatagium paler. In alcoholic specimens the wings appear much paler than in study skins.

SKULL.—Larger than other species of *Eptesicus* reported from Angola, with broad, heavy rostrum. Braincase elevated

above rostrum, dorsal outline of skull sinuous. Occipital height about 65 per cent of mastoid breadth in adults.

DENTITION.—Medial upper incisor deeply bifid; lateral one about one-third shorter, with small posterior cusp. Lower incisors placed in line with margin of lower jaw, distinctly trifid. Cheek-teeth as in *E. capensis*.

MEASUREMENTS.—See table, p. 175.

After examining the cotypes of *E. flavescens* in the Paris Museum, it becomes necessary to synonymize *E. c. angolensis* with that species, although it differs distinctly from the original description of Seabra. The description ascribed to *E. flavescens* yellowish wings, poorly developed tragus and well-marked antitragus, simple lateral incisor, and bifid lower incisors. In all these characters the cotypes agree with the type of *E. c. angolensis* and differ from the original description.

Eptesicus bicolor (Bocage)

Vesperus bicolor BOCAGE, 1889, Journ. Sci. Math. Phys. Nat., Lisbon, (2) I, p. 5. Type locality: Caconda, Benguela district, Angola. Type specimens in Museu Bocage, Lisbon.

The American Museum has no examples of this species, which is known only from the type description. St. Leger (1936) recently reported it from Mount Moco, but this specimen proved to be *E. capensis damarensis*, when examined (1937).

The original description of this species, translated and rearranged, is given below.

EXTERNAL CHARACTERS.—Muzzle obtuse, large and swollen; ear short, scarcely two-thirds as long as head, with medial edge strongly convex from the base and lateral edge emarginate in its upper half; tip rounded. Tragus elongate, knife-like, with a small triangular lobe at base of lateral border. Wings leaving base of hallux, calcaneal lobe distinct. Tail almost entirely included in uropatagium.

COLORATION.—Upperparts brown-chestnut, tips of hairs reddish brown; hairs of underparts deep chestnut with whitish tips. Wing membranes transparent, pale reddish brown.

DENTITION.—Medial upper incisor (I^2) indistinctly bilobate, broad and short;

I^3 vestigial. No trace of P^2 . I_{1-3} trilobate. First lower premolar (P_2) small, scarcely half height of P_4 .

MEASUREMENTS.—See table, p. 176.

Eptesicus tenuipinnis (Peters)

Vesperus tenuipinnis PETERS, 1872, Monatsber. Königl. Preuss. Akad. Wissen. Berlin, p. 263. Type locality: Guinea. The type specimen is in the Berlin Museum.

The expeditions of the American Museum secured no examples of this species in Angola, but has been reported from Cotete by Seabra (1905). *E. tenuipinnis* is found from Guinea and Angola east to Uganda. It appears to be a forest species. The following description is based on specimens from the Congo in the collection of the American Museum.

EXTERNAL CHARACTERS.—Ears moderate, medial border nearly straight, tip rounded and lateral border slightly emarginate. Tragus broad, nearly parallel-sided, sides nearly straight. Pelage abundant, silky. Membranes almost naked; tail included to tip; postcalcaneal lobe well developed. Wings extend to bases of toes.

COLORATION.—Upperparts near Bone Brown with a shining overlay of pale buffy. Below the basal color is similar, but there is a heavy overlay of whitish or Cartridge Buff. The membranes and ears are near Chamois.

SKULL.—Skull short and rounded, sloping almost uniformly from muzzle to occiput; the latter high (62 per cent or more of mastoid breadth). Braincase narrow.

DENTITION.—Medial upper incisor (I^2) broad, grooved anteriorly, with small accessory and cingulum-cusps; I^3 short and broad, situated about as far forward as I^2 and overlapping its lateral part. I_{1-3} trilobate, set transversely in jaw, overlapping.

MEASUREMENTS.—See table, p. 176.

Eptesicus pusillus (Noack)

Vesperus pusillus NOACK, 1889, Zool. Jahrb., Abt. Syst. Geol. Biol. Tiere, IV, pp. 216–218, Pl. II, fig. 2, Pl. V, figs. 60–61. Type locality: Boma, Congo. The type specimen is in the Senkenburg Museum, Frankfurt.

Eptesicus minutus. Monard, 1933.

The American Museum has no examples of this species. It has been reported from Angola under the name of *E. minutus*: Caquindo (Monard, 1933); Cubango Mission and Mukote (Monard, 1935). *E. pusillus* probably occurs throughout Angola, and south from this region to the Cape.

The following description is based on a translation of the original, rearranged and condensed.

EXTERNAL CHARACTERS.—Ear long, slender. Tragus slender basally, medial margin concave, lateral one nearly straight; broadly triangular above, with tip bent medially. Under the chin a thick round wart. Upper side of proximal half of humerus hairy. Uropatagium naked above, pointed; it does not contain last joint of tail.

COLORATION.—Body and membranes deep blackish brown; ear black; hairs of underparts with yellowish-brown tips, otherwise only slightly paler than above.

SKULL.—Frontal bones somewhat inflated. Braincase twice as long as rostrum, flat and broad, moderately constricted interorbitally. Upper profile of skull sinuous, forehead arched and rostrum depressed. Upper jaw only slightly elevated anteriorly. Bullae moderately large and rounded.

DENTITION.—Medial upper incisor simple, with a small basal cusp posteriorly, hook-like, inclined medially. Lateral incisor very small, tricusate, nearly vertical, slightly inclined laterally, however. Lower incisors small, trilobate.

MEASUREMENTS.—See table, p. 176.

The type of *Eptesicus minutus* Temminck was examined in the Leiden Museum and was found to belong to that section of the genus with highly arched forehead.¹ P_2 is only about half as large as P_4 viewed from the side. Although not fully mature, the type of *E. minutus* is larger than *E. pusillus* (see table, p. 176).

LAEPHOTIS THOMAS

Laephotis THOMAS, 1901, Ann. Mag. Nat. Hist., (7) VII, p. 460. Genotype: *Laephotis*

wintoni Thomas. The genus is known from East Africa and Angola.

There is some doubt as to the validity of this genus, based on proportions only, and with species somewhat intermediate between it and *Eptesicus*.

Laephotis angolensis Monard

Laephotis angolensis MONARD, 1935, Arquivos do Museu Bocage, VI, pp. 45–47. Type locality: Tyihumbwé R. (Chiumbe), 15 km. W. of Dala. The type specimen is in the Museum of Natural History at Chaux-de-Fonts.

The American Museum has a single specimen, here referred to *L. angolensis*, from 35 km. E. of Dande. This is nearly 330 kilometers southwest from the type locality; the species probably occurs throughout eastern Angola.

EXTERNAL CHARACTERS.—Ears large, separate. Medial margin with basal accessory fold nearly at right angles to the medial border of the ear, which is weakly convex distally, strongly convex at the base. Tip of ear rounded; lateral margin moderately convex. Antitragus covered with hair, separated from lateral margin of ear by a notch. Tragus broad, about 4.5 mm. high anteriorly; base broad, a deep notch posteriorly about level of the commencement of the medial margin; medial margin slightly concave, lateral one convex; tip rounded; tragus like Dobson's figure of *V. platyrhinus* (1878, Pl. XII, fig. 1). Pelage long (about 7 mm.), silky. Membranes nearly naked, above and below except basal half of uropatagium which is finely haired.

COLORATION.—Upperparts shiny, near Tawny-Olive, overlying blackish brown; this shows through only when examined from the rear. Underparts with bases blackish brown, the tips pale grayish, becoming almost white in the inguinal region. Membranes slightly darker than upperparts, bordered with whitish between fifth anal digit and hind foot.

SKULL.—Long and narrow (mastoid breadth less than 55 per cent of greatest length); braincase smooth with partially developed lambdoidal crests. Dorsal outline nearly straight. Nasal and palatal emargination large. Palate strongly

¹ *Neoromicia* Roberts, 1926, was proposed for this section.

arched from side to side and also from anterior to posterior. Bullae relatively large. Postdental palate long, approximately equal to combined lengths of M^{2-3} .

DENTITION.—Cheek-teeth as in *Eptesicus*. Medial upper incisor bifid; lateral one hardly higher than cingulum of medial incisor. The specimen examined differs from *L. wintoni* and the type of *L. angolensis* in having a diastema between the canine and incisors. Lower canine small, only slightly higher than P_4 . I_{1-3} trifold, overlapping.

MEASUREMENTS.—See table, p. 176.

SCOTEINUS DOBSON

Scoteinus DOBSON, 1875, Proc. Zool. Soc. London, p. 371. Named as a subgenus of *Scotophilus* (= *Pachyotus*). Genotype: *Scotophilus emarginatus* Dobson, by subsequent designation (Miller, 1907).

This genus occurs in Africa, India and Australia. *Scoteinus* is not yet reported from Angola, but the southern race of *S. schlieffenii* occurs just south of the Cunene River in South West Africa and will probably be found to occur north of the river.

Scoteinus schlieffenii fitzsimonsi Roberts

Scoteinus schlieffenii fitzsimonsi ROBERTS, 1932 (Oct.), Ann. Transvaal Mus., XV, p. 17. Type locality: Tsotsoroga Pan, northern Bechuanaland. The type specimen is in the Transvaal Museum, Pretoria.

S. schlieffenii has a wide range, from Egypt and the Sahara to Mozambique and South West Africa.

This bat probably occurs in southern Angola, east of the Huila highlands.

The following description is based on a paratype of *S. s. fitzsimonsi*.

EXTERNAL CHARACTERS.—Nostrils prominent. Ears broadly triangular, medial edge convex, lateral edge nearly straight. Tragus about half the height of ear, truncate at the tip, parallel-sided; medial border slightly concave; lateral border convex with a well-marked triangular lobule near the base, followed dorsally by a notch. Wing membrane extends to base of hallux; tip of tail free from uropatagium; membranes naked, except for basal third of uropatagium above and below which is scantily haired.

COLORATION.—Upperparts between Cinnamon-Buff and Clay Color; underparts paler and duller. Ears near Drab; membranes between Hair Brown and Chaetura Drab.

SKULL.—Skull narrow and moderately high. Dorsal profile nearly straight. Occiput triangular, height about 63 per cent of mastoid breadth. Rostrum slightly excavated dorsolaterally.

DENTITION.—Only one upper incisor, simple, with high cingulum. M^3 with mesostyle and metacone reduced. I_{1-3} trilobate, slightly overlapping. M_3 with second triangle smaller than first.

MEASUREMENTS.—See table, p. 176.

SCOTOPHILUS LEACH

Scotophilus LEACH, 1821, Trans. Linn. Soc. London, XIII, p. 69. Genotype: *Scotophilus kuhlii* Leach.

Pachyotus GRAY, 1831, "Zoological Miscellany," No. 1, p. 38 (part). Genotype: *Scotophilus kuhlii* Leach, by subsequent designation (Miller, 1907).

Two species probably occur in Angola; the genus is found in Africa and southern Asia, including the Malay Archipelago.

- (a) Larger (forearm about 59 mm.; skull length about 20 mm.)..... *S. n. herero*.
- (b) Small (forearm about 48 mm.; skull length about 17.5 mm.)..... *S. v. damarensis*.

Scotophilus nigrita herero Thomas

Scotophilus nigrita herero THOMAS, 1906 (Feb.), Ann. Mag. Nat. Hist., (7) XVII, pp. 174-175. Type locality: Elephants Vley (18° S., 17°30' E.), South West Africa. The type specimen is in the British Museum.

Scotophilus borbonicus. Dobson, 1878, and authors.

Scotophilus nigrita is known from Senegambia and Nubia south to the Cape Province.

No specimens of this species were secured by the American Museum expeditions to Angola. Under the name of *S. borbonicus* it has been recorded from several localities in Angola: Otjipompenima (Jentink, 1887); Humbé (Bocage, 1889b); and Mossamedes (Seabra, 1909). This bat probably occurs throughout southern Angola.

The following description is based on the type.

EXTERNAL CHARACTERS.—Muzzle swollen, with glandular prominences marked. Ears large, with medial margin convex, lateral one nearly straight; tragus half the height of ear, narrow, with medial border concave, lateral border strongly convex; antitragus distinct, quadrate: inferior part of helix forms a distinct triangular lobe. Wing membranes extend to tarsus; tip of tail free. Membranes above naked; below, antebrachial membrane, a strip some 8 mm. wide along forearm, area between elbow and knee, and basal part of uropatagium, haired. Metacarpals of digits II, III, IV, subequal, that of V slightly shorter.

COLORATION.—Upperparts pale, slightly grayer than Cinnamon-Buff, hairs paler at the base; underparts near Cartridge Buff. Membranes darker than Wood Brown.

SKULL.—Skull short and heavy, with widely spreading zygomata. Sagittal crest well marked, produced posteriorly. Mastoid processes large. Palate prolonged considerably behind molars, extending more than halfway to the posterior base of the zygoma.

DENTITION.—Teeth heavy. Incisor large, in contact with canine. P^4 only slightly higher than M^1 . M^{1-2} with mesostyle vestigial, making the middle angle of the W-pattern extremely shallow; M^3 without mesostyle and metacone. M_{1-3} with posterior triangles much reduced.

MEASUREMENTS.—See table, p. 176.

Scotophilus viridis damarensis Thomas

Scotophilus damarensis THOMAS, 1906 (Feb.), Ann. Mag. Nat. Hist., (7) XVII, p. 175. Type locality: Elephants Vley, northern Damara-land, South West Africa. The type specimen is in the British Museum.

Scotophilus viridis is known from a relatively narrow band across Africa from Mozambique to South West Africa. This bat is not yet reported from Angola, and the American Museum has no specimens of the species. It has been recorded in South West Africa on the Angolan boundary and will doubtless be found in the Cubango region of Angola. The type specimen has been examined.

EXTERNAL CHARACTERS.—Similar to *S. n. herero*, but smaller.

COLORATION.—Very slightly paler than *S. n. herero*, especially below.

SKULL.—Rostrum relatively narrower; zygomatic arches less widely spreading; braincase narrower and higher.

DENTITION.—Teeth differ from those in *S. n. herero* only in smaller size, actually and relatively.

MEASUREMENTS.—See table, p. 176.

MIMETILLUS THOMAS

Mimetillus THOMAS, 1904, Abst. Proc. Zool. Soc. London, No. 10, p. 12. Genotype: *Vesperugo* (*Vesperus*) *moloneyi* Thomas.

The Angolan representative of this genus was described as a full species, *Mimetillus bernerii* Monard, but it appears to be no more than a race of the typical species, *M. moloneyi*. *Mimetillus* is known from West Africa, the Congo, Angola, and Northern Rhodesia.

Mimetillus moloneyi bernerii Monard

Mimetillus bernerii MONARD, 1933 (1932), Bull. Soc. Neuchâtel. Sci. Nat., LVII, pp. 49–50. Type locality: Vila da Ponte, Angola. *Vesperugo* (*Vesperus*) *moloneyi*. Seabra, 1900a.

The American Museum has 5 specimens of this short-winged bat from Chitau. It was previously recorded in Angola from Cahata (Seabra, 1900a) and from the type locality (Monard, *loc. cit.*). *M. moloneyi* is known from Lagos and Fernando Po east to the edge of the Congo rain forest, and south to central Angola and Northern Rhodesia.

EXTERNAL CHARACTERS.—Ears triangular, with tip rounded; medial margin gently convex, lateral one nearly straight; tragus low, broad, somewhat rectangular but medial margin concave; antitragus crescentic, broad and low. Wings extraordinarily shortened; legs short and stout. Alar membrane attaching to ankle; uropatagium below nearly naked, basal half above hairy. Postcalcaneal lobe obsolete. Tip of tail, most of last vertebra, free. Pelage short, rather scanty.

COLORATION.—From Bister to between Clove Brown and black, above and below; bases of hairs whitish; membranes near

Chaetura Black, with grayish area between third and fifth digits.

SKULL.—Extremely flat and broad (occipital height 50 per cent or less of mastoid breadth), braincase slightly higher than rostrum. Lacrimal region produced laterally, visible from below. Occiput little more than a ring around large foramen magnum.

DENTITION.—Medial upper incisor (I^2) bifid, only slightly higher than I^3 . P^4 in close contact with canine. I_{1-3} faintly trilobate, set in line with mandible. P_2 minute.

MEASUREMENTS.—See table, p. 177.

SCOTOECUS THOMAS

Scotoecus THOMAS, 1901, Ann. Mag. Nat. Hist., (7) VII, pp. 263–264. Genotype: *Scotophilus albofuscus* Thomas.

Monard, 1935, pp. 52–54, reports *Scotoecus albigula* from the Cunene River, southern Angola. That it should be the same as the East African species from 2000 meters' altitude seems highly improbable.

The size of this *Scotoecus* is larger than that of any previously described except *S. albigula* or possibly *S. falabae* from Nigeria. The coloration whitish below, the throat especially white; upperparts chocolate brown. A minute first upper premolar is present, hidden in the gum, immediately behind the canine, situated internally in relation with the tooth-row. There are six or seven lines of whitish hairs on the wing membranes, obliquely situated in relation to the forearm.

MEASUREMENTS.—See table, p. 177.

GLAUCONYCTERIS DOBSON

Glauconycteris DOBSON, 1875, Proc. Zool. Soc. London, XXIV, p. 383. Named as a subgenus of *Chalinolobus*. Genotype: *Kerivoula poensis* Gray (subsequent designation Miller, 1907).

This genus is found from the Sahara south to Mozambique and South West Africa.

Glauconycteris variegata (Tomes)

Scotophilus variegatus TOMES, 1861, Proc. Zool. Soc. London, p. 36. Type locality: Otjoro (= Otjihero (?), Ovamboland, South West Africa. The type specimen is in the Berlin Museum; "cotypes" are in the British Museum.

Glauconycteris congicus. Monard, 1935.

Glauconycteris variegata occurs in the Cubango region in Angola; Monard secured specimens at Mupanda, southern Angola. It is reported from Mozambique to Uganda and Gambia.

EXTERNAL CHARACTERS.—Muzzle broad and short, sides with glandular prominences. Ears small and rounded, medial border with a short, blunt, basal lobule. Tragus broad and short. Lower lip with a fleshy lobule near each corner of the mouth, projecting horizontally. Third and fourth digits of wing with first phalanx considerably shorter than second phalanx. Hind legs long, slender. Wing membrane extending to base of hallux, naked except along flanks. Base of uropatagium somewhat hairy; no postcalcaneal lobe; tail included in uropatagium to the tip. Pelage long, fine, woolly.

COLORATION.—Upperparts cream-colored, palest on head and neck, becoming darker on hinder parts and uropatagium; underparts dirty whitish; all hairs with a slightly ashy tint at bases. Membranes pale yellowish brown, strongly marked with dark brown reticulating veins.

SKULL.—Extraordinarily short, facial portion much reduced. Braincase high (occipital height about 70 per cent of mastoid breadth). Zygomata short, about the length of maxillary tooth-row.

DENTITION.—Medial upper incisor (I^2) bifid, second cusp placed posteriorly and short; I^3 minute, situated internally to tooth-row. P^2 absent; M^3 with N-pattern complete; I_{1-3} trilobate, set parallel to the mandible.

MEASUREMENTS.—See table, p. 177.

MINIOPTERINAE

MINIOPTERUS BONAPARTE

Miniopterus BONAPARTE, 1841, "Iconografia della Fauna Italica," I, p. 106, fasc. XX–XXI. Named as a subgenus of *Vespertilio*. Genotype: *Vespertilio ursinii* Bonaparte (= *V. schreibersii* Kuhl).

A bat of this genus is reported from Angola. *Miniopterus* is known from southern Europe and Asia, and the entire continent of Africa.

Miniopterus schreibersii (Kuhl)

Vespertilio schreibersii KÜHL, 1819, "Deutsche Fledermäuse," Wetterau Ann., IV, p. 41. Type locality: Mountains S. E. of Bannat, Austria.

This bat has been recorded from Golungo Alto (Thomas, 1904a), Vila da Ponte (Monard, 1933), and Cambisa (Monard, 1935). The specimens from Golungo Alto examined by me are different from *M. smitianus* externally and cranially and are most like *M. schreibersii*. This latter species appears to occur from southern Europe to Angola and Uganda.

EXTERNAL CHARACTERS.—Ears roughly quadrate; tragus long, rounded above, with poorly marked basal lobe. First phalanx of third digit less than half as long as second. Tail long, entirely included in membrane.

COLORATION.—Upperparts dark, slightly darker than Clove-Brown; underparts similar but overlaid with whitish. Wings much as the body; uropatagium slightly paler. Darker and less grayish than *M. smitianus*.

SKULL.—Facial region elongate, narrow. Braincase strongly inflated, considerably elevated above the rostrum, dorsal outline strongly sinuous. Rostrum more slender than in *M. smitianus*; nasal emargination heart-shaped rather than oval.

DENTITION.—First upper premolar large, situated slightly internally to the line of the tooth-row. P_2 - 3 below subequal. M^3 with typical N-pattern complete. Upper incisors with only slight difference in height, both separated by a short diastema from the canine.

MEASUREMENTS.—See table, p. 177.

Kerivoulinae**KERIVOULA GRAY**

Kerivoula GRAY, 1842 (Dec.), Ann. Mag. Nat. Hist., (1) X, p. 258. Genotype: *Vespertilio hardwickii* Horsfield (subsequent designation, Selater, 1901).

There are several records of this genus in Angola, probably referring to *K. argentata* Tomes. *Kerivoula* occurs throughout Africa south of the Sahara, southern Asia, east to New Guinea, and northern Australia.

Kerivoula argentata Tomes

Kerivoula argentata TOMES, 1861 (Jan.), Proc. Zool. Soc. London, pp. 32-33. Type locality: Otjoro [= Otjihoro (?)], Ovamboland, South West Africa.

Kerivoula lanosa. Bocage, 1879, 1889b.

Kerivoula sp. Seabra, 1905.

This bat is reported from Angola, between Cassange and Bihé (Bocage, 1879), Cuango R. (Bocage, 1889b), and Cazengo (Seabra, 1905). It is known from the southern Congo, and Northern Rhodesia west to Angola and South West Africa. Apparently a rare species.

EXTERNAL CHARACTERS.—Ears large, tubular; lateral border sharply and deeply emarginate just below tip. Tragus long and slender, pointed. Antebrachial membrane extends from shoulder to base of thumb; wings extend to base of hallux. Fourth digit and its membrane form a triangular projection, extending from posterior border of wing. Tail included in uropatagium; "spurs" long; feet covered thinly with short hair. Pelage of body and hind leg long, fine, woolly; basal two-thirds of uropatagium above with thin covering of hairs, and posterior margin fringed with short hairs.

COLORATION.—The type is now near Sayal Brown above, frosted with whitish, the bases of the hairs blackish brown. Underparts paler than Cartridge Buff, without plumbeous bases.

SKULL.—Facial region elongate. Braincase ovoid, rising high above rostrum. Palate ending behind molars, almost as far posteriorly as the root of the zygoma.

DENTITION.— I_2^3 , C_1^1 , P_3^3 , M_3^3 . Upper incisors subequal, slender, separated from canine. P^2 and P^3 subequal, short; P^4 only slightly higher than molars, which are normal; M^3 with N-pattern complete.

MEASUREMENTS.—See table, p. 177.

MOLOSSIDAE

There are four genera¹ of free-tail bats in Angola, for which the following key gives brief characterizations.

¹ The difference between the V-pattern of M^3 in *Mops* and the N-pattern characteristic of *Tadarida* and *Chaerephon* is partly bridged in *Mops angolensis*, and the characters separating *Tadarida* from *Chaerephon* are extremely variable. In my opinion *Mops* and *Chaerephon* would be better considered subgenera of *Tadarida* rather than separate genera.

- 1.—(a) M^3 complete, with metacone fully developed and crest between it and metastyle complete, cusps forming an N-pattern.....2.
- (b) M^3 incomplete, metacone vestigial, cusps forming a V-pattern.....*Mops* (p. 57).
- 2.—(a) Skull elongate (cranial index² less than 65). Size large (head and body more than 90 mm.); ears extremely large.....*Otomops* (p. 59).
- (b) Skull broad (cranial index² more than 68). Size small (head and body less than 70 mm.); ears moderate.....3.
- 3.—(a) Skull with premaxillae complete, filling region between incisors.....*Chaerephon* (p. 56).
- (b) Premaxillae incomplete, a vacuity extending between incisors.....*Tadarida* (p. 54).

TADARIDA RAFINESQUE

Tadarida RAFINESQUE, 1814, "Précis des découvertes et travaux somnologiques" (Palerma), p. 54. Genotype, by monotypy: *Cephalotes teniotis* Rafinesque. *Tadarida* apparently has priority over *Nyctinomus* Geoffroy, "1813" [= 1818] and *Nyctinomus* Oken, 1816.

Tadarida occurs in the warm temperate and tropical zones of both hemispheres and over the entire continent of Africa. There are 6 species of *Tadarida* reported from Angola. Two of these are known only from Seabra's original descriptions and are usually referred to *T. aegyptiaca*; the descriptions are inadequate in spite of their lengths. The four distinguishable species are separable by the following key.

- 1.—(a) Size larger (forearm 48 mm. or longer) . 2.
- (b) Size smaller (forearm less than 48 mm.) . 3.
- 2.—(a) Skull flattened (height of braincase, basion to inion, about 50 per cent of mastoid breadth), with nearly straight dorsal profile except for elevated interparietal region.....*T. aegyptiaca* (p. 54).
- (b) Skull higher (occipital height about 70 per cent of mastoid breadth).....*T. brunneus* (p. 55).
- 3.—(a) Palatal emargination larger than diameter of canine; rostrum slender. P_2 small. Pelage abundant. Size small (forearm about 45 mm.).....*T. bocagei* (p. 55).
- (b) Palatal emargination smaller than diameter of canine; rostrum broader (about 9.0 mm.). Pelage short and scanty, a nearly naked area on crown

and across shoulders. Size slightly larger (forearm 45 to 47.5 mm.).....*T. ansorgei* (p. 55).

Tadarida aegyptiaca (Geoffroy)

Nyctinomus aegyptiacus E. GEOFFROY, 1818 ("1813"), "Description de l'Égypte," II, p. 128, Pl. II. Type locality: Egypt. The type specimen is in the Paris Museum.

Nyctinomus sp. Seabra, 1900b.

Nyctinomus anchietae SEABRA, 1900, Jorn. Sci. Math. Phys. Nat., Lisbon, (2) VI, pp. 82-83. Localities: Quibula and Galanga, Angola.

The expeditions of the American Museum to Angola did not secure any specimens of *Tadarida aegyptiaca*, but it has been reported from Caquindo (Monard, 1933), in addition to the localities listed in the synonymy. This species is found from Egypt to Kenya and Angola.

EXTERNAL CHARACTERS.—Ears separate, but close together at their bases; margins rounded. Antitragus half-oval, separated from conch by a deep notch; tragus large, somewhat quadrate. Upper lip with well-marked vertical wrinkles. Pelage abundant, velvet-like, extending on wings above and below to a line between middle of humerus and knee (to middle of femur, in the specimen examined). Antebrachial membrane partly covered with hair, and a band of hairs runs parallel to the forearm almost as far as the wrist. Lower surface of uropatagium scantily haired near the tail. Rest of membranes naked. Face nearly naked.

COLORATION.—Dark brown above, somewhat variable (in the specimen examined, near Mummy Brown). Underparts slightly paler and more grayish. Wings and ears blackish.

SKULL.—Skull flattened, especially in the parietal region; dorsal outline almost straight except for upward bulging of interparietal region. Postorbital region little constricted, antorbital processes well marked; braincase broad. Anterior palatal vacuity large; choanae wide. Basisoccipital moderately wide. Height of braincase, basion to inion, about 50 per cent of mastoid breadth.

DENTITION.— I_2^1 , C_1^1 , P_2^2 , M_2^2 . Upper incisors separated but converging, slender, curved. P^2 small, slightly lower than

² Zygomatic breadth expressed as percentage of basilar length.

anteromedial cusp of P^4 , filling space between latter and canine. M^3 with N-pattern complete.

MEASUREMENTS.—See table, p. 177.

The specimen marked type of this species in the Paris Museum has been examined and forms the basis for the above description.

Tadarida bocagei (Seabra)

Nyctinomus bocagei SEABRA, 1900 (Aug.), Journ. Sci. Math. Phys. Nat., Lisbon, (2) VI, pp. 84–85. Type locality: Galanga, Angola. The type series is in the Museu Bocage, Lisbon.

Although the original description is the only record of this bat from Angola, it occurs in South West Africa, Cape Province, and Transvaal (Shortridge, 1934). Specimens in the British Museum from South West Africa have been examined.

EXTERNAL CHARACTERS.—Ears separated at the base, well developed, somewhat irregular in shape, angular and ornamented anteriorly by a series of dermal tubercles. Antitragus small, semi-ovoid; tragus very narrow, quadrate. Pelage abundant, covering a large part of the ears; scarce on upper surface of antebrachial membrane, absent below; fairly abundant on ventral side of interfemoral, nearly absent above except near base of tail.

COLORATION.—Dark brown on the back, slightly tinged with yellowish; paler on the belly.

SKULL.—Much as in *T. aegyptiaca*, but decidedly smaller; flatter than in *T. ansorgei*, the dorsal outline almost straight.

DENTITION.—Apparently as in *T. aegyptiaca*; P^2 minute, in the middle of space between canine and P^4 ; P_2 hardly more than half height of P_4 .

MEASUREMENTS.—See table, p. 177.

Tadarida ansorgei (Thomas)

Nyctinomus ansorgei THOMAS, 1913 (Mar.), Ann. Mag. Nat. Hist., (8) XI, p. 318. Type locality: Malange, Angola. The type specimen is in the British Museum.

The type specimen is the only one of this species reported from Angola. It is found, however, in the Belgian Congo and the American Museum has a good series from Faradje.

EXTERNAL CHARACTERS.—Ears united basally; tragus minute; antitragus small, triangular. Pelage short and scanty, especially across shoulders. Wing almost naked above, the naked areas extending nearly to the dorsolateral insertion. Antebrachial membrane naked above and below; uropatagium finely haired below. Wings insert near middle of tibia, instead of near the ankles.

COLORATION.—Upperparts near Natal Brown, a little darker in some specimens than this; throat blackish brown, gradually passing into Fuscous on the belly; here the hairs have pale tips. Wings, ears, and limbs, near Fuscous or paler.

SKULL.—Skull relatively narrow and high; dorsal outline sinuous; braincase elevated above rostrum. Interorbital region constricted. Parietal region inflated, not flattened. A low sagittal crest and well-developed lambdoidal crests. Occipital region high (height from basion to inion, 60 to 64 per cent of mastoid breadth). Anterior palatal vacuity minute; choanae narrow anteriorly.

DENTITION.—Agrees closely with that in *T. aegyptiaca*, but upper incisors more closely approximated. P^2 crowded in tooth-row. P_2 only slightly smaller than P_4 .

MEASUREMENTS.—See table, p. 177.

Tadarida brunneus (Seabra)

Nyctinomus brunneus SEABRA, 1900, Journ. Sci. Math. Phys. Nat., Lisbon, (2) VI, pp. 82–83. Type locality: Quissange, Angola.

This species has not been reported from Angola since the type was collected, and the Museum's expeditions secured none. A specimen from Eala, Belgian Congo ($0^\circ, 18^\circ 20' E.$), was reported by Kershaw (1923) and this was examined in 1937 at the Congo Museum.

EXTERNAL CHARACTERS.—Ears united at the base, squarish in shape. Antitragus rounded; tragus quadrate; tail more than half free from membrane; wing membranes attach to near middle of tibia. Line joining middle of humerus and distal third of femur marks limit of body pelage above. Below, pelage extends to line joining middle of femur and elbow. A few hairs in bend

of elbow and along forearm. Uropatagium nearly naked. Long bristle-hairs on rump and femur.

COLORATION.—Upperparts dark brown (near Argus Brown); below, more grayish (near Sayal Brown), brighter posteriorly.

SKULL.—Skull not flattened as in *aegyptiaca*, but profile sinuate, relatively high posteriorly. Palatal vacuity smaller than diameter of canine.

DENTITION.—First upper premolar (P²) large, reaching nearly half as high as the second (P⁴), crowded in the tooth-row between the latter and C¹. In Seabra's description P² is said to be found "along side of" P⁴, which may indicate that the species described above is not *N. brunneus* Seabra, although otherwise agreeing well with the original description.

CHAEREPHON DOBSON

Chaerephon DOBSON, 1874, Jour. Asiat. Soc. Bengal, XLIII, p. 144. Named as a subgenus of *Nyctinomus*. Genotype: *Nyctinomus johorensis* Dobson.

Four species of *Chaerephon* are known from Angola; the genus occurs throughout Africa, India, and the Malayan region.

- (a) Dark fuscous dorsally, with whitish wings and white areas ventrally; posterior borders of palatines truncate; lacrimal process poorly developed. *C. limbatus* (p. 56).
- (b) Upper and underparts uniformly brownish, as are wings. *C. pumilus* (p. 56).
- (c) Russet dorsally; palatines emarginate posteriorly; otherwise agreeing closely with *C. limbatus*. *C. cristatus* (p. 57).
- (d) Drab dorsally, with wings slightly darker; palatines narrowly emarginate posteriorly; lacrimal process well developed. *C. shortridgei* (p. 57).

An even gradation in the length of the frontal tuft of hairs is shown in these species, which makes the subgenus *Lophomops* Allen (1917) of little significance (see also Braestrup, 1933). St. Leger (1936) has used this name as a full genus, which does not appear in the least desirable.

Chaerephon limbatus (Peters)

Dysopes limbatus PETERS, 1852, "Reise nach Mossambique, Säugethiere," I, pp. 56–58, Pl. xiv. Type locality: Mozambique. The type specimen is in the Berlin Museum.

Nyctinomus limbatus. Peters, 1872b; Dobson, 1876; Bocage, 1889b; Seabra, 1900b, 1909. *Chaerephon limbatus*. St. Leger, 1936.

The Vernay Angola Expedition secured two specimens of this species at Hanha. Other localities from which it is recorded are: Benguela (Peters, 1872b); Loanda (Bocage, 1889b); Quissange (Seabra, 1900b); Mossamedes (Seabra, 1909); Congulu (St. Leger, 1936). It probably is present throughout Angola; *C. limbatus* is known from Madagascar to Kenya and the French Congo.

EXTERNAL CHARACTERS.—Ears large, angular, united above the face by a dermal fold, the under side of which is hairy; tragus minute, quadrate; antitragus ovoid, separated from conch. Wings short, membrane granular near body, attaching to lower third of tibia. Tail more than half free. A tuft of long hairs on interauricular fold.

COLORATION.—Upperparts near Clove Brown, faintly grizzled with whitish; underparts near Hair Brown, with midline of belly, inguinal region, and sides white. Dorsal sides of tail, legs, arms, and fingers like the back; under sides whitish. Wing membranes whitish.

SKULL.—Skull short, broad and rounded, with poorly developed crests. Rostrum rounded; lacrimal process small. Palatines truncate posteriorly; interpterygoid region nearly rectangular.

DENTITION.—Upper incisors approximated, separated from canine by a gap. P² minute. M³ with an N-pattern.

MEASUREMENTS.—See table, p. 178.

Angolan specimens compare closely with cotypes in the Berlin Museum externally and cranially.

Chaerephon pumilus (Cretzschmar)

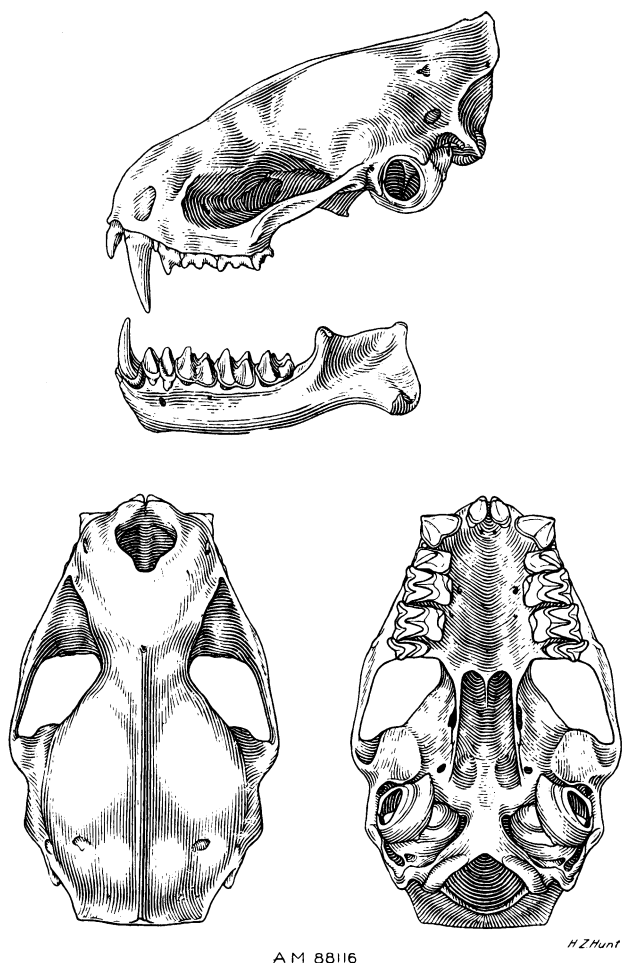
Dysopes pumilus CRETZSCHMAR, 1826, in Rüppell, "Atlas zu der Reise im Nördlichen Afrika," I Abt., Zoologie, p. 69, Pl. xxvii. Type locality: Massauha (= Massowa), Eritrea, Africa. The type is in the Senckenberg Museum, Frankfurt.

Nyctinomus pumilus. Seabra, 1900b.

Chaerephon pumilus. Monard, 1935.

The American Museum does not have specimens of this bat from Angola, but it is reported by Seabra (1900b) from Catum-

EXTERNAL CHARACTERS.—Ears large and



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Fig. 12. *Mops chitauensis*, skull and mandible.

angular, sharply pointed for their size, meeting medially; tragus minute, quadrate; antitragus large, quadrate, with corners rounded. Top of head with depression between ears, and tuft of hair. Wing membrane and uropatagium reach to middle of tibia. Tail apparently more than half free. Pelage fine, oily; above, the pelage extends to a line joining distal third of femur with proximal third of humerus. Below, a band of whitish hairs on the wing membrane between middle of femur and middle of humerus, separated from body by a naked line.

COLORATION.—Upperparts are reddish brown, near Sepia, faintly grizzled with

whitish, becoming Fuscous-Black on head; bases of hair paler. Underparts dirty whitish. Wing membranes, uropatagium, legs and ears, near Clove Brown (in some specimens these are pale, somewhat as in *Chaerephon limbatus*).

SKULL.—Short and broad; lambdoidal crest strongly produced in the type, and sagittal crest well developed. In other specimens these are weak.¹ Basisphenoidal pits moderately developed.

¹ *Chaerephon (Allomops) osborni* Allen is hardly distinguishable cranially and dentally from the type of *M. angolensis*. M³ is identical in pattern and both skulls have well-marked occipital crests. The variation in specimens of *M. angolensis* examined in the development of cranial crests indicates that these characters are of no systematic significance but depend on the age and sex of the individual.

DENTITION.—Upper incisors closely approximated; lower medial pair deeply bifid. P^2 minute; P^4 and canine in contact medially. M^3 about half the size of M^1 or M^2 , with a V-pattern, but with vestigial mesostyle-metacone commissure. Consequently this species is more or less intermediate between typical *Mops* and *Chaerephon*.

MEASUREMENTS.—See table, p. 178.

Mops chitauensis Hill

Figure 12

Mops chitauensis HILL, 1937, Amer. Mus. Novitates, No. 916, p. 3, Fig. 1. Type locality: Chitau, alt. 4930 ft., Angola. The type specimen is in the American Museum.

This bat is known only from the type, which was collected by Mr. Lee S. Bradley, Phipps-Bradley Expedition.

EXTERNAL CHARACTERS.—Ears quadrate; antitragus ovoid; tragus minute, half-crescentic, with strongly convex lateral margin and elongated tip. Medial borders of ears meeting; a tuft of hair behind this. Uropatagium reaches to heels; wing membranes attach to lower third of tibia.

COLORATION.—Upperparts near Fuscous-Black, shading into Black on the head, grizzled with whitish hairs and tips; bases of hairs paler. Underparts dirty whitish. Wings darker than Fuscous, as are the ears. Upper arms and legs pale.

SKULL.—Short and broad; lambdoidal crest strongly developed, but sagittal crest poorly marked. Palatal emargination not extending between incisors.

DENTITION.—Upper incisors closely approximated; separated from canines by a gap. P^2 minute, situated laterally to axis of tooth-row; P^4 and canine in contact medially. M^3 about half size of M^1 and M^2 , with a V-pattern, no trace of the mesostyle-metacone commissure being visible.

MEASUREMENTS.—See table, p. 178.

OTOMOPS THOMAS

Otomops THOMAS, 1913, Jour. Bombay Nat. Hist. Soc., XXII, pp. 90-91. Genotype: *Nyctinomus wroughtoni* Thomas.

A single form is known to occur in Angola. The genus is found in the East Indies, southern and central Africa.

Otomops martiensseni icarus Chubb

Otomys icarus CHUBB, 1917 (May), Ann. Durban Mus., I, pp. 433-434. Type locality: Durban. The type specimen is in the British Museum.

The American Museum has a single specimen from Chitau, Angola, collected by Mr. Lee S. Bradley. Another specimen was secured at this locality by the Carnegie Museum. These are apparently the first records from southwestern Africa for this bat.

EXTERNAL CHARACTERS.—Ears very large, united above the eyes and projecting forward over the face; tragus minute; antitragus apparently absent; a lobe of skin extends ventrally from inner side of conch. Upper lip projects anteriorly, shelf-like. Gular sac present in males. Wing membranes reach to the ankle. Pelage abundant and soft.

COLORATION.—Upperparts dark brown, much darker than Bister posteriorly, the hairs with paler bases, and with a band of dull Cartridge-Buff. Underparts near Saccardo's Umber except the throat which is dirty Pinkish Buff.

SKULL.—Skull elongate, with an irregularly sinuate dorsal outline. Nasal opening wide and the sides flare laterally. Basisphenoidal pits deep, with overhanging edges. Premaxillae meet between incisors. Zygomatic arches slightly more widely spreading than the rostrum, with a large, dorsally directed process. Bullae elongate, reaching forward to meet pterygoids.

DENTITION.—Upper incisors approximated. P^2 small, but normal in position; M^3 relatively large, with metacone well developed. A diastema between P_2 and P_4 .

MEASUREMENTS.—See table p. 178.

It is questionable if *O. icarus* can be distinguished from *O. martiensseni*, but until a larger series of both forms is secured that point cannot be settled. Meanwhile it seems preferable to treat them as races of a single African species.

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ORDER PRIMATES

There are two families, belonging to the two suborders of primates, found in Angola. Family Lorisidae of the Suborder Lemuroidea contains small or medium-sized lemurs: in these the orbit of the skull is incompletely floored; the lower incisors are procumbent, the upper ones minute and separated medially; the second

digit of the foot is armed with a claw. Family Cercopithecidae of the Suborder Anthroipoidea contains the monkeys and baboons: in these the floor of the orbit is complete; the upper incisors are normal and not separated medially; the digits are all armed with flat nails.

SUBORDER LEMUROIDEA

LORISIDAE

Galago, including the African "bush-babies," and *Otolemur*, containing the gray lemurs, occur in Angola.

- (a) Rostrum short and weak (distance from front of orbit to tips of nasals less than diameter of orbit). Tail long and slender.....*Galago*.
 (b) Rostrum well developed (distance from front of orbit to tips of nasals greater than diameter of orbit). Tail thick.....*Otolemur*.

GALAGO GEOFFROY

Galago E. GEOFFROY, 1796, Mag. Encyclop., (2) I, p. 49, Pl. I. Genotype, by monotypy: *Galago senegalensis* Geoffroy.

The genus occurs from Senegal and Kenya to the Cape.

Galago senegalensis moholi Smith

Plate I

Galago moholi A. SMITH, 1836, "Rept. Exped. Explor. S. Africa," appendix, p. 42. Type locality: Limpopo River, about 25° S., Bechuanaland. The type specimen is in the British Museum.

Galago senegalensis. Bocage, 1879; 1882.

Galago galago. Seabra, 1909.

Galago moholi var. *intontoi* MONARD, 1931, Bull. Soc. Neuchâtel. Sci. Nat., LV, pp. 67-68. Type locality: Kubango region, Angola.

Galago tumbolensis MONARD, 1931, idem, pp. 68-69. Type locality: Rio Tumbolé, about 40 km. E. Vila da Ponte, Angola.

The American Museum has 84 specimens from Angola: Chitau, 67; Chissonque, 8; without locality, but probably Chitau, 9. The Carnegie Museum has 15 specimens: Chitau, 3; Gauca R. and Gauca, 12. Other localities in Angola from which *G. s. moholi* is recorded, are: Caconda (Bocage, 1879); Benguela (Thomas and Wroughton, 1905); Country of the Cuamates (Seabra, 1909); Bailondo, Ganguela, and Lobito (Schwarz, 1931); Rio Mbalé, Caquindo, Chimpore, Vila da Ponte, and Rio Tumbolé, 40 km. E. Vila da Ponte (Monard, 1931); Congulu (St. Leger, 1936). *G. s. moholi* occurs locally throughout Angola.

EXTERNAL CHARACTERS.—Ears large, ovoid, nearly naked; tragus large, situated internally; antitragus well marked, separated behind by a notch. Fore feet with third and fourth digits elongate; pollex opposable, second finger, partly so.

Hind leg long, hind foot hand-like, tarsus elongate, hallux strongly opposable. Palmar and distal part of plantar surfaces naked. Tail longer than head and body, club-shaped and slightly flattened. Pelage soft and woolly. Mammæ 2-0 = 4.

COLORATION.—Individual variation is slight, but there are some seasonal differences in two series, one collected in February, the other in August.

February specimens: Upperparts from near Drab-Gray to Deep Mouse Gray, grizzled with whitish. A whitish stripe on the nose to the forehead. Circumocular rings black. Underparts whitish, underlaid by plumbeous and washed with Cream-Buff, especially in the pectoral region. Limbs faintly washed with Cream-Buff. Tail of slightly different gray than that of the back, becoming much darker at the tip, in individuals nearly black.

August specimens: Upperparts more brownish, from near Mouse Gray to near Drab, grizzled with whitish and grayish. Tail usually darker than Drab at the tip, more brownish than in February. One individual has a whitish tail-tip, and others have a few whitish hairs.

SKULL.—Facial part of skull much reduced; braincase large and rounded. Orbits large, together nearly equal in size to braincase. Postorbital bar complete but orbit not walled in posteriorly. Front of orbit above point between P^3 and P^4 .

DENTITION.— I_2^2 , C_1^1 , P_3^3 , M_3^3 = 36. Upper incisors rounded in section, slender and weak; upper canine with secondary cusps on posterior edge. P^4 molariform, but small. M^3 triangular. Lower incisors flattened from side to side, procumbent; lower canine like them. P_{2-3} caniniform, P_4 transitional to quadritubercular M_{1-2} ; M_3 with 5 cusps.

MEASUREMENTS.—See table, p. 179.

OTOLEMUR COQUEREL

Otolemur COQUEREL, 1859 (Nov.), Rev. Mag. Zool., (2) XI, pp. 458-460, Pls. xvii-xviii, fig. 1. Genotype: *Otolemur agisymbanus* Coquerel (a race of *O. crassicaudatus* Geoffroy, 1812).

The large lemurs are found in the same general region as the galagos.

Otolemur crassicaudatus monteiri
(Gray)

Callotus monteiri GRAY, 1863, Proc. Zool. Soc. London, p. 145 (from Bartlett, Ms.). Type locality: Cuio Bay, Angola. The type is in the British Museum.

Galago monteiri. Bocage, 1865, and authors.

Galago (Otogale) monteiri. Peters, 1881.

The American Museum has 27 specimens of *O. c. monteiri* from Angola: Lobito, 2; Mombolo (Namba), 1; Chitau, 19; 20 to 35 km. E. of Dande, 4; Capelongo, 1. The Carnegie Museum has 4 specimens: Chitau, 3; Gauca, 1. Other records of this lemur in Angola are: Duque de Bragança (Bocage, 1865); Caconda (Bocage, 1879); Malange (Peters, 1881); Ndongo, Benguela District (Thomas and Wroughton, 1905); Vila da Ponte and Tumbolé (Monard, 1931); Mount Moco and Quirimbo (St. Leger, 1936). *O. c. monteiri* is found in Angola and Northern Rhodesia.

EXTERNAL CHARACTERS.—Much like *Galago s. moholi*, but fur longer, more woolly, especially on the tail; hind legs apparently shorter.

COLORATION.—Individually variable, gray washed with varying amount of buff. Upperparts from near Deep Neutral Gray through Drab-Gray to Olive-Buff, overlaid by blackish. Top of head more brownish, ears blackish; circumocular black markings, rest of face with admixture of white. Tail from near Neutral Gray to near Pale Olive-Buff. Underparts white, overlying Deep Neutral Gray except in midventral, pectoral, and inguinal regions. Fingers and toes nearly black.

SKULL.—Facial portion large, rostrum long, heavy, swollen over the roots of the canines. Zygomatic arches widely spreading (zygomatic breadth, 60 to 67 per cent of skull length); postorbital bar situated at middle of jugal bone, orbit subequal to temporal opening. Braincase elongate and flattened. Lateral pterygoid plates only slightly divergent.

DENTITION.—As in *Galago*, but upper incisors more flattened anteroposteriorly; canines much larger; first upper premolar relatively larger; M^3 more quadrate.

MEASUREMENTS.—See table, p. 179.

SUBORDER ANTHROPOIDEA

CERCOPITHECIDAE

The old world monkeys are represented in Angola by three genera:

- 1.—(a) Skull broad and short (zygomatic breadth about 74 per cent of greatest length); front of orbit above M^1 or in front of it; foramen magnum opening posteriorly. Thumb vestigial. *Colobus* (p. 63).
- (b) Zygomatic breadth 64 to 69 per cent of greatest length of skull; front of orbit above M^2 or in front of it; foramen magnum opening chiefly inferiorly. 2.
- (c) Zygomatic breadth about 60 per cent of greatest length of skull; facial part of skull greatly elongated, front of orbit behind last upper molar. Dark or pale olive-brownish. *Papio* (p. 66).
- 2.—(a) Eyelids whitish. Mandible massive, its ramus nearly vertical. M_3 with 5 cusps. *Cercocebus* (p. 66).
- (b) Eyelids colored as face. Mandible weaker, with sloping ramus. M_3 with 4 cusps. *Cercopithecus* (p. 64).

COLOBUS ILLIGER

Colobus ILLIGER, 1811, "Prodromus Syst. Mamm. Avium," p. 69. Genotype: *Cebus*

polykomos Zimmermann (subsequent designation, I. Geoffroy, 1857).

A single species is known to occur in Angola. *Colobus* occurs from Sierra Leone to Angola, east to Ethiopia and Zanzibar.

Colobus angolensis angolensis Sclater

Colobus angolensis SCLATER, 1860, Proc. Zool. Soc. London, p. 245. Type locality: About 300 miles inland from Bembe, Angola. The type specimen is in the British Museum.

Colobus angolensis sandbergi LÖNNBERG, 1908, Arkiv f. Zool., IV, No. 15, p. 1, text fig. Type locality: Lufizi River, upper Zambezi River, Angola.

This species does not occur in the region of Angola in which the American Museum expeditions collected. In addition to the two type localities given above, it is recorded questionably from the country of the Muata-Yanvo (Bocage, 1889), and occurs in the Congo.

EXTERNAL CHARACTERS.—A conspicuous whorl of hairs on top of the head; a well-marked superciliary fringe. Lateral

whiskers well developed, but beard rudimentary.

COLORATION.—Black, with long white shoulder mantles and white temporal patches; end of tail with a white brush. A narrow perineal patch of white. No white superciliary band.

CERCOPITHECUS LINNAEUS

Cercopithecus LINNAEUS, 1758, "Systema Naturae," 10th Ed., p. 26. Genotype: *Simia diana* Linnaeus, designated by Stiles and Orleman, 1926. Placed on official list of genera by the International Committee on Zoological Nomenclature, 1928, Opinion 104 (Smithsonian Misc. Coll., LXXIII, No. 5).

There are four species of guenon monkeys recorded from Angola: the genus occurs from south of the Sahara to the Cape.

- 1.—(a) Facial part of skull short in adults (distance from front of orbit to prosthion¹ less than 40 per cent of the zygomatic breadth). M³ small, usually with only three cusps. Color yellowish olive; nose black; underparts whitish. Size small (head and body less than 380 mm.).....*C. talapoin ansorgei* (p. 65).
- (b) Facial part of skull longer in adults. M³ usually quadritubercular. Size larger.....2.
- 2.—(a) Facial part of skull moderately developed (front of orbit to prosthion¹ less than 45 per cent of zygomatic breadth); front of orbit above M¹ in adult males, in front of it in females. A conspicuous cordate white spot on nose; underparts whitish, upperparts with reddish brown, many-banded hairs.....*C. a. ascanius* (p. 65).
- (b) Facial part of skull longer (front of orbit to prosthion more than 45 per cent of zygomatic breadth); front of orbit over M² in adult males, or over hinder part of M¹ in females.....3.
- 3.—(a) Head, limbs, tail, and underparts predominantly blackish; body blackish and whitish mixed; whitish brow-band.....*C. m. mitis* (p. 65).
- (b) Head, limbs and tail olive-grayish; underparts whitish; a whitish brow-band, margined below with black.....*C. aethiops cynosuroides* (p. 64).

Cercopithecus aethiops cynosuroides (Scopoli)

Plate II

Simia cynosuroides SCOPOLI, 1786, "Deliciae Florae et Faunae Insulariae," part 1, pp. 44–45.

¹ The most anterior point of the premaxillary.

Pl. XIX. (Ticini: folio.) No type or type locality given, description based on living specimen in captivity.

Cercopithecus cynosuroides. Jentink, 1893.

Cercopithecus aethiops cynosuroides. Schwarz, 1926.

The American Museum has 15 specimens of *C. a. cynosuroides* from Angola: Chitau, 6; 35 km. E. Dande, 2; Chipopia, 1; Capelongo, 6. Most of these specimens are immature, however, and nearly half are native skins without skulls. This monkey has been previously reported from Cahama, on the Caculovar River (Jentink, 1893); Rio Cubal (Schwarz, 1926); Cangela and Cubango Mission (Monard, 1935). *C. a. cynosuroides* probably occurs along the rivers throughout Angola, but it is apparently rare in the western half of the country, since Angolan records of it are so few. The species is found from Senegal and Ethiopia to the Cape, exclusive of most of the Congo basin.

EXTERNAL CHARACTERS.—Face becoming prognathous with age and to a greater degree in males. Body slender; limbs relatively long; tail longer than head and body. Front of face covered with short hairs; scattered vibrissae on upper lip and chin; cheeks, forehead, and sides of head with hairs directed dorsally; forehead and cheeks with bristles intermixed with hairs. Pollex much reduced; hallux large.

COLORATION.—Upperparts vary in color from near Dark Olive-Buff to near Isabella Color mixed with black; head like back or with more black admixture. Underparts silky whitish. Face with blackish hairs; a broad indistinct whitish superciliary band; eyebrows narrow, blackish. Cheeks mixed whitish and black; sides of head and neck below ears, white. Limbs laterally near Light Mouse Gray, medially white. Dorsal part of tail with more black than limbs; usually a patch of Cinnamon-Rufous hairs on either side between base of tail and ischial callosities. The young are grayer than adults, and very young individuals are whitish, overlaid with black dorsally, with grayish belly and limbs.

SKULL.—In males the rostrum is much longer than in females; muscular crests are better developed, temporal ridges form a sagittal crest in old individuals. In both

sexes, nasals are narrow distally, concave in dorsal outline. Braincase short and broad (mastoid breadth more than 75 per cent of the distance from brow to inion). Posterior margin of bony palate produced medially to an obtuse angle; alveolar margin of palate almost at right angles to flattened "roof."

DENTITION.—Lateral upper incisors moderately developed. Males with long canines, strongly grooved anteriorly. M³ with four cusps, although in related forms the hypocone is said to be reduced (Schwarz, 1928, p. 663).

MEASUREMENTS.—See table, p. 18^o.

Cercopithecus mitis mitis Wolf

Cercopithecus mitis J. WOLF, 1822, "Abbildungen u. Beschreibungen merkwürdiger naturgeschichtlicher Gegenstände," II, p. 145, Pl. xxxiv (Nürnberg). The type specimen, probably from Angola, was living in the Nürnberg Menagerie (*vide* Schwarz, 1933).

Cercopithecus leucampyx FISCHER, 1829, "Synopsis Mammalium," p. 20. Type locality: "Guinea" = Angola. Type: "*C. diana*" female, in Cuvier and Geoffroy (1824-42), "Hist. Nat. Mamm."; now in the Paris Museum.

Cercopithecus pluto GRAY, 1848, Proc. Zool. Soc. London, pp. 56-57, Pl. III, 1 fig. Type locality: Angola. The type specimen was living in the London Zoological Gardens; now in the British Museum.

Cercopithecus samango (?). Peters, 1865.

The American Museum does not have specimens of this species from Angola. It is recorded from near Pungo Andongo (Peters, 1865); Columbo and Loanda (Bocage, 1889); Dondo (Elliot, 1913), and in the Leiden Museum there are numerous specimens imported by dealers from "Benguela." *C. m. mitis* occurs in western Congo and northern Angola; closely allied forms are found from Uganda and the Congo to Natal.

COLORATION.—Back and sides black, speckled with white or pale buffy. A white, mixed with blackish, superciliary band. Top of head, neck, and shoulders, black or speckled sparsely with grayish. Limbs and underparts black or very dark grayish; feet sometimes tinged with brownish. Tail black at base and tip; remainder, dark grayish black.

MEASUREMENTS.—See table, p. 180.

Cercopithecus ascanius ascanius (Audebert)

Simia ascanius AUDEBERT, 1799, "Histoire Naturelle des Singes," Fam. IV, pp. 21-22, Pl. XIII. Type locality: not given, probably Angola. The type specimen is in the Paris Museum.

Cercopithecus melanogenys GRAY, 1845, Ann. Mag. Nat. Hist., (1) XVI, p. 212; 1849, Proc. Zool. Soc. London, pt. 17, pp. 7-8, Pl. ix. Type locality: Western Africa, probably Angola. The type specimen is in the British Museum.

Cercopithecus picturatus SANTOS, 1886 (July), Jorn. Sci. Math. Phys. Nat., Lisbon, (1) XI, pp. 95-98. Type locality: Quipampala, 6 miles from Ambriz, Angola. The type specimen was then living in the Zoological garden of Lisbon; now in the Museu Bocage.

The Vernay Angola Expedition secured a single native skin without skull or measurements from Vila Arriaga, 180 km. E. Mossamedes. No doubt this specimen came from the interior or north. It has been recorded from Bembe (Sclater, 1860); Encôge (Monteiro, 1860). The species occurs from Angola east to Uganda, chiefly in the heavy forests.

EXTERNAL CHARACTERS.—In the specimen examined: Ears agree closely with Audebert's description, small, flesh-colored, nearly naked.

COLORATION.—Upperparts black, ticked with Orange-Rufous, the underfur Olive-Brown. Top of head much less rich, black grizzled with Cartridge Buff. Face (according to descriptions) bright blue with violet tints, during life. Underparts, medial sides of limbs, throat, cheeks, and a rosette in front of ears, whitish. Cheeks with a black bar transversally, formed by black-tipped hairs. Nose black, with a striking white, heart-shaped spot at the end. Fore legs laterally black, hind legs like back basally, becoming iron-gray distally. Tail like the back above, whitish below, basally; becoming more reddish, above and below, distally (as in Santos' description of *picturatus*).

Cercopithecus talapoin ansorgei Pocock

[*Cercopithecus talapoin*] *ansorgei* Pocock, 1907 (Oct.), Proc. Zool. Soc. London, p. 742. Type locality: Cambaca [= Canhoca], Angola. The type specimen is in the British Museum.

Miopithecus talapoin. Thomas, 1904.

The Vernay Angola Expedition secured

a single subadult male at Hanha, and two specimens from Angola in the Leiden Museum have been examined. In addition to the type locality, *C. t. ansorgei* is recorded from Ambaca (Bocage, 1889); Cassoalala (Elliot, 1913). It is apparently rare in Angola.

COLORATION.—Upperparts are between Deep Olive-Buff and Olive-Ochre mixed with Deep Mouse Gray of underfur and overlaid with black. Lateral sides of limbs brighter. Underparts and medial sides of limbs silky whitish. Tail blackish, hairs with bands of near Reed Yellow. Nose and lips covered with black hairs; under the nose, a semi-circle of Olive-Ochre and white; cheeks whitish overlaid with Olive-Ochre and blackish; an obscure black streak from the eye halfway to the ear.

SKULL.—Facial region much reduced, even in old males, as compared with young specimens of *C. a. cynosuroides*. Supraorbital ridges less developed. Nasals short, with dorsal outline nearly straight, instead of convex. Alisphenoid forming less than one-third of outer wall of orbit instead of more than half in *cynosuroides*. Posterior choanae broad. Orbits large and rounded. Zygomatic arches extremely short, enclosing a quarter circle. Walls of tympanic bullae cellular and translucent.

DENTITION.—Middle pair of upper incisors much broader than lateral ones. M^3 reduced, with only three cusps well developed instead of the usual four.

MEASUREMENTS.—See table, p. 180.

CERCOCEBUS GEOFFROY

Cercocebus E. GEOFFROY, 1812, Ann. Mus. d'Hist. Nat. Paris, XIX, p. 97. Genotype: *Cercocebus fuliginosus* Geoffroy (= *Simia atys* Audebert).

Cercocebus occurs from French Guinea to Katanga, Congo, east to the Tana River, Kenya.

Cercocebus aterrimus (Oudemans)

Cercopithecus aterrimus OUDEMANS, 1890, Zool. Garten, XXXI, p. 267. Type locality: Stanley Falls, Belgian Congo. The type specimen is in the Leiden Museum.

Cercocebus aterrimus will probably be found in Lunda Province, Angola, but no

records have yet been published of its presence in Angola.

EXTERNAL CHARACTERS.—Pelage long and coarse. "Whiskers" below ears long (approximately 85 mm.). Top of head with a crest. Pollex reaches to middle of first phalanx of digit II.

COLORATION.—All black except cheek "whiskers" which are near Drab.

SKULL.—Nasals flattened. A deep fossa in the maxillary root of the zygoma.

DENTITION.—Teeth massive, especially middle incisors. M^3 with five cusps.

MEASUREMENTS.—See table, p. 180.

PAPIO ERXLEBEN

Papio ERXLEBEN, 1777, "Systema Regni Animalis," p. 15. Genotype: *Papio sphinx* Erxleben, not of Linnaeus (= *Cynocephalus papio* Desmarest), by subsequent designation, Palmer, 1904.

There are two species of *Papio* in Angola: the genus is found from the upper Nile and Senegal to the Cape, exclusive of much of the Congo region.

- (a) Coloration light: Near Chamois and Honey Yellow overlaid by blackish. Molars small (M^1 less than 9 mm. in greatest width).....*P. kindae*.
- (b) Coloration dark: Fuscous-Black grizzled with Olive-Buff. Molars large (M^1 more than 9.5 mm. in greatest width).....*P. comatus*.

Papio comatus Geoffroy

Plate III

Papio comatus E. GEOFFROY, 1812, Ann. Mus. Nat. Hist. Nat. Paris, XIX, p. 103.

Cynocephalus porcarius. Bocage, 1889.

Papio porcarius. Of authors.

The Vernay Angola Expedition secured 6 specimens of the chacma baboon at Hanha. It has been reported from Bibala, and the interior of Benguela and Mossamedes districts (Bocage, 1889). *P. comatus* probably does not occur north of Benguela district, nor east of the Cunene and Cuvo Rivers; it is a South African form.

COLORATION.—General coloration agrees closely with a specimen from District George, Cape Province. Body above and below slightly more olivaceous than Chacura Drab (Fuscous-Black grizzled with Olive-Buff). Neck with a short mane of

black hairs. Cheeks, throat, and medial sides of limbs near Smoke Gray. Lateral sides of forearms and upper sides of hands and feet almost black.

SKULL.—Skulls of adult males have facial portion elongate (rostrum approximately equal in length to braincase); rostrum heavy, squarish, with sides behind root of canine excavated; anterior nares wide, orbit slightly wider than high (about 6.5×4.3); palatines squarish, with a medial posterior projection. Braincase large, sloping, with only a slight convexity from brow toinion; occiput flattened, rugose. Well-marked lambdoidal and temporal crests, the latter usually forming a short sagittal crest posteriorly.

DENTITION.—All teeth large and powerful. Molars with nearly double the bulk of those in *P. kindae*.

MEASUREMENTS.—See table, p. 181.

Skulls of chacma baboons from Angola are appreciably smaller than specimens and published measurements of South African animals (Goldblatt, 1926).

Papio kindae Lönnberg

Papio kindae LÖNNBERG, 1919, Rev. Zool. Afric., VII, pp. 147-149. Type locality: Kinda, Lulua district, Belgian Congo.

Papio cynocephalus, part. Selater, 1901.

The Vernay Angola Expedition secured 4 specimens of this species: Chitau, 3 (including an infant); Mombola (Namba), 1. *P. kindae* is probably found only in central interior Angola and in Katanga, Belgian Congo, unless this may be the baboon reported by Elliot (1913), under the name of *Papio papio*, from Cuio Bay, Angola. The type and several topotypes were examined in the Congo Museum, Tervueren, Belgium.

COLORATION.—Back a mixture of Honey Yellow, or slightly brighter, and black; sides paler with less blackish. Underparts pale dirty whitish. Lower cheeks, postauricular spot, and medial sides of limbs like the underparts. Lateral sides of limbs and dorsal sides of feet, paler than sides of body. Tail like the back, but more blackish especially toward the tip.

SKULL.—The skull differs from skulls of *P. comatus* as follows: size considerably

smaller; rostrum shorter, tapering, and more slender; zygomatic arches weaker; parietal part of braincase higher; ascending process of alisphenoid much narrower; frontal process of premaxillary longer, the premaxillo-nasal suture about equal in length to maxillo-nasal, rather than half as long; nasals truncate anteriorly; a much deeper fossa between molar teeth and orbit; postglenoid process much smaller; palatine bones shorter. The skull of a subadult specimen resembles that of *Papio papio* of the same age, figured by Elliot (1913, Pl. VIII); rostrum more angular, relatively more slender; frontal roughly semi-circular rather than wedge-shaped; brow almost directly above root of zygoma, rather than above middle of zygoma.

DENTITION.—All teeth considerably smaller than in *P. comatus*, especially the molars. Molars agree well in size with measurements of *P. kindae*.

MEASUREMENTS.—See table, p. 181.

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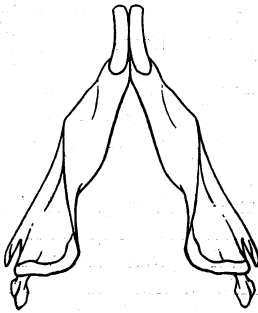
ORDER RODENTIA

KEY TO THE FAMILIES OF ANGOLAN RODENTS

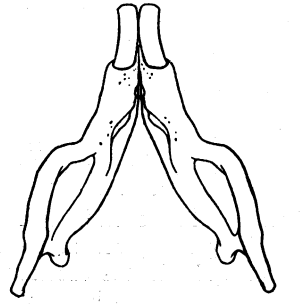
- 1.—(a) Mandible with angle and ramus on same plane as the alveolar portion, not bent laterally (see Fig. 13).....2.
- (b) Mandible with angle and ramus bent laterally (see Fig. 13).....5.
- 2.—(a) A flying membrane between fore and hind limbs; tail with a series of large scales on under side....ANOMALURIDAE (p. 77.)
- (b) Without a flying membrane or large ventral caudal scales....3.
- 3.—(a) Skull with infraorbital foramen small, usually situated on rostrum in front of zygomatic plate; postorbital processes present; cheek-teeth $\frac{4}{4}$ or $\frac{5}{4}$. Tail bushy; external ear small, relatively thick.....
- (b) Skull with infraorbital foramen moderately large, situated in root of zygoma; no postorbital processes. External ear relatively large and leafy....4.
- (c) Skull with infraorbital foramen enormous; small postorbital processes; mastoid bullae strongly inflated, appearing on roof of skull; cheek-teeth $\frac{4}{4}$. Tail long, bushy, black-tipped; claws of hind foot like small hoofs....PEDETIDAE (p. 77.)
- 4.—(a) Skull with palate broad, relatively to cheek-teeth; zygomatic plate small, horizontal; jugal bone large; incisive foramina small; cheek-teeth $\frac{4}{4}$, small. Tail bushy; pelage soft.....MUSCARDINIDAE (p. 78.)
- (b) Skull with palate relatively narrow; zygomatic plate larger, partly vertical; jugal bone small, zygomatic arch formed

chiefly by maxillary and squamosal; incisive foramina relatively large; cheek-teeth $\frac{3}{2}$. Tail nearly naked; pelage often harsh.....MURIDAE (p. 81.)

- 5.—(a) Skull with infraorbital foramen moderately small; zygomatic arches widely spreading; hard palate extending far behind cheek-teeth; incisors proodont (projecting forward), their roots extending to palate behind molars; cheek-teeth simple. Tail short; pelage short, soft; external ears and eyes minute.BATHYERGIDAE (p. 114.)



Sciuroid



Hystricoid

Fig. 13. Types of mandibles in rodents.

- (b) Skull with infraorbital foramen large; zygomatic arches normal; palate short; incisors ortho- or opisthodont, shorter-rooted; cheek-teeth with complicated enamel-folds....6.
- 6.—(a) Skull with moderately large rostrum, not inflated; incisive foramina large; incisors strong, with three deep grooves. Pelage coarse and bristly.....THRYONOMYIDAE (p. 118.)
- (b) Skull strongly-inflated; nasals extremely broad; incisive foramina minute; incisors weak, without definite grooves. Pelage with long quills; end of tail with rattle of hollow quills.....HYSTRICIDAE (p. 119.)

SCIURIDAE

There are five forms of squirrel in the Angolan collections of the American Museum, and three others are known to occur in Angola. The Angolan squirrels are all moderately large, diurnal rodents with short, thick-walled ears, large eyes, and long bushy tails. Their pelage is either harsh or moderately soft. Cranially, they differ from other Angolan rodents by the small size of the infraorbital foramen, which transmits no muscle fibers, and by the presence of definite postorbital processes. The cheek-teeth are $\frac{3}{2}$ or $\frac{4}{2}$.

Geosciurus is, as its name indicates, a ground squirrel and lives in burrows in

the deserts of southern Angola. The other genera are brush or tree squirrels.

KEY TO THE GENERA OF SQUIRRELS FOUND IN ANGOLA

- 1.—(a) Pelage coarse, like dry spruce needles; a white stripe on either side of the back. Skull large and arched; tympanic bullae large; palate extending considerably behind molars; nasals almost parallel-sided. Mammæ 0-2 = 4.....*Geosciurus* (p. 70).
- (b) Pelage normal. Tympanic bullae smaller; nasals expanded anteriorly; palate ending near molars.....2.
- 2.—(a) Cheek-teeth $\frac{5}{2}$. Skull with muzzle narrow, tapering anteriorly; postorbital processes small, weak.....3.
- (b) Cheek-teeth $\frac{4}{2}$; lower crowns basin-shaped. Skull with muzzle broader, longer, less tapering; postorbital processes stronger, directed more laterally.....4.

- 3.—(a) A pale stripe on either side of the back. Skull with rostrum weaker. Cheek-teeth smaller; lower ones with low cusps and transverse ridges. Ears short, rounded; mammae 0-2 = 4. *Funisciurus* (p. 70).
 (b) Color yellowish gray, unstriped. Skull with rostrum heavier. Cheek-teeth larger; lower ones with high cusps. Ears higher, more pointed; mammae 1-2 = 6. *Paraxerus* (p. 74).
- 4.—(a) Size large (head and body about 290 mm.). Ventral surface of body nearly naked. Skull relatively elongated; infraorbital foramen larger, situated in zygomatic plate. *Protoxerus* (p. 76).
 (b) Size smaller (head and body about 200 mm.). Ventral surface moderately well clothed with fur. Skull broader; infraorbital foramen smaller, at the end of a canal. Ear short, rounded; mammae 1-2 = 6. *Helosciurus* (p. 75).

Xerinae

GEOSCIURUS A. SMITH

Geosciurus A. SMITH, 1834 (Mar.), S. Afr. Quart. Jour., II, No. 2, p. 128. Genotype: *Sciurus capensis* Kerr, subsequent designation Thomas, 1897 (= *Sciurus inaurus* Zimmermann).

In addition to the several diagnostic characters of the genus given in the key to the genera of squirrels, the external ear is minute; the hind foot is large, with a naked sole, the interdigital pads are well developed, but the metatarsal pads are absent.

This genus is a South African one, closely related to *Xerus* of eastern Africa.

Geosciurus princeps Thomas

Plate IV; Figure 14

Geosciurus princeps THOMAS, 1929, Proc. Zool. Soc. London, p. 106. Type locality: Otji-tunda, Central Kaokoveld, South West Africa. The type specimen is in the British Museum.

This harsh-pelaged ground squirrel was previously reported only from the Kaokoveld. The Vernay Angola Expedition secured two specimens, 101 km. E. Mossamedes. In addition to these, there is a single specimen in the Carnegie Museum collection, taken by Ralph Pulitzer at Mucungu, some distance to the north of the other locality. In Angola, *Geosciurus* is probably found throughout the southwestern desert region, north at least to Mucungu.

COLORATION.—There is considerable difference in general color tone between the July and October specimens. In the former pelage, general coloration of upperparts Bister, grizzled with whitish. In the October specimen the pelage is more worn and shorter; coloration appreciably paler, near Cinnamon. On the head, however, the coloration remains constant. In fresh pelage the basal two-thirds of each hair is darker than Bister (about 15"n), a band of Cinnamon follows, and the tip is white.

A conspicuous white stripe on either side of the back, from shoulder to flank. Another white stripe from the nares over the eye; a subocular stripe of white. Underparts white; this including medial sides of fore and hind legs, and hind feet.

Tail clothed with long hairs, which are white for the basal sixth; the following sixth, between Bister and Black; the next sixth, white; the next two-sixths, Bister-Black; and the tip is again white. The dark bands fade with wear to Bister or slightly darker.

SKULL.—Skull large, with heavy rostrum and zygomata. Supraorbital crest and postorbital processes well developed. Tympanic bullae large and irregular, with partial division into compartments visible externally. Mandible with a large, medially bowed angle, and a small coronoid process.

DENTITION.—Premolars, above and below, considerably smaller than molars.

MEASUREMENTS.—See table, p. 182.

Mr. Lang in his field notes states that *Geosciurus* is fairly common at the locality 101 km. E. Mossamedes.

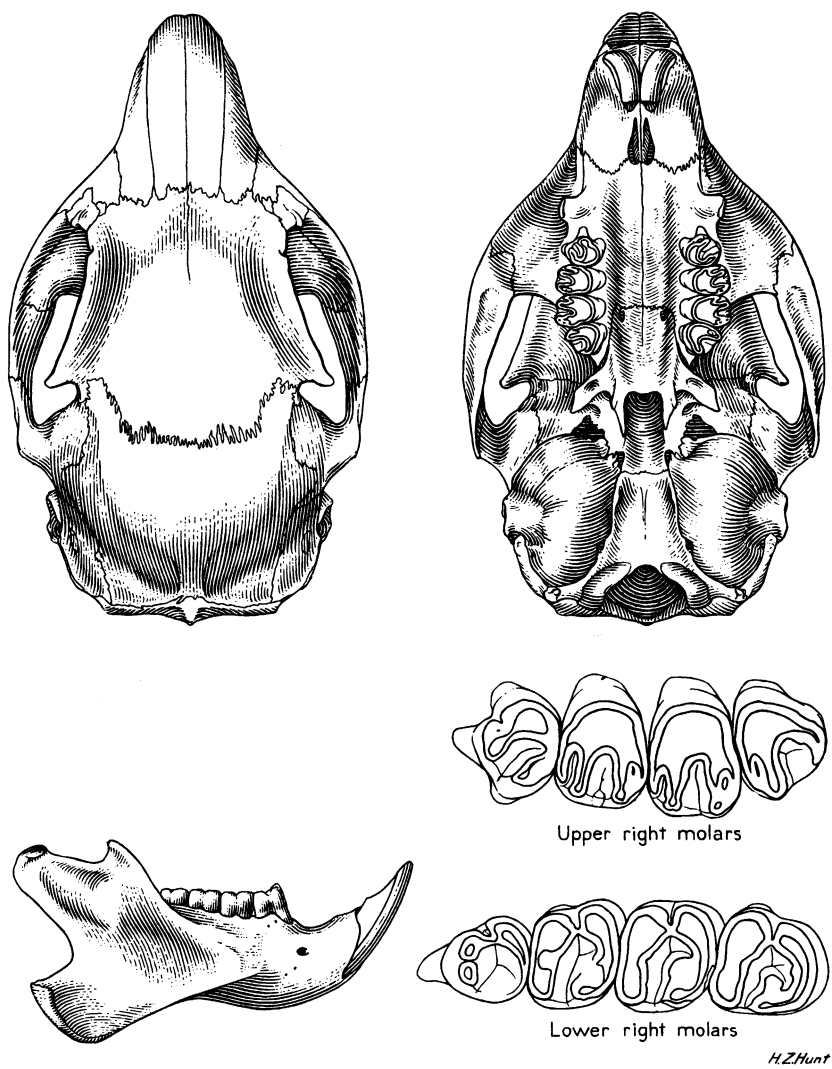
Funambulinae

FUNISCIURUS TROUESSART

Funisciurus TROUESSART, 1880, Le Naturaliste, II, No. 37, p. 293. Genotype, by monotypy: *Sciurus isabella* Gray.

The diagnostic characters of this genus are given in the key to the genera of squirrels.

There are four forms of the small, striped tree squirrel found in Angola. Only two of these, however, are represented in the Museum's Angolan collection.



A.M. 86479

Fig. 14. *Geosciurus princeps*, skull, mandible, and cheek-teeth.

- 1.—(a) Lower limbs bright fulvous.....
 *F. pyrrhopus pembertonii* (p. 74).
- (b) Limbs not fulvous.....2.
- 2.—(a) Dorsolateral stripes whitish.....3.
- (b) Dorsolateral stripes yellowish.....
 *F. bayonii* (p. 73).
- 3.—(a) Coloration dark, blackish olive.....
 *F. c. congicus* (p. 71).
- (b) Coloration paler, yellowish olive.....
 *F. c. flavinus* (p. 73).

Funisciurus is reported from the Gold Coast to South West Africa, east to Uganda and Tanganyika.

Funisciurus congicus congicus (Kuhl)
Sciurus congicus KUHLE, 1820, "Beiträge zur Zoologie und vergleichenden Anatomie," p. 66 (Frankfurt a. M.). Type locality: Congo [probably Angola]. The type is in the British Museum.
Xerus congicus. Seabra, 1908.
Sciurus lemniscatus. Peters, 1881.
Funisciurus congicus olivellus THOMAS, 1904, Ann. Mag. Nat. Hist., (7) XIII, p. 411. Type locality: Cunga, Angola.

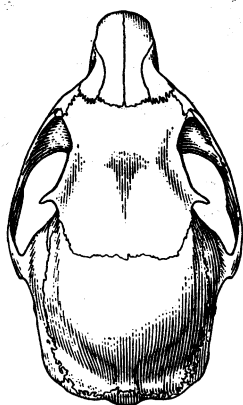
The Angolan collections in the American Museum contain 18 specimens from the

following localities: Mombolo, 4; Chipipi, Cassonque, 7; Namba, Cassonque, 6; Mount Moco, 7000 ft., 1. This squirrel is recorded from Benguela, Catumbela, and Lobito (Bocage, 1890); Canhoca, Caconda, Cunga, and Cuanza River (Thomas, 1904); Golungo Alto (Seabra, 1905); and Cuango (Peters, 1881). These localities are all in the northwestern

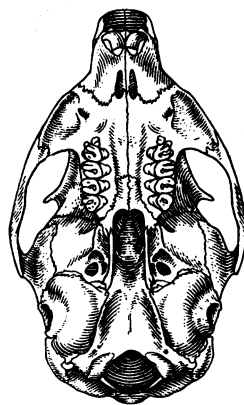
blackish, more grayish than the back. Underparts near Olive-Buff. Light color bands on hairs of upperparts near Olive-Ochre (about 22" h); tail variegated with this color and black. Upper half of muzzle near Isabella Color.

The coloration is relatively uniform in the series examined.

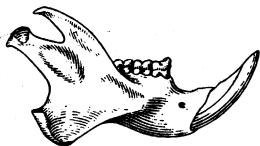
SKULL.—Braincase large and strongly



A.M. 86477



A.M. 86477



A.M. 86477



A.M. 85110

Upper right molars



A.M. 85110

Lower right molars

H.Z. Hunt

Fig. 15. *Funisciurus congicus flavinus*, skull, mandible, and cheek-teeth.

quarter of Angola. The range of *Funisciurus c. congicus* extends from the Congo southward to the vicinity of Lobito, and eastward at least to Cassonque. It apparently does not include the drier plains.

COLORATION.—Upperparts duller than Yellowish Olive (about 23" k). A narrow whitish stripe runs from shoulder to hip on either side of the back; dark bands border these stripes laterally, of the same color as middorsal area. Sides and legs less

convex dorsally; rostrum relatively weak, short and tapering. Nasals expanded both anteriorly and posteriorly. Supra-orbital "shelves" and postorbital processes weakly developed. Tympanic bullae partly divided by partitions which are visible externally.

DENTITION.—First upper premolar (P^3) minute; P^4 smaller than the molars, but resembles them in structure (see Fig. 15). Lower cheek-teeth have transverse ridges

with low cusps. Incisors narrow, dark orange in color.

MEASUREMENTS.—See table, p. 182.

***Funisciurus congicus flavinus* Thomas**

Figure 15

Funisciurus congicus flavinus THOMAS, 1904, Ann. Mag. Nat. Hist., (7) XIII, pp. 411-412. Type locality: Capangombi, southern plateau region, Angola. The type specimen is in the British Museum.

Sciurus congicus. Jentink, 1887.

Sciurus flavivittus. Peters, 1870.

Sciurus congicus, var. *flavivittis* Bocage, 1890 (not *Sciurus flavivittis* Peters, 1852).

The American Museum has a good series of *F. c. flavinus*, 86 specimens in all, from the following localities: Caporolo, 2; Hanha, 14; 101 km. E. Mossamedes, 3; Humpata, 7; Lubango, 3; Quipungo, 2; Luvando, 8; Chipopia, 3; 50 km. from Capelongo, 1; Capelongo, 31; Mulando, 12. In addition to these localities, *Funisciurus c. flavinus* is recorded from Rio Chimba, Bibale, Huila, Humbé, Quindumbo, and Mossamedes (Bocage, 1890); Quilengues, Catengue, Usolo River, Busolo, Sand Pits, Cabeça de Ladrão, and Eland's Water, all in Benguela district (Thomas and Wroughton, 1905); Osi and Ebanga (Monard, 1935). *Funisciurus c. flavinus* is found in the southern half of western Angola, from Hanha south at least as far as Humbé. It is found typically in the plateau country, but specimens have been taken at the edge of the desert near Mossamedes.

COLORATION.—Upperparts more blackish than Tawny-Olive; rump closer to Orange-Cinnamon. White stripe on either side of back broader than in typical *congicus*; each margined laterally by a dark stripe, definitely more blackish than the middorsal area. Sides paler; belly near Chamois, not sharply set off from the sides. Eyes margined above and below with bright Ochraceous-Buff. Tail appears considerably darker than dorsum of body; hairs tipped with Pale Ochraceous-Buff and banded with black and Ochraceous-Buff.

There is a small amount of individual variation, but this does not appear to be correlated with geography.

SKULL AND DENTITION.—Skull like that of typical *congicus*, but bullae slightly larger. Molariform teeth also larger.

MEASUREMENTS.—See table, p. 182.

Monard (1935) secured specimens at Mupa, which may be representatives of the paler, white-bellied *F. c. oenone* Thomas.

FIELD NOTES.—At Hanha, Mr. Lang found these squirrels "common in the palm groves, especially in the early morning, when they move from frond to frond. On a precipitous limestone wall where lizards (*Agama*) were very common, these squirrels ran along the many shelves, probably plundering the lizard's eggs . . ." He also found them to be "common in the bushes of the savannah." At Lubango they were "fairly common in the trees on the sides of the cliff." The stomach of one contained the pulp of a fruit. The adult male taken at this locality, June 19, had enlarged testes.

***Funisciurus bayonii* (Bocage)**

Sciurus bayonii BOCAGE, 1890, Journ. Sci. Math. Phys. Nat., Lisbon, (2) II, p. 3. Type locality: Duque de Bragança (?), Angola. The types are in the Museu Bocage, Lisbon, and in the British Museum.

This squirrel is not represented in the American Museum, but a skin without skull of a paratype was examined in the British Museum.

EXTERNAL CHARACTERS.—Ear short, rounded. Tail shorter than body. Pelage soft.

COLORATION.—Upperparts, including tail, near Brownish Olive. A poorly marked yellowish lateral strip from behind shoulders to point of ilium. Underparts grayish. Tail with obscure blackish rings, hairs of tail and back with plumbeous bases, followed by black, with yellowish subterminal bands.

REMARKS.—No skulls of this squirrel are known, and without them relationships can only be provisional. The color pattern resembles that of *Funisciurus mystax* and *F. anerythrus* somewhat. No accurate measurements are known, but in general dimensions *F. bayonii* resembles these species.

Funisciurus pyrrhopus pambertoni
Thomas

Funisciurus pambertoni THOMAS, 1904 (Sept.), Ann. Mag. Nat. Hist., (7) XIV, p. 201. Type locality: Dondo, Angola. The type specimen is in the British Museum.

Sciurus pyrrhopus. Peters, 1881.

The skull of the type was examined in London. This species was reported at Cuango by Peters (1881).

COLORATION.—Upperparts much paler than *F. p. pyrrhopus*, a pale olive-gray. Head like the back, without any rufous. White line above eyes; ears with black tips and white bases. An inconspicuous whitish lateral line. Underparts pure white. Limbs, except thigh and feet, rich orange-fulvous. Tail above with hairs gray basally, with black subterminal bands and whitish tips, terminally the black extends to the tips of the hairs. Below the tail shows much fulvous coloring distally.

SKULL.—Skull elongate and ovoid in outline with minute postorbital processes and weak rostrum.

MEASUREMENTS.—See table, p. 182.

PARAXERUS MAJOR

Paraxerus FORSYTH MAJOR, 1893, Proc. Zool. Soc. London, p. 189. Genotype: *Xerus cepapi* A. Smith (subsequent designation, Thomas, 1897, Proc. Zool. Soc. London, p. 933).

A single race of the typical species, *Paraxerus cepapi phalaena*, was secured by the Vernay Angola Expedition.

Paraxerus occurs from the Transvaal north to Somaliland, Katanga District, Belgian Congo, and southern Angola.

***Paraxerus cepapi phalaena* Thomas**

Figure 16

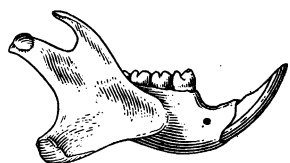
Paraxerus cepapi phalaena THOMAS, 1926, Proc. Zool. Soc. London, p. 296. Type locality: Forest between Ukuambi and Ondongwa, Ovamboland, South West Africa. The type specimen is in the British Museum.

Sciurus cepapi. Jentink, 1888b.

The series of 7 specimens in the American Museum was collected at Capelongo, Angola, by Mr. Herbert Lang. This squirrel was reported from Koelo-ei-Kasinga River, interior of Mossamedes, Angola, by Jentink (1888b). In Angola it is probably restricted to the southern plateau region, from near Capelongo southward to South West Africa. *P. cepapi*

is found from the Transvaal north to Angola, Katanga, and Tanganika.

COLORATION.—Upperparts between Isabella Color and Deep Olive-Buff (about 20''a); tail slightly darker, obsoletely ringed with black. Near end of tail, pale color bands of the hairs become nearly Orange-Cinnamon instead of Pale Ochraceous-Buff. Fresh pelage on the forehead near Isabella Color. Underparts scantily clothed with dirty whitish hairs, of the same color throughout.



Upper right molars



Lower right molars

A.M. 86487

H.Z.K.

Fig. 16. *Paraxerus cepapi phalaena*, mandible and cheek-teeth.

SKULL.—Facial portion of skull relatively larger than in *Funisciurus congicus*. Otherwise there is little difference cranially between the two genera.

DENTITION.—Agrees closely with that in *Funisciurus*; cusps of lower molariform teeth much higher in *Paraxerus*, but similar.

MEASUREMENTS.—See table, p. 183.

Although the series examined was collected some distance to the north of the type locality, these squirrels agree closely with the original description. They differ from the type and paratypes in being slightly more brownish in general color tone.

HELIOSCIURUS TROUESSART

Heliosciurus TROUESSART, 1880, Le Naturaliste, II, No. 37, p. 292. Idem, No. 40, p. 315. Genotype: *Sciurus gambianus* Ogilby (subsequent designation, Thomas, 1909).

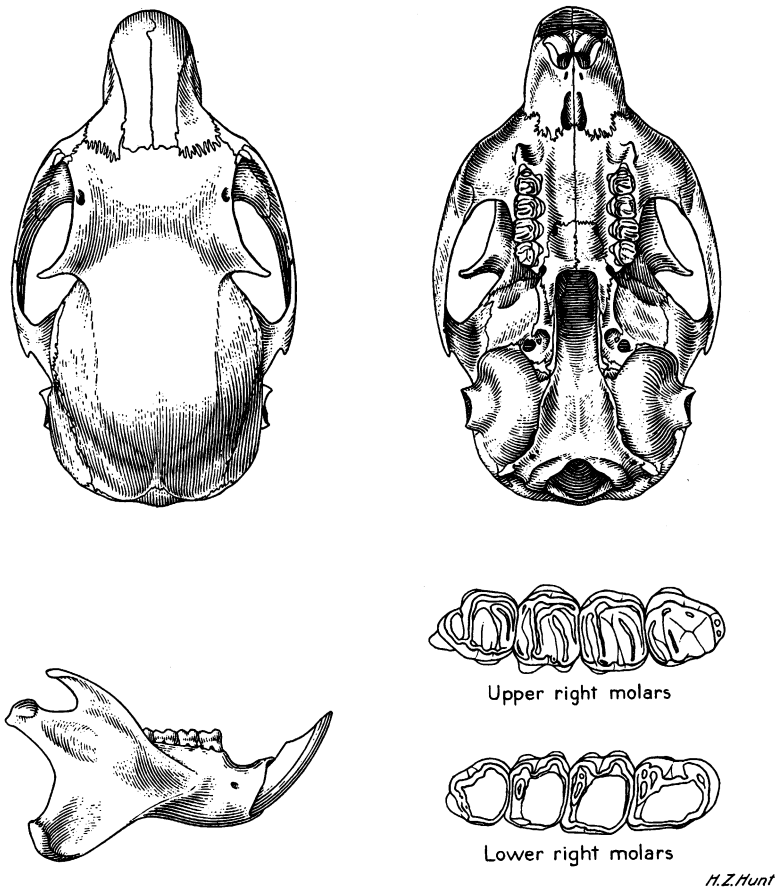
Two races of *H. gambianus* occur in Angola, the first found chiefly in the dry savannah country of the eastern portion; the other in the rain forest of the Amboim region.

Heliosciurus is found from Senegal to Abyssinia, south to Mozambique, Northern Rhodesia, and Angola.

Heliosciurus gambianus loandicus
Thomas

Figure 17

Heliosciurus rhodesiae loandicus Thomas, 1923 (April), Ann. Mag. Nat. Hist., (9) XI, p.



A.M. 87698

Fig. 17. *Heliosciurus gambianus loandicus*, skull, mandible, and cheek-teeth.

- (a) Smaller (head and body about 200 mm.). Silvery Gray above, dirty whitish to Clay Color below and under side of fore legs. *H. g. loandicus*.
 (b) Larger (head and body about 218 mm.). Dark, blackish variegated with ochraceous and buffy above, Ochraceous-Orange below and near Tawny on under side of fore legs. *H. g. brauni*.

521. Type locality: Dala Tando, Angola. The type specimen is in the British Museum.

Sciurus punctatus. Bocage, 1890; Seabra, 1903.

Sciurus annulatus. Thomas, 1904.

Funisciurus annulatus. Wroughton, 1907; Monard, 1933.

The large series (50) of this handsome

squirrel in the American Museum was collected at Chitau. A single skin with skull, also from Chitau, in the Carnegie Museum, Pittsburgh, was collected by Mr. and Mrs. Boulton in the Pulitzer Expedition. In addition to the type locality, *Heliosciurus g. loandicus* has been recorded from other localities in Angola: Rio Cuce, to the east of Caconda (Bocage, 1890); Cazengo (Seabra, 1903); Canhoca (Thomas, 1904); Vila da Ponte (Monard, 1933); Mucoti, Cambissa, Sanguene, and upper Cuvelai River (Monard, 1935). It appears to range over most of the interior savannah area, but the records indicate that it is abundant only in restricted localities.

COLORATION.—(Fresh February pelage.) Upperparts mixed white and black with underlying brownish, between Buffy Brown and Army Brown (about 15''i) showing through. Distal two-thirds of tail banded black and paler than Tilleul Buff (about 17''g). Underparts usually dirty whitish, but may be between Cinnamon-Buff and Clay Color (about 17''a) or intermediate. Underfur Blackish Plumbeous basally, dull Buffy Brown distally. Long hairs are Blackish Plumbeous basally, followed by a band of Buffy Brown; distal half of each is black, interrupted by a band of pure white about 2 mm. in width. Upper sides of feet, gray; medial sides of fore and hind limbs colored like the underparts.

SKULL.—Rostrum heavy; supraorbital ridges and postorbital processes strongly developed. Zygomatic arches stout. Tympanic bullae relatively small; externally, they do not show division into compartments as in *Funisciurus* and *Paraxerus*.

DENTITION.—Single upper premolar well developed, but not fully molariform; an anterior lobe apparently takes the place of the third premolar. Lower molars wear to basin-like structures, with four fairly high cusps at the corners of each tooth.

MEASUREMENTS.—See table, p. 183.

REMARKS.—Ingoldby (1927) has compared the squirrels of the genus *Heliosciurus* and concluded that all belong to a single species, *Heliosciurus gambianus* Ogilby. Examination of the types of the many forms of this genus in the British Museum leads

to the conclusion that at least most of the described forms are no more than races of this highly variable species. There is greater difference in color between the palest and darkest specimens in the topotypical series of *H. g. loandicus* in the British Museum than between the darkest specimen and the type of *H. g. brauni*. However the type locality, Dala Tando, is in the region where intergradation would be expected between the dark coastal race and the paler one from the interior.

***Heliosciurus gambianus brauni* St. Leger**

Heliosciurus rufobrachiatu brauni St. Leger, 1935, Nov. Zool., XXXIX, p. 252. Type locality: Congulu, alt. 800 m., Angola (about 65 mi. E. Porto Amboim). The type specimen is in the British Museum.

This squirrel is probably restricted to the rain-forest areas of northern Angola.

The original description is modified slightly below. The type was examined.

COLORATION.—Upperparts variegated black, ochraceous and pale buffy; bases of hairs black. Tail lighter than body in color; hairs tawny, with 3 black bands and a broad white tip. Lateral side of forearms paler than the back; fore feet near Ochraceous-Buff above. Lateral side of hind legs like the back; hind feet like fore feet but speckled with black medially. Underparts, including medial sides of legs, near Ochraceous-Tawny; bases plumbeous and this may show through, darkening the general color.

SKULL.—Skull does not differ appreciably from the preceding species.

MEASUREMENTS.—See table, p. 183.

PROTOXERUS MAJOR

Protoxerus FORSYTH MAJOR, 1893, Proc. Zool. Soc. London, p. 189, Pl. VII, figs. 7-8, Pl. IX, figs. 7-8. (Named as a subgenus of *Xerus*.) Genotype: *Sciurus stangeri* Waterhouse, 1843 (subsequent designation Thomas, 1897).

Protoxerus occurs from the Gold Coast to Kenya and Angola.

***Protoxerus stangeri loandae* (Thomas)**

Sciurus stangeri loandae THOMAS, 1906 (Oct.), Ann. Mag. Nat. Hist., (7) XVIII, p. 296. Type locality: Canhoca, Angola. The type specimen is in the British Museum.

Sciurus stangeri. Bocage, 1890, 1897; Seabra, 1908.

Sciurus nordhoffi. Thomas, 1904.

This large squirrel is recorded from Cazengo (Bocage, 1890); Hanha (Bocage, 1897); Golungo Alto (Thomas, 1904). It is probably restricted to the northern half of Angola. The American Museum has no specimens from Angola, but the type of this race was examined in London.

EXTERNAL CHARACTERS.—Ears small. Tail long, bushy. Pelage coarse, hair-like, without underfur. Belly sparsely haired, sharply set off from upperparts.

COLORATION.—Black and yellowish, brighter on the back and paler on the head. Dull yellowish patch behind each ear; ears yellowish. Cheeks whitish or grayish white. Tail banded above, alternately black and whitish; under side variegated black and whitish. Feet stained with yellowish above.

SKULL.—Skull elongate, ovoid, with tapering rostrum. Palate with a small medial posterior projection. Infraorbital foramen large, situated in the zygomatic plate.

DENTITION.—Upper incisors deep reddish orange in color. Cheek-teeth relatively small; above, all have 3 roots; below, P_4 has 3 roots, the molars have 4.

MEASUREMENTS.—See table, p. 183.

ANOMALURIDAE

The anomalurids resemble flying squirrels, with broad gliding membranes between fore and hind legs, and between hind legs and tail. Under the tail is a series of scales. Cranially, these rodents differ from the squirrels, in having a very large infraorbital foramen, and the masseter muscle is restricted to the zygoma in its origin, not extending up on the rostrum.

The family is known only from Central and West Africa, with no close relatives elsewhere.

ANOMALURUS WATERHOUSE

Anomalurus WATERHOUSE, 1843 (Jan.), Proc. Zool. Soc. London, (1842), p. 124. Genotype, by monotypy: *Anomalurus fraseri* Waterhouse.

Anomalurus occurs throughout the forested region of Africa from Liberia to Kenya

south to Northern Rhodesia and Northern Angola.

Anomalurus jacksoni jordan St. Leger

Anomalurus jacksoni jordan ST. LEGER, 1935, Novit. Zool. XXXIX, p. 251. Type locality: Congulu, alt. 700 to 800 m. inland from Porto Amboim, Angola. The type specimen is in the British Museum.

The species occurs from Uganda and Kenya to Angola. *Anomalurus j. jordan* is known only from the type and one specimen, which were examined in London.

COLORATION.—General color very dark gray; Dusky Neutral Gray overlaid lightly with Pale Smoke Gray. Face slightly paler than body. Upper side of fore feet and wrists nearly black; upper side of hind feet like the back, with black bristles over bases of claws. Underparts whitish, strongly tinged with buffy; basally Deep Neutral Gray, tips Cartridge Buff, becoming nearly Pinkish Buff midventrally. Proximal half of tail, color of body; distal moiety black.

SKULL AND DENTITION.—These do not appear to differ from those in *A. j. jacksoni*.

MEASUREMENTS.—See table, p. 184.

PEDETIDAE

The springhaas is a large rodent, externally resembling a kangaroo, which it also resembles in its mode of locomotion. The external ears are large. The hind legs are long and the claws of the hind feet are hoof-like. The long, bushy tail has a conspicuous black end. The skull is high and short, particularly the rostrum. The infraorbital foramina are nearly as large as the large orbits. The mastoid and tympanic bullae are greatly inflated, the former appearing on the roof of the skull. The cheek-teeth are $\frac{4}{4}$.

There is only one Recent genus in this family.

PEDETES ILLIGER

Pedetes ILLIGER, 1811, "Prodromus Syst. Mamm. et Avium," pp. 81-82. Genotype: *Mus cafer* Pallas.

It seems probable that most of the

various forms of *Pedetes* which have been described are no more than geographic races of the one species *Pedetes cafer*. One of these races occurs in Angola.

Pedetes cafer angolae Hinton

Pedetes angolae HINTON, 1920, Ann. Mag. Nat. Hist., (9) VI, p. 102. Type locality: Cholende, 20 mi. N. E. Bihé (Silva Porto), Angola. The type specimen is in the British Museum.

Pedetes cafer. Peters, 1865; Bocage, 1890.

The Angolan collections in the American Museum have specimens from the following localities: Chitau, 2; Huambo, 2; Humpata, 2. The Pulitzer Expedition of the Carnegie Museum collected a specimen at Catengue and three specimens at Humbé, the latter of these appear to be intergrading with *Pedetes c. damarensis*. Peters (1865) and Bocage (1890) record *Pedetes* from Golungo Alto; Monard (1933) reports these rodents from Cubango, and (1935) from Mupa. The springhaas is apparently widely distributed in the interior of Angola.

EXTERNAL CHARACTERS.—These have been described in the diagnosis of the family.

COLORATION.—Upperparts near Tawny-Olive, paler on the sides; thighs much paler, near Olive-Buff, with a well-marked white band. Tail brighter than the back; its distal half has increasing numbers of white hairs which form an indistinct band just in front of the Blackish Brown terminal marking. Underparts of body and under side of basal three-quarters of the tail whitish. Fore feet and legs white; hind legs white medially, but feet marked with brown above, toes margined with silvery white.

SKULL.—The skull of *Pedetes angolae* was described as longer and more slender than that of *Pedetes cafer*. None of the skulls available for examination are as long as Hinton's type, and several are broader. *Pedetes* is quite variable cranially, and it is questionable whether the cranial proportions recorded by Hinton were more than individual variations. The skulls examined resemble closely those of *Pedetes cafer* from Kroonstadt, Orange Free State.

DENTITION.—Cheek-teeth divided into

two lobes by reentrant angles, laterally in the upper teeth, from the medial side in the lower ones.

MEASUREMENTS.—See table, p. 184.

MUSCARDINIDAE

The dormice are small or moderately small rodents, with large mouse-like ears and well-furred tails. The pelage is extremely soft, and the coloration is dark grayish with a shade of brown. The hind feet are short and broad. The mammae are in four pairs (2-2). Cranially, these rodents resemble the mice, but the jugal bone is large, reaching forward almost to the lacrimal, and the palate is wide. There are no postorbital processes. The cheek-teeth are $\frac{4}{4}$ in number.

Claviglis is the only genus of dormouse known to occur in Angola.

CLAVIGLIS JENTINK

Claviglis JENTINK, 1888 (April), Notes Leyden Mus., X, pp. 41-42. Genotype, by monotypy: *Claviglis crassicaudatus* Jentink.

Claviglis is found from Liberia to the Sudan south to the Cape of Good Hope. There appear to be five species of dormouse found in Angola:

- 1.—(a) Size relatively large (head and body about 160 mm.; skull length more than 35 mm.). Pelage long. *C. monardi* (p. 81).
- (b) Size smaller (head and body 100 to 110 mm.; skull length 29 to 30 mm.). Skull flattened; bullae large. Tail with conspicuous white tip. 2.
- (c) Size small (head and body 85 to 90 mm.; skull length 24 to 26 mm.). Skull convex; bullae small. Tail grizzled, white tip indistinct. 3.
- (d) Size small (head and body 64 mm.; skull length about 23 mm.). Tail paler than body, with distinct white tip. *C. kelleni* (p. 81).
- 2.—(a) Upperparts Hair Brown. *C. angolensis* (p. 78).
- (b) Upperparts Mouse Gray. *C. parvulus* (p. 79).
- 3.—(a) Upperparts near Mouse Gray. *C. ansorgei ansorgei* (p. 79).
- (b) Upperparts darker than Hair Brown. *C. ansorgei cuanzensis* (p. 80).

Claviglis angolensis (De Winton)

Graphiurus angolensis DE WINTON, 1897 (Sept.), Ann. Mag. Nat. Hist., (6) XX, pp. 320-321. Type locality: Caconda, Angola. The type specimen is in the British Museum.

Myoxus (Graphiurus) murinus. Peters, 1870.

Myoxus casensis (?). Bocage, 1882.

Graphiurus murinus. Bocage, 1890.

Gliriscus angolensis. Roberts, 1929.

"Quicerecere," native name, Bocage, 1890.

The American Museum has 31 specimens of this dormouse from Chitau. The Carnegie Museum has 2 specimens from Chitau and 1 from Gauca. Other localities in Angola, from which this species is recorded are the following: Duque de Bragança and Caconda (Peters, 1870); Quilengues and Cuango (Bocage, 1890); Galanga (De Winton, 1897); Pedreira (Thomas and Wroughton, 1905). According to Bocage (1890), *Claviglis angolensis* is common throughout the interior plateau region of Angola.

EXTERNAL CHARACTERS.—The most important of these are given in the diagnosis of the family.

COLORATION.—Upperparts Hair Brown, slightly darker middorsally. Base of tail above, redder than the back; distally grizzled with white; tip of tail white. Underparts whitish, the hairs Dark Plumbeous basally. Usually a maroon-colored stain of varying intensity in the pectoral region. Feet white; also medial sides of legs. A blackish marking around the eyes which, somewhat diluted, extends forward to the vibrissae. White of underparts extends up on the face as far as this mask. Ears near Army Brown.

SKULL.—Braincase somewhat flattened dorsally; tympanic bullae large, well inflated; zygomatic arches relatively widely spreading; rostrum relatively heavy.

DENTITION.—First upper cheek-tooth (P⁴) about three-fourths as large as M¹. Cheek-teeth notched laterally; cusps worn down early in life. Upper incisors broadly and faintly grooved; wear produces an inverted V-shaped notch between them.

MEASUREMENTS.—See table, p. 185.

The specimens examined are from a region some distance east and north of the type locality of *Claviglis angolensis*. They fit the description given by De Winton closely, but average larger than his type.

Claviglis parvulus (Monard)

Graphiurus parvulus MONARD, 1933 (1932). Bull. Soc. Neuchâtel. Sci. Nat., LVII, p. 54.

Type locality: not given (specimens from Rio Mbalé, Tumbolé and Vila da Ponte, Angola); it may be here restricted to Vila da Ponte, from which most specimens came.

Claviglis parvulus is known only from the Cubango region of Angola.

EXTERNAL CHARACTERS.—About size of *C. angolensis*. Ears as wide as long.

COLORATION.—Mouse Gray, white on the belly (hair basally slate-colored). Middle of back darker, due to increased black tips of hairs. Tail gray, tinged with russet, white at the extremity. A black spot extends from snout to eye.

SKULL.—Skull large, flattened in the parietal region.

MEASUREMENTS.—See table, p. 185.

Claviglis ansorgei ansorgei (Dollman)

Graphiurus ansorgei DOLLMAN, 1912, Ann. Mag. Nat. Hist., (8) IX, pp. 317–318. Type locality: Tala Kilau, alt. 3000 ft., Donguena, Mossamedes, Angola. The type specimen is in the British Museum.

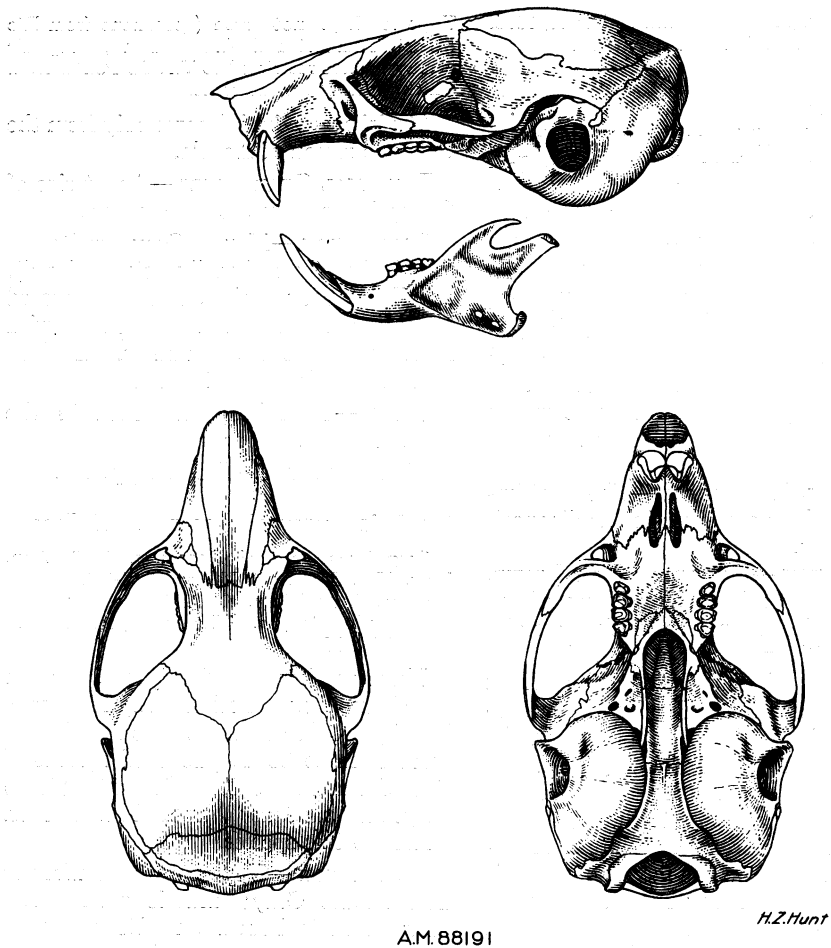
Three specimens of *Claviglis a. ansorgei* from Humpata were collected by Mr. Lee S. Bradley. Other than the type description, there seem to be no published records of this dormouse, unless Seabra's (1909) "*Myoxus murinus*," from Mossamedes, relates to this species.

COLORATION.—Upperparts uniformly near Mouse Gray; muzzle paler. Tail between Hair Brown and Benzo Brown (about 15''i), with white hairs scattered throughout and forming an indistinct marginal and terminal marking of whitish; below, white hairs are very numerous. Underparts near Pearl Gray; plumbeous bases of the hairs visible through the whitish overlay. Feet white. Ears near Avellaneous; large and rounded.

SKULL.—Braincase more convex than in *C. angolensis*. Nasals taper more evenly posteriorly. Tympanic bullae large; they do not extend so far ventrally as in the other species; each is constricted behind the anterior fourth. Otherwise the skulls of the two species are quite similar.

DENTITION.—Much as in *C. angolensis*, but teeth smaller.

MEASUREMENTS.—See table, p. 185.



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Fig. 18. *Claviglis ansorgei cuanzensis*, skull and mandible.***Claviglis ansorgei cuanzensis* Hill and Carter**

Figure 18

Claviglis ansorgei cuanzensis Hill and Carter, 1937 (Mar.), Amer. Mus. Novit., No. 913, p. 9, fig. 5. Type locality: Chitau, alt. 4930 ft., Angola. The type specimen is in the American Museum of Natural History.

The American Museum has 33 specimens from Chitau, 1 specimen from 20 km. E. Dando, and 1 from 35 km. E. Dando. The Carnegie Museum has 2 examples from Chitau. It seems probable that the specimens referred to *G. kelleni* by Thomas and Wroughton (1905) from Pedreira belong to this form. The localities from which these dormice come are in the drain-

age of the Cuanza River, a semi-arid rolling savanna.

COLORATION.—Upperparts between Hair Brown and Cinnamon-Drab in color; shoulders and sides slightly paler; forehead near Light Drab. Tail, above, between Benzo Brown and Fuscous; below, much grizzled with white; margins and tip whitish. Underparts whitish, overlying Dark Plumbeous. A black mask-like marking on the face. Feet white, sometimes with gray marking. Ears slightly darker than in *ansorgei*.

SKULL AND DENTITION.—Not appreciably different from those in *Claviglis ansorgei ansorgei*.

MEASUREMENTS.—See table, p. 186.

Claviglis kelleni (Reuvens)

Eliomys kelleni REUVENS, 1890, "Die Myoxidae oder Schläfer" (Leiden); 1891, Notes Leyden Mus., XIII, pp. 74-76. Type locality: "Damara-land" [actually interior of Mossamedes District, Angola]. The type specimen, alcoholic with skull, is in the Rijksmuseum van Natuurlijke Historie, Leiden, and was examined.

This species was known only from the type specimen, but recently a specimen was collected at Dandi, near Bêla Vista, by the Reverend Kenneth H. Prior and is now in the collections of the Museum of Vertebrate Zoology, Berkeley, California.

EXTERNAL CHARACTERS.—Like *C. ansorgei*, but smaller. Ears much narrower.

COLORATION.—As in *C. a. ansorgei*, but tail decidedly paler than body; hairs reddish with long, silky white tips.

SKULL.—Skull with stouter rostrum than in *C. ansorgei*, narrower, more rounded braincase, and less expanded zygomatic arches.

MEASUREMENTS.—See table, p. 186.

Claviglis monardi St. Leger

Claviglis monardi St. LEGER, 1936 (April), Ann. Mag. Nat. Hist., (10) XVII, p. 465. Type locality: 15 km. above Dala, Tyihumbwe River (= Chiumbe River), Angola. The type specimen is in the British Museum.

Aethoglis hueti monardi. Allen, 1939, p. 307.

This species is known only from the vicinity of the type locality.

EXTERNAL CHARACTERS.—Pelage long and coarse for a dormouse. Ears large, rounded, about 14 mm. high and the same wide. Tail bushy.

COLORATION.—General color of upper-parts grayish brown, darkening on crown and middorsal line to Chaetura Drab or Fuscous. Narrow Fuscous-Black eye-ring and a streak, wider than the eye-ring, from eye to muzzle. Ears brown. Ventral surface creamy, tinged with Pale Olive-Buff, base of fur dark gray; may be stained a reddish brown. Back of hands and feet creamy, unless stained. Tail near Benzo Brown, with wide border and tip whitish.

SKULL.—Skull like that of *C. hueti*, but smaller with flatter braincase (less flattened than in *Gliriscus*).

DENTITION.—Premolar almost molari-form. Teeth relatively small.

MEASUREMENTS.—See table, p. 186.

MURIDAE

The mice found in Angola are small to moderately large rodents with thin, leaf-shaped ears and scaly, scantily haired tails. Cranially, the infraorbital foramen is large, usually wedge-shaped, and part of the medial masseter muscle penetrates it; the interorbital region is constricted and there are no postorbital processes. The cheek-teeth are $\frac{3}{2}$.

There are four well-marked subfamilies of mice in Angola, distinguished chiefly by dental characters. The following key gives these and other characters in condensed form.

- 1.—(a) M^1 is the largest molar, with 3 laminae, or rows of cusps. 2.
- (b) M^3 is the largest molar, with 6 to 7 laminae. Pelage shaggy; general appearance microtine. OTOMYINAE (p. 113).
- 2.—(a) Molars with separate cusps, except in old individuals. Skull with tympanic bullae small or moderate in size. . . 3.
- (b) Molars laminate, without cusps in adults. Skull with tympanic bullae very large. Hind legs and tail relatively long. . . GERBILLINAE (p. 109).
- 3.—(a) M^1 with 2 medial accessory cusps, 8 cusps in all. MURINAE (p. 81).
- (b) M^1 with 1 medial accessory cusp; this forms part of the middle lamina. DENDROMURINAE (p. 102).

Murinae

The mice belonging to the subfamily Murinae are characterized by the pattern of the molar teeth, which are laminate with low cusps. The first upper molar has two medial accessory cusps, making eight cusps in all. A large number of genera are included here and these are often difficult to separate. The main diagnostic characters of each genus are given in the following key.

- 1.—(a) Size large (head and body in adults more than 320 mm.; skull length more than 70 mm.); tail long, proximally black and distally white. Cheek-pouches present. Skull long and narrow. M^1 with anteromedial accessory cusp separate from the first lamina. . . . *Cricetomys* (p. 83).

- (b) Size considerably smaller (head and body less than 280 mm.). M^1 with anteromedial accessory cusp united with the first lamina. 2.
- 2.—(a) Fore foot with fifth digit normal, reaching beyond base of the fourth. Incisors not grooved. 3.
- (b) Fore foot with fifth digit subequal in length to pollex. Incisors grooved or pelage striped. 13.
- 3.—(a) Hind foot with fifth digit short, subequal to hallux. 4.
- (b) Hind foot with fifth digit longer, subequal to the second. 11.
- 4.—(a) Skull with interorbital region broader than rostrum in front of zygomatic plate. M^1 with 4 roots; anterior loph distorted, its medial accessory cusp on level with lateral cusps of second loph. M^1 larger than M^2 and M^3 combined. Pelage of soft spines. Color dark rich brown; underparts reddish. Head and body, 120 to 140 mm.; skull length 30 to 32 mm. *Lophuromys* (p. 83).
- (b) Skull with interorbital region much narrower than rostrum, about equal to greatest breadth of combined nasals. M^1 with 5 to 7 roots; its anterior loph nearly straight. M^1 as broad or broader than palate between M^1 - M^1 , smaller than M^2 and M^3 combined. Pelage long, silky. Color dark olive-brown. Head and body, 160 to 190 mm.; skull length, 36 to 42 mm. *Dasymys* (p. 98).
- (c) Skull with interorbital region subequal to or narrower than rostrum but broader than nasals. Pelage coarse, or mixed with soft spines, or fine. 5.
- 5.—(a) M^1 with 5 to 6 roots; as broad as, or broader than, palate between M^1 - M^1 ; little larger than M^2 . Cusps of molars persist in adults. Interpterygoid breadth subequal to palatal breadth. Pelage coarse, rat-like. Color grayish with russet rump and muzzle; underparts yellowish white. Head and body, 155 to 180 mm.; skull length, 35 to 40 mm. *Oenomys* (p. 95).
- (b) M^1 with 3 roots; one-third to half as broad as palate; subequal to or larger than M^2 and M^3 combined. Interpterygoid breadth less than half palatal breadth between M^1 - M^1 6.
- (c) M^1 with 4 to 5 roots; about one-third as broad as palate; subequal to or less than, M^2 and M^3 combined. Interpterygoid breadth half to two-thirds palatal breadth. 10.
- 6.—(a) Larger (head and body more than 100 mm., skull longer than 28 mm.) 7.
- Smaller. 9.
- 7.—(a) M^1 appreciably larger than M^2 and M^3 combined; its lophs little distorted. Incisors projecting (proödont), slender. Pelage fine. Color grayish brown. Tail shorter than head and body. Head and body, 120 to 140 mm.; skull length 28 to 32 mm. *Zelotomys* (p. 88).
- (b) M^1 nearly equal to M^2 and M^3 combined. Incisors recurved (opisthodont). Tail subequal to head and body. 8.
- 8.—(a) Mammæ 3-2 = 10. M^1 with first loph little distorted. Interpterygoid region broader than M^1 . Incisive foramina unconstricted posteriorly. Pelage mouse-like. Color grayish brown. Head and body, 100 to 130 mm.; skull length 28 to 33 mm. *Myomys* (p. 87).
- (b) Mammæ more than 12, in unbroken series. M^1 with anterior loph, distorted as in *Zelotomys*. Interpterygoid region narrower than M^1 . Incisive foramina constricted posteriorly. Pelage, color and size as in *Myomys*. *Mastomys* (p. 86).
- 9.—(a) M^1 smaller, about equal to M^2 and M^3 combined, its breadth about one-third palatal breadth. Pelage soft, fine, without soft spines. Color dark grayish. Tail length subequal to head and body. Head and body, 75 to 90 mm.; skull length, 19 to 22 mm. *Mus* (p. 84).
- (b) M^1 relatively larger. Pelage mixed with soft spines. Tail appreciably shorter than head and body. Head and body, 45 to 95 mm.; skull length, 15 to 25 mm. *Leggada* (p. 84).
- 10.—(a) M^1 about equal to M^2 and M^3 combined. Incisive foramina shorter, less than two-thirds as long as diastema. Mammæ 2-3 = 10, or 3-3 = 12. Color black or grayish brown. Head and body, 135 to 250 mm.; skull length, 35 to 55 mm. *Rattus* (p. 94).
- (b) M^1 relatively smaller. Incisive foramina longer, more than three-quarters as long as diastema. Mammæ 1-2 = 6 or 0-2 = 4. Color yellowish or grayish brown. Head and body, 110 to 180 mm.; skull length, 30 to 43 mm. *Aethomys* (p. 88).
- 11.—(a) Size larger (head and body of adults more than 135 mm.; skull length 33 to 34 mm.). A mask-like marking on the face. Skull with tympanic bullæ large and interorbital region relatively narrow. M^1 with 5 roots. *Thallomys* (p. 95).
- (b) Size smaller (head and body usually

- less than 125 mm.; skull length less than 30 mm.). Skull with tympanic bullae smaller and interorbital region broader. 12.
- 12.—(a) Size smaller (head and body about 95 mm.). Pelage short. Underparts grayish. Incisive foramina narrow. M^1 with 3 roots. *Hylomyscus* (p. 97).
 (b) Size larger (head and body about 110 mm.). Pelage long and silky. Underparts white without any underlying plumbeous. M^1 with 5 roots. *Grammomys* (p. 97).
- 13.—(a) Incisors grooved; molars cuspidate. No middorsal stripe or only a faint one. *Pelomys* (p. 99).
 (b) Incisors ungrooved. Size large (head and body, 120 to 135 mm.; skull length 31 to 35 mm.). A single well-marked dorsal stripe or with entire dorsal surface striped and spotted. *Lemniscomys* (p. 100).
 (c) Incisors ungrooved. Size small (head and body, 110 to 120 mm.; skull length 28 to 30 mm.). Two pale dorsal stripes, each bordered by black. Pelage softer. *Rhabdomys* (p. 101).

CRICETOMYS WATERHOUSE

Cricetomys WATERHOUSE, 1840, Proc. Zool. Soc. London, pp. 1-2. Genotype: *Cricetomys gambianus* Waterhouse.

Cricetomys ranges from Senegal and Bahr-el-Ghazal to Mozambique and the Transvaal.

Cricetomys gambianus ansorgei Thomas

Cricetomys ansorgei THOMAS, 1904 (June), Ann. Mag. Nat. Hist., (7) XIII, p. 412. Type locality: Pungo Andongo, Angola. The type specimen is in the British Museum.

Cricetomys gambianus. Bocage, 1882, 1890; Seabra, 1905.

The American Museum has a total of 17 specimens from the following localities: Lobito, 1; Luimbale, 1; Chitau, 12; Humpata, 3; *Cricetomys* is also recorded from Caconda (Bocage, 1882); Bibala (Bocage, 1890); Golungo Alto (Thomas, 1904); Serra de Seles (Seabra, 1905); Bahia dos Tigres (Seabra, 1909); Caluquembe Mission and Chiumbe River, 15 km. W. Dala (Monard, 1935).

EXTERNAL CHARACTERS.—External appearance much like a very large Norway rat. Mouth with cheek-pouches. Fore and hind feet naked below, with large pads. Ears narrow and moderately large. Tail long, clothed with fine hairs; scales

relatively small, about 15 per centimeter. Pelage short, moderately coarse. Mammariae 2-2 = 8.

COLORATION.—Upperparts are variable, from near Buffy Brown (about 16''j) or Mouse Gray, to nearly Fuscous. Underparts in most specimens, including medial sides of fore legs, pure white, but in several examples from Chitau the belly is near Avellaneous and in others it is more or less intermediate. Fore feet and wrist pure white; hind feet colored much like upperparts. Basal half of tail near Fuscous-Black; distal half, pure white.

SKULL.—Skull elongate and low, with strongly marked supraorbital and temporal crests. Incisive foramina small; interpterygoid region and palate wide; rostrum long; tympanic bullae small.

DENTITION.— M^1 has 3 roots; medial accessory cusps remain independent until the teeth are well worn, when they unite with the second and third lophs, rather than with the first and second. There are two small anterior accessory cusps and one posterior cusp on M^1 ; the latter is also present on M^2 .

MEASUREMENTS.—See table, p. 187.

Male specimens taken in August and December exhibited evidence of a breeding season; the testes were scrotal and enlarged. Adult females in August appear to be nursing young.

Cricetomys ansorgei was described as a full species by Thomas, chiefly because of the pure white underparts. The finding of two types (white and grayish underparts) in the same locality, together with intermediates, raises the question of the importance of this character, especially in view of the wide range of individual variation in color and the relative uniformity of the skull. However, the coloration of the base of the tail, which is darker than in more northern specimens, and the prevalence of white underparts seem sufficient reasons to recognize the Angolan population as a race of *gambianus*.

LOPHUROMYS PETERS

Lophuromys PETERS, 1874 (March), Monatsber. Königl. Preuss. Akad. Wissen. Berlin, p. 234. New name for *Lasiomys* Peters, 1866

- 3.—(a) Size larger (head and body more than 83 mm.; skull length more than 23 mm.).....*L. callewaerti* (p. 85).
 (b) Size smaller (head and body less than 82 mm.; skull length less than 23 mm.).....*L. triton* (p. 85).

Leggada is so close to *Mus* that there seems little reason to continue to recognize it as a genus.

Leggada bella sybilla Thomas

Leggada bella sybilla THOMAS, 1918 (Dec.), Ann. Mag. Nat. Hist., (9) II, p. 484. Type locality: Usolo River, Benguela, Angola. The type specimen is in the British Museum.

The American Museum has a total of 58 specimens from Angola: Chitau, 53; Capelongo, 5. Most published records of *Leggada* from Angola are difficult to assign to species here recognized, although many may refer to this form. Monard (1935) records the species from Cubango, Chiumbe, Sangeve, Caluquembe, and Bimbe. *Leggada bella sybilla* occurs probably throughout most of Angola.

EXTERNAL CHARACTERS.—Most external features agree closely with those in *Mus*. Tail shorter, with about 24 annulations per centimeter; it appears relatively plump in the flesh. Pelage stiffened by numerous grayish bristles, especially on the rump. Mammæ 3-2 = 10.

COLORATION.—Upperparts near Saccardo's Umber, paler on the sides, becoming near Light Ochraceous-Buff. Underparts pure white, this extending up on the muzzle to include the mystacial area and region around the rhinarium. Fore and hind feet, and lower part of forelegs, also white. Tail grayish below; above colored much like the back.

SKULL.—*Mus*-like, with narrower rostrum. Interpterygoid region narrow; pterygoid fossae broad. Infraorbital foramina wide; incisive foramina long. Zygomatic arches narrow in spread; braincase large and rounded.

DENTITION.—Anterior lamina of M^1 with medial cusp situated posteriorly, as in *Mus*.

MEASUREMENTS.—See table, p. 188.

Leggada triton Thomas

Leggada triton THOMAS, 1909 (Dec.), Ann. Mag. Nat. Hist., (8) IV, p. 548. Type locality: Kirui, alt. 6000 ft., Elgon, Uganda.

The American Museum has 10 specimens of this species from Chitau.

EXTERNAL CHARACTERS.—Tail short, clothed with fine hairs; annulations about 22 per centimeter. Hind feet long; tarsal part of the sole, hairy. Pelage fine, mixed with numerous soft spines. Mammæ 3-2 = 10.

COLORATION.—Upperparts between Hair Brown and Chaetura Drab, becoming more grayish on the sides. Underparts white with basal Blackish Plumbeous showing through, giving a pearl-gray effect. Feet dirty whitish. Tail near Fuscous above, paler below.

SKULL.—Rostrum slender. Interpterygoid region moderately wide. Tympanic bullae small.

DENTITION.—Upper incisors yellowish, slender and orthodont; usually with a sub-apical notch, as in *Mus*.

MEASUREMENTS.—See table, p. 187.

Leggada callewaerti (Thomas)

Hylonomys callewaerti THOMAS, 1925 (June), Ann. Mag. Nat. Hist., (9) XV, p. 668. Type locality: Luluabourg, Lualaba, Belgian Congo.

The American Museum has 7 specimens of this large *Leggada* from Chitau, Angola. It was known previously only from the type locality.

EXTERNAL CHARACTERS.—Externally, except for stiffer pelage, *Leggada callewaerti* agrees closely with *L. triton*.

COLORATION.—Like that of *L. triton*, but a little duller. Underparts with a wash of Avellaneous in the pectoral region.

SKULL.—Skull larger than in *L. triton*, with rostrum more tapering. Supraorbital crests well marked, whereas in *triton* they are absent; bullae much larger; incisive foramina longer; interpterygoid region narrower.

DENTITION.—Upper incisors white, orthodont or slightly proödont, and slender.

MEASUREMENTS.—See table, p. 188.

Thomas named this species as the type of a new genus *Hylonomys*, based on a single specimen. Hatt,¹ when studying the mice of the Congo, concluded that this specimen

¹ 1940, pp. 541-542.

was aberrant, and of no systematic significance, so he applied Thomas' name to the population of *Leggada triton*. In the Vernay Angola collection there appear to be two distinct types, differing in size and in cranial characters. Except for the extreme procumbency of the upper incisors in the type of *callewaerti*, seven specimens from Chitau agree closely with Thomas' description; we have identified them with *callewaerti*. However, there does not appear to be any valid reason for recognizing the genus *Hylenomys*.

FIELD NOTES.—Mr. Lang writes that a specimen from Capelongo "was taken under a decayed prickly pear. Apparently in the débris they live on the many insects frequenting such places. This one ran off and immediately stuck its head out, watching, from under other débris."

Female specimens taken July 14 to August 13 at Capelongo and Chitau were apparently lactating.

Leggada deserti Thomas

Leggada deserti THOMAS, 1910 (Jan.), Ann. Mag. Nat. Hist., (8) V, p. 90. Type locality: Molopo, northern Bechuanaland. The type specimen is in the British Museum.

The Vernay Angola Expedition collected 4 specimens at Capelongo. This species has not been previously recorded from Angola.

EXTERNAL CHARACTERS.—Much as in *Leggada bella sybilla*, but ears appear smaller and tail shorter.

COLORATION.—Upperparts near Clay Color, only slightly paler on the sides. Underparts pure white as in *L. b. sybilla*. Tail white below, with a narrow Drab stripe above.

SKULL AND DENTITION.—Skull smaller than in *L. b. sybilla*, with appreciably shorter rostrum and smaller tympanic bullae. Otherwise it is quite similar. The teeth are also similar.

MEASUREMENTS.—See table, p. 188.

These specimens differ from the type of *L. deserti* by having a narrow band of Drab on the dorsal side of the tail and being slightly darker. They were taken some distance from the type locality of that species.

MASTOMYS THOMAS

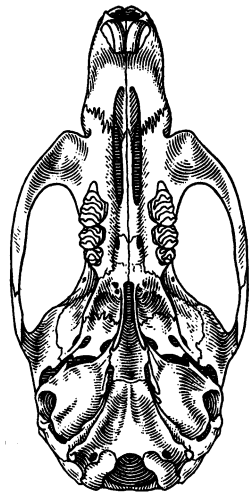
Mastomys THOMAS, 1915 (Dec.), Ann. Mag. Nat. Hist., (9) XVI, p. 477. Genotypes: *Mus coucha* Smith.

Mastomys coucha is found in Angola: this species occurs throughout Africa, except in the extremely arid regions.

Mastomys coucha Smith

Figure 19

Mus coucha A. SMITH, 1836, "Appendix Report Expedition Exploring South Africa," p. 43. Type locality: between Orange River and the Tropic. The type specimen is in the British Museum.



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Fig. 19. *Mastomys coucha*, skull and right upper molars.

Mus sp., var. *albinus* Bocage, 1890, Journ. Sci. Math. Phys. Nat., Lisbon, (2) II, p. 14. Type locality: Caconda, Angola. The type specimen was not designated, but the type series is in the Museu Bocage, Lisbon.

Mus sp., var. *fusca* Bocage, 1890 (preoccupied, *vide* Roberts, 1935).

Mus sp., var. *rufa* Bocage, 1890 (preoccupied, *vide* Roberts, 1935).

Mus microdon. Peters, 1870.

Mus natalensis. Peters, 1870.

Mus coucha. Jentink, 1887.

The American Museum has 147 specimens from the following localities in Angola: Mombola (= Namba), 1; Hanha, 8; Luimbale, 1; Chitau, 48; 101 km. E. Mossamedes, 1; Humpata, 48; Luvando, 3; Mulondo, 24; Capelongo, 22; and 1 without data. Other recorded localities are: Catumbela, Caconda, and Huila (Peters, 1870); Quilengues, Quindumbo, and Gambos (Bocage, 1890); Pungo Andongo (Thomas, 1904); Bingondo and Pedreira, Bihé District (Thomas and Wroughton, 1905); Vila da Ponte, Calu-

less sharply set off from the Pale or Pallid Mouse Gray of underparts. Tail only slightly paler below than above, much the same color as the back. Feet white, as also the chin and areas around the mammae.

SKULL.—Skull moderately elongate and flattened. Temporal crests well developed in old specimens, especially in old males. Incisive foramina extend posteriorly almost to medial root of M^1 . Interpterygoid region narrow. Tympanic bullae small.

DENTITION.—Incisors narrow. M^1

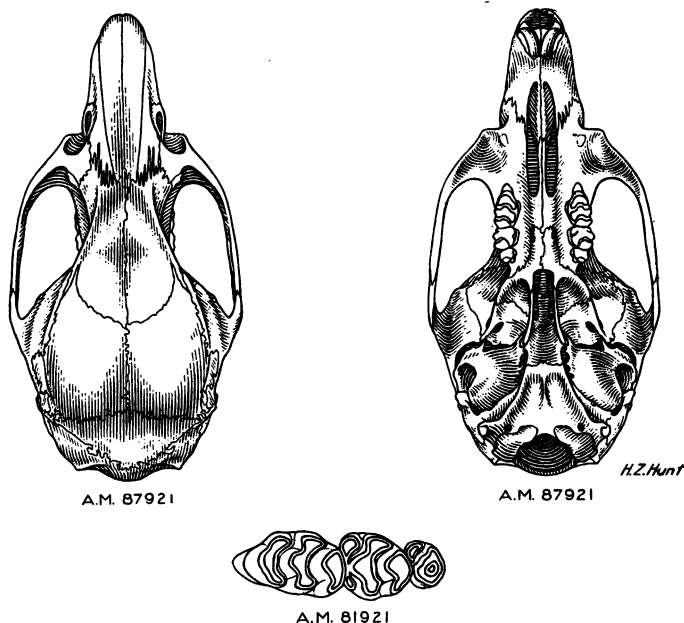


Fig. 20. *Myomys angolensis*, skull and right upper molars.

quembe Mission, Ebango, Tumbolé, and Rio Mbalé (Monard, 1933).

EXTERNAL CHARACTERS.—Except for the larger size *Mastomys coucha* resembles closely *Mus musculus* in general appearance. Tail about as long as head and body; its scales in annulations, about 14 per centimeter. Ears moderately large. Mammae numerous, arranged in a continuous series.

COLORATION.—Upperparts are relatively variable in exact color tone; in most specimens between Hair Brown and Fuscous, but may be much paler or more reddish, near Army Brown. Sides paler, more or

three-rooted; structure of anterior loph almost intermediate between that in the *Mus* group and that in the other murine genera. M^1 about the size of M^2 and M^3 combined.

MEASUREMENTS.—See table, p. 189.

MYOMYS THOMAS

Myomys THOMAS, 1915 (Dec.), Ann. Mag. Nat. Hist., (8) XVI, p. 477. Genotype: *Mus colonus* Brants, 1827. Named as a subgenus of *Epimys*.

A single species of this genus has been recorded from Angola. *Myomys* occurs from Gambia and Abyssinia south to the

Cape, but is not found in the rain forest of the Congo and West Africa.

Myomys angolensis (Bocage)

Figure 20

Mus angolensis BOCAGE, 1890, Journ. Sci. Math. Phys. Nat., Lisbon, (2) II, pp. 12-13. Type locality: Capangombe, Angola. The type was not designated, but it is in the Museu Bocage, Lisbon.

The American Museum has 19 specimens of this mouse from Angola: Chitau, 7; Luimbale, 7; and Humpata, 5. In addition to the type locality, it is recorded from Pungo Andongo (Thomas, 1904); Sangeve and Caluquembe (Monard, 1935). Although it is not common, *Myomys angolensis* appears to be found throughout most of Angola.

EXTERNAL CHARACTERS.—Except for the number of mammae, 3-2 = 10, *Myomys angolensis* can hardly be distinguished externally from *Mastomys coucha*.

COLORATION.—In coloration, *Myomys angolensis* falls within the range of variation in *Mastomys*. The former tends to be slightly more reddish on the rump, but this is by no means always the case.

SKULL.—Skull, in general, much like that in *Mastomys*, but interpterygoid region appreciably wider.

DENTITION.— M^1 has 3 roots as in *Mastomys*, but the angle between anterior and medial roots is much less evident than in that genus. Proportions of teeth much as in *Mastomys*.

MEASUREMENTS.—See table, p. 189.

ZELOTOMYS OSGOOD

Zelotomys OSGOOD, 1910 (Feb.), Field Mus. Nat. Hist., (Zool. Ser.) X, p. 7. Genotype: *Mus hildegardeae* Thomas.

A single species of this genus occurs in Angola: *Zelotomys* occurs from Kenya and Uelle District, Belgian Congo to Northern Rhodesia and Angola.

Zelotomys shortridgei kuvelaiensis St. Leger

Figure 21

Zelotomys shortridgei kuvelaiensis ST. LEGER, 1936 (April), Ann. Mag. Nat. Hist., (10) XVII, p. 470. Type locality: Cuvelai River, 50 km. above Mupa, Angola. The type specimen is in the British Museum.

The two expeditions of the American Museum to Angola each secured a single specimen of this mouse: Chitau, 1; Humpata, 1. Consequently, it may be considered a rare animal. It probably occurs throughout most of southern Angola.

EXTERNAL CHARACTERS.—Ears relatively short. Tail nearly naked, shorter than body; scale rings about 15 per centimeter. Hind feet long, with naked soles. Mammae 3-2 = 10.

COLORATION.—Upperparts near Buffy Brown, becoming slightly more grayish on the head; almost Pinkish Buff on the sides. Underparts near Tilleul Buff, with Vinaceous-Buff in pectoral and axillary regions. Deep Plumbeous of bases of the hairs shows through except on the chin and around the mammae, where the hairs are white to the roots. Feet and lower parts of face colored as the belly. Tail whitish except for upper side at the base, which is nearly the color of the back.

SKULL.—Skull somewhat resembles in shape that in the Bathyergidae and the Spalacidae. Rostrum heavy; zygomatic arches widely spreading; crests well developed. Incisive foramina large; tympanic bullae small; interparietal bone relatively narrow.

DENTITION.—Incisors strongly procident. Molars comparatively heavy; M^1 larger than M^2 and M^3 together.

MEASUREMENTS.—See table, p. 189.

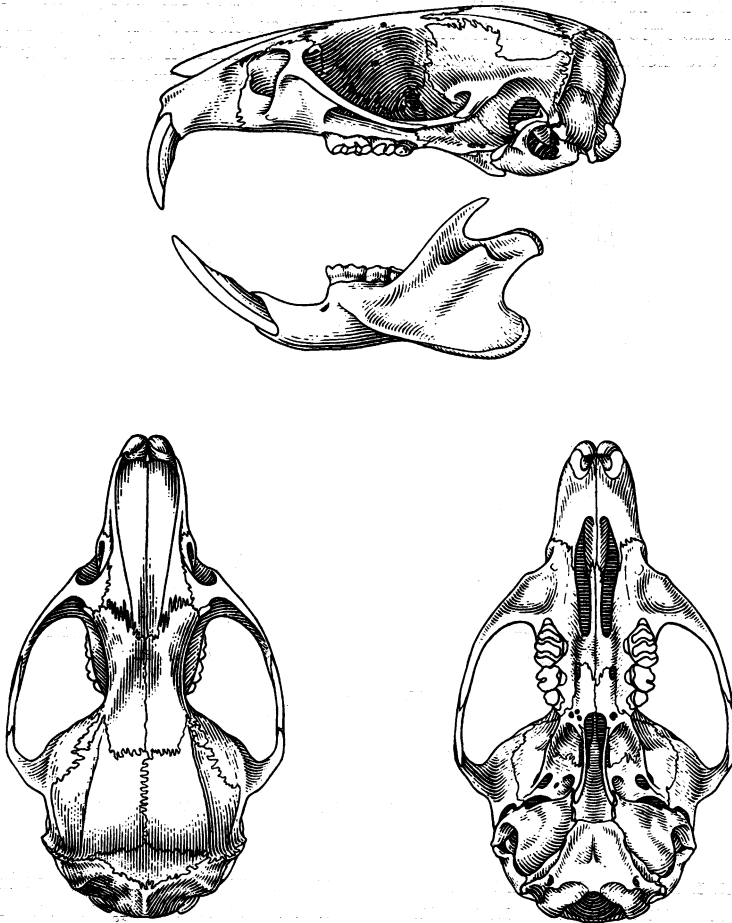
AETHOMYS THOMAS

Aethomys THOMAS, 1915 (Dec.), Ann. Mag. Nat. Hist., (8) XVI, p. 477. Genotype: *Mus hindei* Thomas.

There appear to be several species of these rats in Angola; one species exhibits geographic differentiation into two races. The following key gives the chief differences between the forms of *Aethomys* in Angola. The genus occurs from Nigeria and Kenya to Cape Province.

- 1.—(a) Hair of belly pure white to the roots. Size smaller (head and body less than 135 mm.; skull length less than 35 mm.). Skull like that of *Myomys*. 2.
- (b) Hair of belly with plumbeous bases. Size larger (head and body in adults longer than 135 mm.; skull length more than 35 mm.). 3.
- 2.—(a) Upperparts near Ochraceous-Buff,

- lightly overlaid with blackish.....
*A. avunculus avunculus* (p. 90).
 (b) Upperparts near Cinnamon, with heavier black overlay.....
*A. avunculus phippii* (p. 91).
 3.—(a) Tail considerably longer than head and body, nearly naked. Size large (head and body more than 150 mm.; skull
- incisive foramina narrow. Molars heavy (M^1 about 2.5 mm. in breadth). Tail considerably darker than upperparts.....*A. vernayi* (p. 93).
 (b) Nasals almost or quite as long as premaxillary tongues; skull more elongate. Molars smaller.....5.
 5.—(a) Color pale. Hind foot with 6 plantra



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Fig. 21. *Zelotomys shortridgei kuvelaiensis*, skull and mandible.

- length more than 40 mm.). M^1 with 5 roots.....*A. bocagei* (p. 92).
 (b) Tail about length of head and body. Size smaller (head and body usually less than 150 mm.; skull length less than 39 mm.). M^1 with 4 roots...4.
 4.—(a) Nasals shorter than premaxillary tongues; skull short and broad;
- pads. Skull with incisive foramina narrowed posteriorly. Incisors heavy, strongly recurved.....
*A. chrysophilus imago* (p. 91).
 (b) Color dark. Hind foot with 5 plantar pads. Skull with incisive foramina wide. Incisors weaker, less recurved.....
*A. thomasi* (p. 92).

Aethomys avunculus avunculus
(Thomas)

Mus avunculus THOMAS, 1904 (June), Ann. Mag. Nat. Hist., (7) XIII, p. 417. Type locality: Pungo Andongo, alt. 1200 m., Angola. The type specimen is in the British Museum.

The American Museum has 8 specimens of this small rat from Angola: Caporolo, 6; Hanha, 2. It was known previously only from the type locality, but its range is probably the northern plateau region of Angola.

white. Ankles Pale Ochraceous-Buff. Tail Hair Brown above, whitish below at the base; the end darker both above and below.

SKULL.—Skull elongate, with narrowly spreading zygomatic arches and ovoid braincase. Incisive foramina large. Tympanic bullae relatively smaller than in other species from Angola, with a definite bony Eustachian tube. Rostrum weak.

DENTITION.—Upper incisors orange,

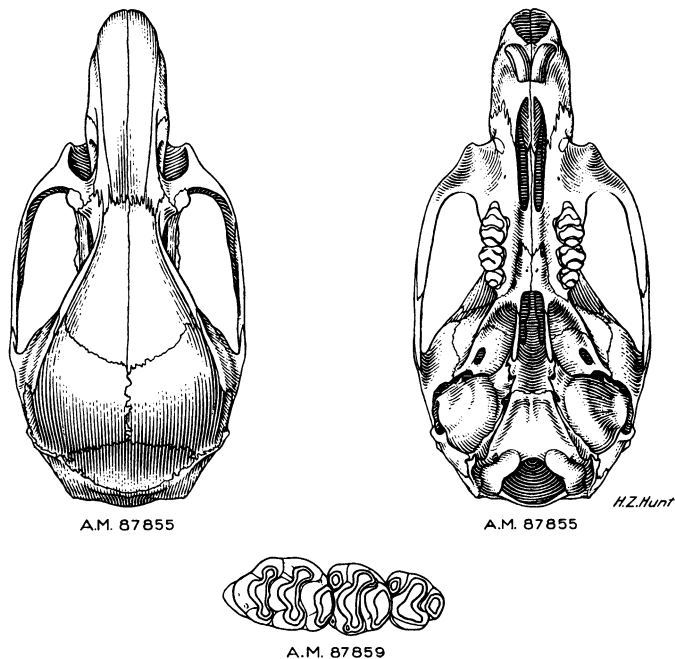


Fig. 22. *Aethomys avunculus phippisi*, skull and right upper molars.

EXTERNAL CHARACTERS.—Tail considerably longer than head and body, scantily clothed with hairs which increase in length distally; scales in rings, about 12 per centimeter. Hind feet elongate. Pelage long and rather coarse; vibrissae very long. Mammae 0-2 = 4 or 1-2 = 6.

COLORATION.—Upperparts Ochraceous-Buff, lined with black on the back; sides paler, with less black. Underparts pure white, although along the sides the white hairs have plumbeous bases. Lower face, insides of fore and hind legs, and feet,

strongly opisthodont. M^1 smaller than M^2 and M^3 combined. Alveoli for the 2 medial roots of M^1 united; these roots more or less fused, so that there are 4 separate roots.

MEASUREMENTS.—See table, p. 189.

Thomas when he named this species thought it would prove to be related to *Myomys angolensis*. Cranially it does show close approach to *Myomys*, but externally *avunculus* is nearer to *Aethomys*, the mammae are either 6 or 4, and M^1 has four roots as in the latter genus.

***Aethomys avunculus phippsi* Hill and Carter**

Figure 22

Aethomys avunculus phippsi HILL AND CARTER, 1937 (Mar.), Amer. Mus. Novit., No. 913, p. 3, Fig. 2. Type locality: Humpata, alt. 6300 ft., Angola. The type specimen is in the American Museum of Natural History.

The American Museum has 47 specimens from the type locality.

EXTERNAL CHARACTERS.—Agree closely with those in the typical form, but ears smaller. The mammae vary, 1-2 = 6 or 0-2 = 4, the latter most frequently.

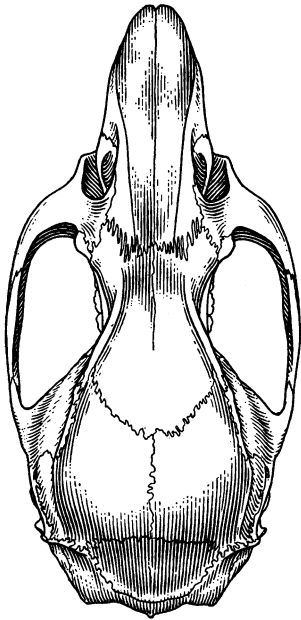
cisive foramina larger. Teeth similar to those of the typical form.

MEASUREMENTS.—See table, p. 190.

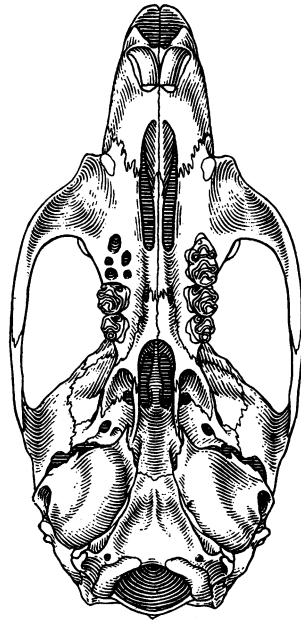
***Aethomys chrysophilus imago* Thomas**

Aethomys chrysophilus imago THOMAS, 1927 (July), Proc. Zool. Soc. London, I, p. 387. Type locality: Stampriet, South West Africa. The type specimen is in the British Museum.

The Phipps-Bradley Expedition collected 7 specimens at Mulondo, Angola. Monard (1935) reports *A. c. imago* from Mucoti, Cubango, Sangeve, Mupanda, and Mupa. This is a South African species



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Fig. 23. *Aethomys bocagei*, skull.

COLORATION.—Upperparts darker than in *A. a. avunculus*, near Cinnamon, with heavier black overlay. Sides become near Ochraceous-Buff. Underparts white, but in individuals the white hairs may predominantly have plumbeous bases. Tail darker, becoming nearly black at the tip.

SKULL AND DENTITION.—Zygomatic arches more widely spreading than in *A. a. avunculus*; interorbital and mastoid regions broader, tympanic bullae and in-

found from Natal to Northern Rhodesia and Angola.

EXTERNAL CHARACTERS.—Tail appreciably longer than body in adult specimens; clothed with short hairs, scarcely longer than the scales; the latter in annulations 11 or 12 per centimeter. Ears moderately large. Pelage silky. Hind foot with six well-marked plantar pads. Mammae 1-2 = 6.

COLORATION.—Upperparts near Cinna-

mon, Dark Plumbeous of bases of the hairs showing through faintly. Sides paler, near Pale Pinkish Buff. Underparts sharply set off from upperparts, white with only a faint plumbeous color showing through. In some specimens large areas of the belly are pure white. Medial sides of legs like the belly; feet pure white. Upper side and end of tail Light Drab, or more yellowish, whitish below.

SKULL.—Skull elongate, but less so than in *A. bocagei*. Rostrum heavy; zygomatic arches narrow in spread. Incisive foramina do not extend so far posteriorly as medial root of M^1 . Tympanic bullae moderately large.

DENTITION.—Upper incisors heavy, strongly opisthodont; M^1 has 4 roots.

MEASUREMENTS.—See table, p. 190.

Aethomys bocagei (Thomas)

Figure 23

Mus bocagei THOMAS, 1904 (June), Ann. Mag. Nat. Hist., (7) XIII, pp. 416–417. Type locality: Pungo Andongo, alt. 1200 m., Angola. The type specimen is in the British Museum.

The Vernay Angola Expedition collected 7 specimens at Hanha. *Aethomys bocagei* was previously recorded only from the type locality and Dala (Monard, 1935). It occurs probably only in the northern interior of Angola.

EXTERNAL CHARACTERS.—Tail considerably longer than head and body, nearly naked, with about 10 rings of scales per centimeter. Hind feet large, with 6 large plantar pads. Ears large. Mammae 0–2 = 4.

COLORATION.—Upperparts near Snuff Brown, with Deep Neutral Gray of bases of the hairs showing through, especially in worn pelage. Underparts near Pale Smoke Gray tinged with Olive-Buff. Feet usually marked above with fuscous or dirty whitish. Tail fuscous above, slightly paler below. Half-grown young of this species are redder, near Russet above, more grayish below.

SKULL.—Skull larger and decidedly more elongate than in other species of *Aethomys* from Angola. Temporal ridges diverge evenly at an angle of approximately 20°. Incisive foramina do not extend as far posteriorly as anterior medial root of M^1 .

Rostrum heavy, depressed anteriorly. Tympanic bullae of moderate size. Frontoparietal sutures form a chevron.

DENTITION.—Incisors heavy, strongly opisthodont. Molars moderately small for such a large rat; M^1 has 5 roots.

MEASUREMENTS.—See table, p. 190.

Aethomys thomasi (De Winton)

Mus thomasi DE WINTON, 1897 (Sept.), Ann. Mag. Nat. Hist., (6) XX, pp. 321–322. Type locality: Galanga, Angola. The type specimen is in the British Museum; the skull was examined and compared with that of our specimens.

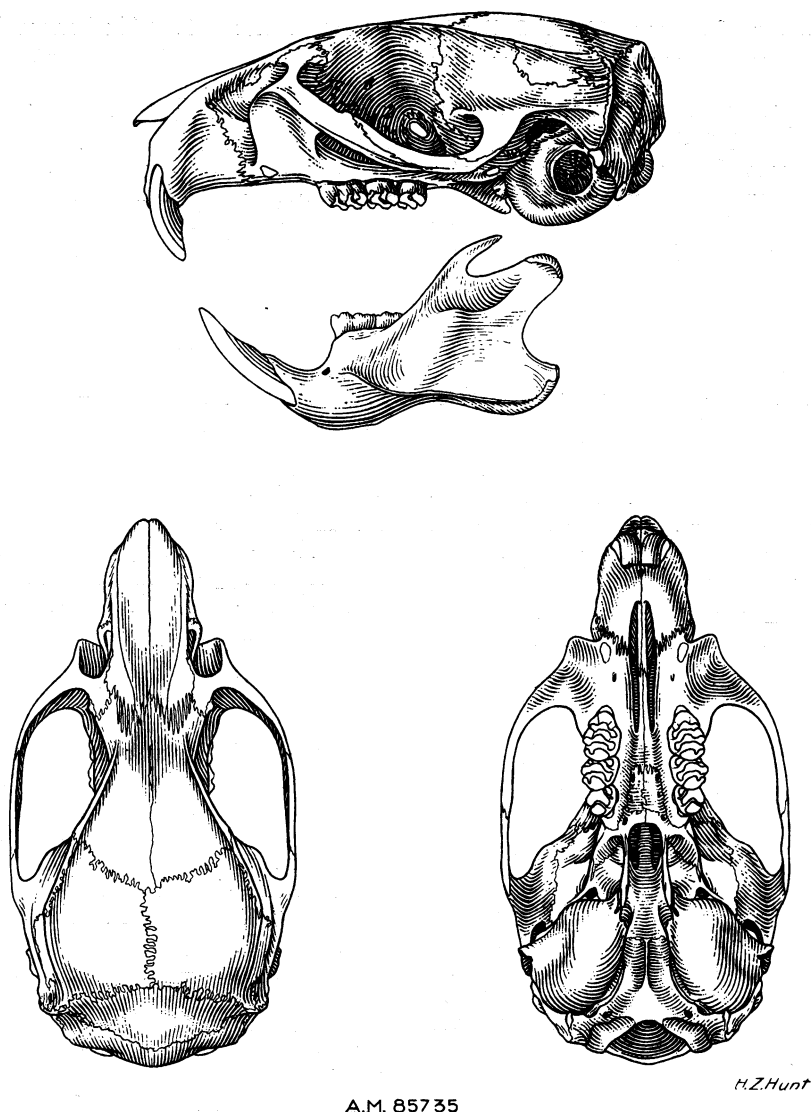
The Angolan collections of the American Museum contain 68 specimens of this rat: Chitau, 51; Humpata, 17. *Aethomys thomasi* was known previously only from the type locality, but it is probably distributed over most of the interior plateau region of Angola south of the Cuanza River.

EXTERNAL CHARACTERS.—Tail short, scantily clothed with bristle-like hairs; scales moderately large, in about 11 rings per centimeter. Ears large and rounded. Hind feet moderately long, with only 5 plantar pads; fifth toe only slightly larger than the first, much shorter than the three middle toes. Pelage shaggy, somewhat like that of *Dasymys*.

COLORATION.—Upperparts near Cinnamon, heavily overlaid with black, considerably paler on sides and muzzle. A sprinkling of white hairs over the body. Underparts near Pallid Mouse Gray, washed with Olive-Buff in midventral region. Medial sides of fore and hind legs colored like belly; feet whitish. Upper side and tip of tail near Chaetura Drab (hairs black); under side whitish (hairs white).

SKULL.—Rostrum heavy; zygomatic arches widely spreading. Infraorbital foramina large, especially dorsally. Incisive foramina extend posteriorly as far as the medial root of M^1 . Supraorbital and lambdoidal crests well marked. Bullae moderate in size. Skull relatively broader, more massive than in *A. avunculus*, *A. bocagei*, or *A. chrysophilus*, but more slender than in *A. vernayi*.

DENTITION.—Upper incisors slender, only slightly opisthodont. Molars moder-



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Fig. 24. *Aethomys vernayi*, skull and mandible.

ately large; M^1 has the two medial roots united so that there are only 4 roots.

MEASUREMENTS.—See table, p. 191.

The specimens examined by us do not agree precisely with De Winton's description of this species. The tail is bicolored and slightly more hairy. However, in coloration, the shape of the ear, the loss of a plantar pad, and in measurements they agree closely.

Male specimens taken near the first of

August, 1925, have the testes scrotal and enlarged. Three recently born young were collected on March 10, 1932, and a number of half-grown specimens in February, March, August, and December. From this it appears that breeding is fairly continuous throughout the year.

***Aethomys vernayi* Hill and Carter**

Figure 24

Aethomys vernayi HILL AND CARTER, 1937 (Mar.), Amer. Mus. Novit., No. 913, p. 1, Fig. 1.

Type locality: Chissonque, 20 km. E. Dando, Angola. The type specimen is in the American Museum.

The American Museum has 2 specimens from Chissonque, Angola.

EXTERNAL CHARACTERS.—Tail shorter than head and body, sparsely covered with bristle-like hairs; scales in rings, 12 per centimeter. Hind feet with fifth digit subequal to first; 6 plantar pads; metatarsal pads small, nearly opposite each other. Ears large, rounded. Pelage long, thick, and soft.

COLORATION.—Dorsal region variable, from near Sayal Brown to between Army Brown and Olive-Brown (about 15'''). Sides much grayer, passing gradually into whitish gray of underparts; medial sides of legs like the belly. Tail Fuscous-Black above; below similar in color, or whitish for basal two-thirds.

SKULL.—Skull massive and broad, with heavy rostrum and zygomata, and broad short braincase. Tympanic bullae larger than in other species of *Aethomys* in Angola. Incisive foramina narrow, reaching posteriorly almost to medial root of M¹.

DENTITION.—Incisors heavy, moderately opisthodont. Molars relatively much larger than in other species of *Aethomys* in Angola.

MEASUREMENTS.—See table, p. 191.

These rats resemble *Thallomys* in general appearance, but may be easily differentiated from that genus by their much shorter fifth digit, and cranially they are quite distinct.

RATTUS FISCHER

Rattus [misprint for *Rattus*] G. FISCHER, 1803, "Das Nationalmuseum der Naturgeschichte zu Paris," II, p. 128. Genotype: *Mus decumanus* Pallas (= *Mus norvegicus* Berkenhout).

There are two species of this genus found in Angola. *Rattus norvegicus* reaches a larger size than *Rattus rattus*; the ears are smaller and the pelage coarser. The skull is more elongate, with much stronger, less curved temporal ridges. *Rattus*, originally Asiatic in distribution, is now world wide.

Rattus norvegicus (Berkenhout)

Mus norvegicus Berkenhout, 1769, "Outlines of Natural History of Great Britain and Ireland," I, p. 5. Type locality: Great Britain.

Mus decumanus. Bocage, 1890.

Mus norvegicus. Seabra, 1909.

The Vernay Angola Expedition collected 2 examples of the brown rat at Lobito. Bocage (1890) reports that it is common throughout the coastal region of Angola, and Seabra (1909) records it from Bahia dos Tigres, Mossamedes District. The brown rat is evidently a recent invader in Africa.

EXTERNAL CHARACTERS.—Tail long, covered with short bristles; scales in rings about 10 per centimeter. Hind feet large, with naked soles and large plantar pads; fifth digit about intermediate between first and second. Ears small. Pelage coarse, with long guard-hairs and spines.

COLORATION.—Upperparts grizzled brownish, not close to any color in Ridgway (1912). Underparts near Pale Olive-Buff, not sharply set off from upperparts. Feet whitish. Tail near Fuscous above, slightly paler or dirty whitish below.

SKULL.—Skull elongate, strongly ridged. Supraorbital and temporal crests do not diverge much. Incisive foramina wide but short, not reaching so far posteriorly as the anterior root of M¹.

DENTITION.—Incisors heavy. Molars relatively small; M¹ with 5 roots, smaller than M² and M³ together.

MEASUREMENTS.—See table, p. 191.

Rattus rattus (Linnaeus)

Mus rattus LINNAEUS, 1758, "Systema Naturae," 10th Ed., I, pp. 61–62.

The American Museum has 34 specimens of this rat from Angola: Lobito, 1; Hanha, 1; Monte Victoria Verdun, 3; Chitau, 28; Capelongo, 1. The Carnegie Museum has 3 specimens from Chitau and it is recorded from the following localities in Angola: Duque de Bragança (Peters, 1870); Pungo Andongo, Ambaca, Dondo, Benguela, Quindumbo, Caconda, and Rio Cuce (Bocage, 1890); Cazengo (Seabra, 1903); Calaquembé Mission and Vila da Ponte (Monard, 1933). *Rattus rattus* is distributed throughout most of Angola, as indeed throughout most of Africa.

EXTERNAL CHARACTERS.—Tail slightly longer than head and body, clothed with short bristles which become longer distally; scales in rings about 11 per centimeter. Hind foot with fifth digit about intermediate between first and second. Ears moderately large. Pelage mixed with soft spines. Mammae, 2-3 = 10.

COLORATION.—Black specimens: upper-parts Sooty Black, Deep Olive-Gray of bases of the hairs showing through. Underparts about Mouse Gray; hind feet near Hair Brown. Brownish specimens: upper-parts between Hair Brown and Grayish Olive (about 19'''h); underparts Deep Olive-Buff or Olive-Buff. In both types the coloration of the belly shades gradually into that of the back.

SKULL.—Skull less elongate and rugose than in *R. norvegicus*; temporal crests amphoral.

DENTITION.—Upper incisors deep orange, moderate in size and strongly opisthodont. M^1 about as in *R. norvegicus*, with 5 roots.

MEASUREMENTS.—See table, p. 191.

The black rat found in Angola appears to be the typical race, *Rattus r. rattus*, but the brown form does not agree closely with other described races of *Rattus rattus*. There are two brown specimens from Chitau, and one intermediate between brown and black types.

OENOMYS THOMAS

Oenomys THOMAS, 1904 (June), Ann. Mag. Nat. Hist., (7) XIII, p. 416. Genotype: *Mus hypoxanthus* Pucheran.

A race of the *Oenomys hypoxanthus* is found in Angola. *Oenomys* is a tropical genus, found from the Gold Coast and Kenya to northern Angola.

Oenomys hypoxanthus anchietae (Bocage)

Mus anchietae BOCAGE, 1890, Journ. Sci. Math. Phys. Nat., Lisbon, (2) II, pp. 11-12, Pl., figs. 3-3a. Type locality: Ambaca, Angola. The type specimen is in the Museu Bocage, Lisbon.

The American Museum has 4 specimens of this rat from Angola: Chitau, 2; Luimbale, 1; Mombolo (Namba), 1. Bocage (1890), in addition to the type locality, records it from Dondo, and

Thomas (1904) had specimens from Pongo Andongo. The species is probably found in most parts of northern interior Angola, since it occurs on the west coast of Africa, north to the Gold Coast.

EXTERNAL CHARACTERS.—Tail slightly longer than head and body, nearly naked; scales in annulations about 12 per centimeter. Ears fairly large, rounded and hairy. Hind feet with naked soles and large plantar pads; fifth digit only slightly longer than first. Pelage consists of woolly underfur and fine, longer guard-hairs. Mammae 2-1 = 6 in the two female specimens.

COLORATION.—Back, a mixture of Pinkish Buff and black, becoming more orange and brighter posteriorly until the rump is near Tawny. Muzzle between Zinc Orange and Tawny (about 13'h). Underparts Ivory Yellow, or white washed with Light Ochraceous-Buff. Usually a narrow region of the latter color between belly and upper-parts. Hind feet vary from near Avellaneous to grayish. Tail darker than Hair Brown above, near Pale Drab-Gray below.

SKULL.—Skull like that of *Rattus rattus* in shape. Palate ends near middle of M^3 rather than behind it. Incisive foramina wider; they end at level of anterior root of M^1 . Tympanic bullae much smaller, less rounded than in *Rattus*.

DENTITION.—Incisors moderate in size, but molars very large; M^1 wider than breadth of palate between M^1 - M^1 . M^1 has 5 roots, and in addition the postero-lateral root is almost divided. Lateral cusps in M^3 obsolete. Cusps of molars high, separated from each other by deep longitudinal grooves.

MEASUREMENTS.—See table, p. 191.

An adult male, taken August 14, has scrotal testes, and two females, collected September 5 and 29, appear to have been lactating.

THALLOMYS THOMAS

Thallomys THOMAS, 1920 (Jan.), Ann. Mag. Nat. Hist., (9) V, p. 141. Genotype: *Mus nigricauda* Thomas.

Thallomys is a climbing rat, evidently closely related to *Aethomys*. The range of this genus extends from the Orange River and Zululand north to Kenya and Angola, probably also in Katanga, Belgian Congo.

- (a) Facial mask distinct; color darker. Tail with a dark pencil. *Thallomys n. nitela*.
 (b) Facial mask obsolete; color pale. Tail without pencil. *Thallomys d. herero*.

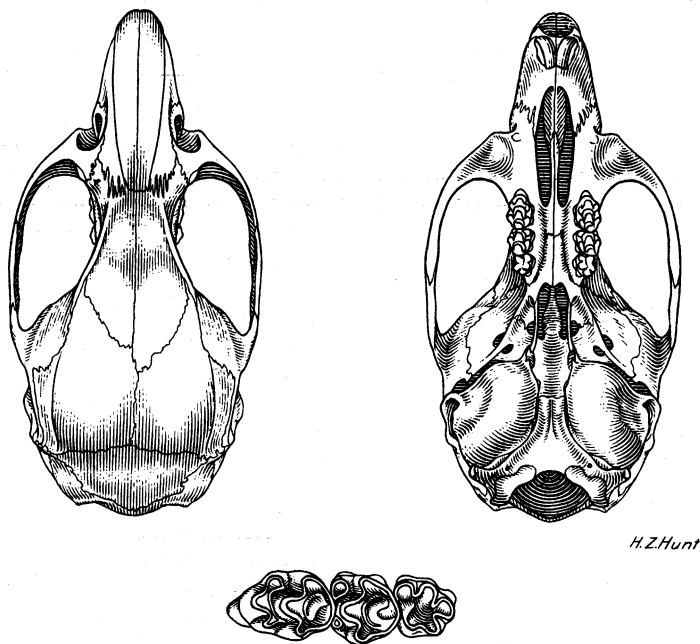
***Thallomys nigricauda nitela* Thomas and Hinton**

Figure 25

Thallomys nitela THOMAS AND HINTON, 1923 (Sept.), Proc. Zool. Soc. London, II, p. 493. Type locality: Bombone, alt. 3200 ft., Mos-

EXTERNAL CHARACTERS.—Tail usually longer than head and body, slightly penciled; scales in rings 13 to 15 per centimeter. Hind feet broad, with fifth digit long, subequal to second. Ears large, moderately hairy. Pelage rather thin and soft; vibrissae long. Mammæ 0-2 = 4.

COLORATION.—Back near Tawny-Olive; sides grayish; forehead also gray. A mask of Fuscous or even darker from muzzle around eyes. Underparts, fore and hind



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Fig. 25. *Thallomys nigricauda nitela*, skull and right upper molars.

samedes, Angola. The type specimen is in the British Museum.

Mus nigricauda. Bocage, 1890; Jentink, 1887, 1888.

Mus arborarius (?). Thomas, 1904.

The Vernay Angola Expedition collected 5 specimens at Hanha. Other localities in Angola from which these rats have been reported are: Huila (Bocage, 1890); Otjipæhe, interior plateau, Mossamedes District (Jentink, 1887, 1888); Pungo Andongo (Thomas, 1904); and Ponangkuma, Mossamedes District (Thomas and Hinton, 1923).

feet, pure white. White of underparts comes up on the face to the dark mask. Cheek gray; a small tuft of white at base of the ear.

SKULL.—Skull much like that of *Aethomys avunculus*. Interorbital region narrow. Frontoparietal sutures form a chevron; interparietal long. Palate narrow, ending near posterior border of M^3 , with a small medial projection. Incisive foramina wide; extend posteriorly as far as anteromedial root of M^1 . Tympanic

bullae larger than in other Angolan Murinae.

DENTITION.—Upper incisors pale yellowish, slender. Molars small, with persistent cusps, as in *Oenomys*, separated by longitudinal grooves. M^1 has 5 roots. Anterolateral and posterolateral cusps of M^2 , vestigial.

MEASUREMENTS.—See table, p. 192.

The specimens available for examination do not agree entirely with the type of *Thallomys nitela*: the mask is paler in color; the feet do not have a dark metapodial marking; the size is slightly smaller, and the tail less hairy. However, our specimens are not uniform in these respects.

Thallomys damarensis herero Thomas

Thallomys herero THOMAS, 1926, Proc. Zool. Soc. London, p. 303. Type locality: Ondongwa, Ovamboland, South West Africa. The type specimen is in the British Museum.

Monard (1935) reports this rat from southern Angola, east of the Cunene River at Mupa and Mupanda.

COLORATION.—Back only slightly more brownish than sides, pale buffy brown. Underparts white, without grayish bases. Face markings indistinct or absent, ears slightly darker than back.

SKULL AND DENTITION.—Agree closely with *T. n. nitela*.

MEASUREMENTS.—See table, p. 192.

REMARKS.—Examination of the type specimens of South African species of *Thallomys* shows no cranial characters of importance for the several forms. Coloration is relatively variable in these rats, and it seems probable that in time all will be considered races of *Thallomys nigricauda*.

GRAMMOMYS THOMAS

Grammomys THOMAS, 1915 (Aug.), Ann. Mag. Nat. Hist., (8) XVI, p. 150. Genotype: *Mus dolichurus* Smuts.

A race of *Grammomys surdaster* occurs in Angola. *Grammomys* is not distinguished from *Thamnomys* by characters of any great importance and might be better considered as a subgenus.

Grammomys surdaster angolensis Hill and Carter

Grammomys surdaster angolensis Hill and Carter, 1937 (Mar.), Amer. Mus. Novit., No.

913, p. 4. Type locality: Chitau, alt. 4930 ft., Angola. The type specimen is in the American Museum.

Grammomys surdaster. Monard, 1935.

The American Museum has 2 specimens from Chitau, and Monard (1935) secured three on the Chiumbe River, 15 km. W. Dala. *Grammomys s. angolensis* is probably restricted to northeastern Angola.

EXTERNAL CHARACTERS.—Tail considerably longer than head and body, moderately well haired and with a pencil; scales in rings, about 15 per centimeter. Hind feet long, with fifth digit subequal to second. Ears moderately large. Pelage fine but rather stiff; vibrissae long.

COLORATION.—Back near Cinnamon, lined with black, becoming slightly more Orange on the rump. Sides paler, becoming almost pure Light Ochraceous-Buff at border of the underparts. The latter white to the roots, tinged with Ivory Yellow, but more nearly white than in *G. s. callithrix*. Fore and hind feet above, washed with Cinnamon. Ears and tail slightly paler than Clove Brown. A blackish spot in front of the eye.

SKULL.—Rostrum heavy, short; braincase broad, rounded. Incisive foramina broad, extending posteriorly as far as the anterior root of M^1 . Interpterygoid region wide. Tympanic bullae small.

DENTITION.—Upper incisors strongly opisthodont. Molars tuberculate, the first two with posteromedial cusps reduced to small ridges. M^1 has 5 roots.

MEASUREMENTS.—See table, p. 192.

Grammomys s. angolensis is closely related to *G. s. callithrix*, but the coloration above is paler; the belly is less yellowish; the feet are paler. The tympanic bullae are smaller, and so are the molar teeth.

HYLOMYSCUS THOMAS

Hylomyscus THOMAS, 1925 (Jan.), Ann. Mag. Nat. Hist., (9) XVII, p. 178. Genotype: *Epimys aeta* Thomas.

A single species of this genus is known to occur in Angola: *Hylomyscus* occurs from the Cameroons and Angola to Kenya.

Hylomyscus carillus Thomas

Mus carillus THOMAS, 1904 (June), Ann. Mag. Nat. Hist., (7) XIII, pp. 418-419. Type

locality: Pungo Andongo, alt. 1200 m., Angola. The type specimen is in the British Museum.

The Vernay Angola Expedition collected 5 specimens of this species: Chitau, 2; Hanha, 3. *Hylomyscus carillus* was known previously only from the type locality; it probably occurs throughout the more northern part of Angola in the forested areas, and in Katanga District, Congo.

EXTERNAL CHARACTERS.—Tail considerably longer than head and body, nearly naked except at the end where there is a small tuft; rings of scales about 17 per centimeter. Hind feet long, with naked soles; fifth digit long, partly opposable. Ears large, naked. Pelage short, soft and woolly. Mammae, in the three adult females examined, $2-2 = 8$.

COLORATION.—Pelage badly worn in all specimens, quite variable in color. Upperparts from near Tawny to near Cinnamon-Buff with basal Dark Plumbeous showing through. Underparts whitish, Dark Plumbeous bases of the hairs showing through. Fore feet white; hind feet more or less colored like the back but with whitish toes. Tail near Hair Brown above, slightly paler below.

SKULL.—Braincase relatively large. Zygomatic arches narrow in spread; zygomatic plates small, not easily visible from above. Interorbital region and palate moderately wide. Incisive foramina and tympanic bullae small.

DENTITION.—Incisors slender and almost orthodont (or vertical). M^1 almost as large as M^2 and M^3 together, with 3 roots.

MEASUREMENTS.—See table, p. 192.

The type of *Hylomyscus carillus* is a female with only 6 mammae (1-2), while our specimens had an extra nipple in the pectoral region. Possibly the type is abnormal; and several genera exhibit variation in the number of mammae in specimens from one locality, otherwise indistinguishable from each other. In coloration our specimens are somewhat duller than the type.

Three females collected at Hanha, May 15, 1925, were lactating.

DASYMYS PETERS

Dasymys PETERS, 1875 (Jan.), Monatsber. Königl. Preuss. Akad. Wissen. Berlin, pp. 12-13. Genotype: *Dasymys guinzii* Peters (= *Mus incomtus* Sundevall).

One species of this genus has been found in Angola: *Dasymys* occurs from Natal, Transvaal, Ngamiland and South West Africa north to Bahr-el-Ghazel, northern Nigeria and Liberia.

Dasymys nudipes Peters

Mus (Isomys) nudipes PETERS, 1870 (Dec.), Journ. Sci. Math. Phys. Nat., Lisbon, (1) III, pp. 126-127. Type locality: Huila, Angola. The type specimen is in the Museu Bocage, Lisbon.

"Quifelefele," native name, Bocage, 1890.

The collections in the American Museum contain 47 specimens from Angola: Chitau, 36; Humpata, 11. It is recorded from many other localities: Ambaca, Bibale, Caconda, Benguela, Quissange and Quindumbo (Bocage, 1890); Hanha (Bocage, 1897); Duque de Bragança (Thomas, 1904); Kripa (Thomas and Wroughton, 1905); Ebanga and Etonga (Monard, 1933). *Dasympes nudipes* is riparian in habitat, and apparently widespread in Angola; outside of Angola it occurs in the Caprivi and Grootfontein districts of South West Africa, in Ngamiland and in adjacent Northern Rhodesia.

EXTERNAL CHARACTERS.—Tail shorter than head and body, nearly naked, the short hairs being slightly longer than the scales; rings of scales about 10 per centimeter. Hind feet long, with naked soles, and very sparsely haired upperparts; 5 plantar pads subequal and small. Ears small, rounded and hairy. Pelage long, soft and shaggy. Mammae $1-2 = 6$, in the one lactating female.

COLORATION.—Upperparts an iridescent Blackish Brown, mixed with Pale Pinkish Buff on the head and with increasing amounts of Orange-Cinnamon on the back and rump. Sides duller, more grayish. Underparts near Neutral Gray, washed with Pale Olive-Buff. Upper sides of tail and hind feet near Hair Brown; under side of tail paler, near Drab-Gray.

SKULL.—Microtine in appearance; interorbital region slender, with strongly raised

supraorbital crests; zygomata heavy, moderately widespread. Infraorbital foramina wide dorsally and narrowed ventrally; incisive foramina reach farther posteriorly than anterior root of M^1 . Tympanic bullae small. Interpterygoid region wide.

DENTITION.—Incisors heavy and smooth. Molars large; M^1 as wide as the palate at its narrowest, with 6 roots and a rudimentary central rootlet.

MEASUREMENTS.—See table, p. 193.

Male specimens taken August 5, 6, 11, 19, and 20, at Chitau, and November 8, 9, and 10, at Humpata, all have scrotal testes. A female collected at Chitau, August 10, 1925, was lactating.

PELOMYS PETERS

Pelomys PETERS, 1852 (May), Monatsber. Königl. Preuss. Akad. Wissen. Berlin, p. 275. Genotype: *Mus (Pelomys) fallax* Peters.

There are two species of *Pelomys* found in Angola: *P. frater* is slightly larger; the molars are larger; the hairs of the belly have grayish bases. *P. campanae* is smaller, with smaller molars, and with the hairs of the belly dirty yellowish white to their roots. *Pelomys* occurs from Ngamiland and Mozambique north to Uganda and Liberia.

Pelomys frater Thomas

Pelomys frater THOMAS, 1904 (June), Ann. Mag. Nat. Hist., (8) XIII, p. 415. Type locality: Duque de Bragança, Angola. The type specimen is in the British Museum.

Pelomys fallax. Peters, 1870; Jentink, 1888; Bocage, 1890, 1896, 1897.

Golunda fallax. De Winton, 1897; Monard, 1933; Seabra, 1909.

The American Museum has 35 specimens from Angola: Chitau, 29; Chissouque, 2; Luimbale, 3; Mombolo (Namba), 1. It has been reported from the following localities: Catumbela and Capangombe (Peters, 1870); Krokkie, Mossamedes District (Jentink, 1888); Ambaca, Benguela, Rio Coroa, and Quindumbo (Bocage, 1890); Hanha (Bocage, 1896, 1897); Bahia dos Tigres (Seabra, 1909); Ebanga and Rio Mbalé (Monard, 1933). It is probably distributed throughout most of Angola, wherever there are streams.

EXTERNAL CHARACTERS.—Tail usually

shorter than head and body, but it may be subequal or even slightly longer; covered with stiff hairs, not obscuring the scales which are in rings approximately 10 per centimeter. Hind feet long, with naked soles; 5 plantar tubercles small; first and fifth digits subequal. Fore feet with the fifth digits rudimentary, as in other rats of the *Arvicanthis* group. Ears moderate in size, rounded, and hairy. Pelage harsh. Mammary 2-2 = 8.

COLORATION.—Upperparts variegated Light Ochraceous-Buff (or darker) and black, with a tinge of Russet on the back and rump. Underparts near Chamois or paler, Dark Plumbeous of underfur and bases of the longer hairs showing through. No sharp contrast between the underparts and upperparts; the color of one shades gradually into that of the other. Tail above almost black, below, dirty Pale Ochraceous-Buff. Hind feet colored like underparts.

SKULL.—Rostrum short and heavy; zygomatic arches strong, but narrow in spread. Infraorbital foramina large, rounded dorsally, narrow and slit-like ventrally. Braincase relatively small and narrow, but high. Incisive foramina large. Tympanic bullae small, rounded. The palate ends opposite middle of M^3 .

DENTITION.—Upper incisors strongly grooved. Molars heavy; M^1 with 5 roots, but the anterior and posterolateral ones are partly divided and there is a rudimentary central root.

MEASUREMENTS.—See table, p. 193.

Pelomys frater may be only a race of *P. fallax* Peters, one subspecies of which occurs in the Caprivi, South West Africa.

Pelomys campanae (Huet)

Golunda campanae HUET, 1888, Le Naturaliste, (2) II, pp. 143-144, 2 figs. Type locality: Coast of Landana, Cabinda. The type specimens are in the Museum National d'Histoire Naturelle, Paris; no type was designated.

The American Museum has 15 specimens from Angola: Luimbale, 4; Hanha, 8; Caporolo, 3. *Pelomys campanae* is recorded from other localities in Angola: Ambaca, Pungo Andongo, Duque de Bragança (Thomas, 1904); Eland's Water, Cupa, and Benguela (Thomas and Wroughton,

1905). It occurs in the northern two-thirds of Angola, and in western Congo.

EXTERNAL CHARACTERS.—Externally *Pelomys campanae* closely resembles *P. frater*, described above.

COLORATION.—Upperparts colored much like those in *P. frater*, but slightly brighter and lacking much of the russet tinge. Underparts much paler, near Honey Yellow, with bases of the hairs paler. In some specimens the underparts are even paler than Honey Yellow, near Cartridge Buff: probably this is due to molting, since these lighter specimens show patches of the deeper color. Tail slightly paler than in *P. frater*. Hind feet colored like the belly, hairs with darker bases.

SKULL.—Rostrum usually shorter than in *P. frater*; interorbital region slightly broader; palate wider, ending even with posterior border of M^3 . Tympanic bullae smaller.

DENTITION.—Molars much smaller than in *P. frater*, but the dentition is otherwise similar.

MEASUREMENTS.—See table, p. 193.

It is possible that some of the references in the list of recorded localities for *Pelomys frater* belong to this species.

LEMNISCOMYS TROUESSART

Lemniscomys TROUESSART, 1881, Bull. Soc. Étud. Sci. Angers, Ann. 10, 1880, p. 124. Genotype: *Mus barbarus* L. (Thomas, 1916).

There are at least two species of *Lemniscomys* in Angola, but the American Museum expeditions obtained only *Lemniscomys griselda*. This species is grizzled buffy and black with a single middorsal stripe. Thomas (1904) had specimens which he identified as *Arvicanthis* [= *Lemniscomys*] *pulchellus*, but which are probably *L. striatus*. This species is blackish brown in color, the back and sides with numerous small oblong spots, almost forming stripes. *Lemniscomys* is found from Transvaal and Zululand, north to Morocco and the Sudan.

Lemniscomys griselda griselda (Thomas)

Arvicanthis dorsalis griselda THOMAS, 1904 (June), Ann. Mag. Nat. Hist., (7) XIII, p. 414.

Type locality: Muene Coshi, Jinga Country, Angola. The type specimen is in the British Museum.

Mus dorsalis. Bocage, 1890.

Arvicanthis dorsalis. Monard, 1933.

The American Museum has 58 specimens from Angola: Chitau, 51; Chis-sonque, 2; Hanha, 1; Capelongo, 2; Mulando, 2. The Carnegie Museum has 4 from Gauca, 20 mi. E. Dando. *Lemniscomys griselda* is recorded from other localities in Angola: Quissange, Quilengues, and Caconda (Bocage, 1890); Caluquembe, Tumbolé, and Rio Mbalé (Monard, 1933). Outside of Angola this species occurs from Zululand to Katanga, Kenya, and northern South West Africa.

EXTERNAL CHARACTERS.—Tail usually slightly longer than head and body, but it may be shorter. It is clothed with stiff hairs which do not completely hide the scales; the latter in rings, about 11 per centimeter. Hind feet long and narrow; fifth toe about the size of first and both much shorter than the middle digits. Fore feet with fifth digit subequal to first. Ears moderate in size, hairy. Pelage coarse, as in *Pelomys*. Mammæ 2-2 = 8.

COLORATION.—Upperparts near Light Ochraceous-Buff, lined with black, becoming more ochraceous on the rump (about 15'a). A narrow black middorsal stripe extends from between the ears to base of the tail. Sides slightly paler; underparts nearly white (about Cartridge Buff), without slaty bases. Lips, throat and medial sides of four legs like the belly. Feet Light Pinkish Cinnamon. Tail with an almost black dorsal stripe, bordered with Cinnamon-Buff; under side Pinkish Buff. Hairs on ears near Ochraceous-Tawny.

SKULL.—Skull resembles that of *Pelomys* closely, but more slender, with shorter rostrum. Supraorbital crests strongly developed. Tympanic bullae larger than in *Pelomys*; lower part of infraorbital foramen slightly wider. Incisive foramina narrow. Zygomatic plate low, about half the height of the rostrum.

DENTITION.—Incisors without a definite groove, although in some specimens there is a faint indication of one. Molars moderately large; M^1 has 5 simple roots. Lami-

nae of molars bent posteriorly at the medial ends.

MEASUREMENTS.—See table, p. 194.

Lemniscomys striatus (Linnaeus)

Mus striatus LINNAEUS, 1758, "Systema Naturae," 10th Ed., I, p. 62. The type locality was incorrectly given as India (= Sierra Leone, Thomas, 1911).

Mus barbarus. Peters, 1872.

Arvicanthis pulchellus. Thomas, 1904.

Peters (1872) records this species from Cambembe, and Thomas (1904) reports specimens from Pungo Andongo, Duque de Bragança, and Marimba (Jinga country).

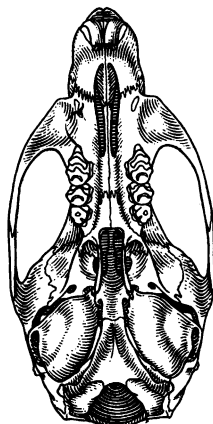
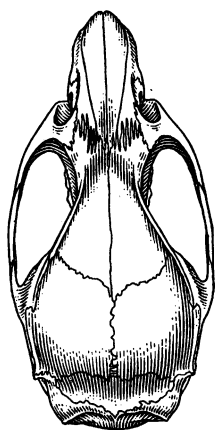
The Angolan specimens in the British Museum and those from southern Belgian Congo, agree with *Lemniscomys striatus*.

Two species of this genus are found in Angola. *Rhabdomys pumilio angolae* is smaller in size and much darker in color, with well-marked stripes; the tympanic bullae are small. *Rhabdomys bechuanae* is larger, very pale, with the stripes obsolete; the tympanic bullae are large. *Rhabdomys* occurs from the Cape of Good Hope north to Uganda and Angola.

Rhabdomys pumilio angolae
(Wroughton)

Figure 26

Arvicanthis pumilio angolae WROUGHTON, 1905 (Dec.), Ann. Mag. Nat. Hist., (7) XVI, p. 636. Type locality: Caconda, alt. 4700 ft., Angola. The type specimen is in the British Museum.



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Fig. 26. *Rhabdomys pumilio angolae*, skull.

EXTERNAL CHARACTERS.—As in *L. griselda*.

COLORATION.—Upperparts nearly black, with 14 longitudinal rows of pale spots, seven on each side of black middorsal stripe, which runs from between the eyes to base of the tail. Underparts whitish, with an overlay of Pinkish Buff on the belly or pectoral region. Feet brownish.

SKULL AND DENTITION.—Agree closely with those in *L. griselda*.

MEASUREMENTS.—See table, p. 194.

RHABDOMYS THOMAS

Rhabdomys THOMAS, 1916 (July), Ann. Mag. Nat. Hist., (8) XVIII, p. 69. Genotype: *Mus pumilio* Smith.

Mus pumilio. Peters, 1870; Bocage, 1882; Jentink, 1887, 1888.

Mus vittatus. Bocage, 1890.

Arvicanthis pumilio. Thomas and Wroughton, 1905; Monard, 1933.

Arvicanthis vittatus. Seabra, 1909.

The American Museum has a large series from Angola, 78 specimens from the following localities: Chitau, 17; Namba, 2; Monte Victoria Verdun, 2; Humpata, 57. These rats are recorded from the following localities: Huila (Peters, 1870); Humpata (Jentink, 1887); Mossamedes (Jentink, 1888); Bibala and Rio Cuando (Bocage, 1890); Caluquembe, Muleke, and Vila da Ponte (Monard, 1933). They are distributed throughout southern and

central Angola, exclusive of the southwestern desert.

EXTERNAL CHARACTERS.—Tail shorter than head and body, hairy, with scales in rings about 14 per centimeter. Hind feet as in *Lemniscomys* and *Pelomys*; fifth digits of the fore feet are short, the pollex armed with a claw. Ears small and hairy. Pelage bristle-like. Mammæ 2-2 = 8.

COLORATION.—In fresh pelage, October to December: upperparts near Mouse Gray, grizzled with blackish and pale buff. Bases of hairs almost black. Four black stripes from occiput to base of tail enclosing lighter stripes, one of which is mid-dorsal. A single black stripe extends down the forehead. Sides of body more buffy. Eyes ringed with Pinkish Buff. Underparts dirty white, washed with Pinkish Buff; underfur near Dark Mouse Gray. Hairs inside the ears near Zinc Orange; on outsides ears are similar in color, except for a black anterodorsal marking. Feet colored like the underparts.

SKULL AND DENTITION.—Skull much as in *Lemniscomys* but smaller; bullae more compressed from side to side. Molars relatively smaller.

MEASUREMENTS.—See table, p. 194.

The large series from Humpata differs slightly from those taken farther north in Angola. They are paler and the stripes are less distinct. The skulls, however, are hardly distinguishable.

Rhabdomys bechuanae (Thomas)

Isomys pumilio bechuanae THOMAS, 1892, Proc. Zool. Soc. London, pp. 551-552. Type locality: "Bechuanaland" = Rooibank, near Walvis Bay, South West Africa (see Shortridge, 1934, p. 280).

The Vernay Angola Expedition collected a single specimen at Pico Azevedo. This species was not known previously from Angola.

EXTERNAL CHARACTERS.—Tail longer than head and body, sparsely haired; scales in rings about 10 per centimeter. Hind feet larger and much broader than in *R. p. angolae*; ears also larger. Pelage harsh and spiny.

COLORATION.—Upperparts extremely pale, not close to any of Ridgway's (1912) standards, but nearest to Olive-Buff.

Pattern as in *Rhabdomys pumilio*; lateral pale stripes fairly distinct, but medial pale stripe the color of rest of upperparts. Dark stripes obsolete, about Clay Color; some hairs have black tips. Dark stripes do not extend forward beyond the shoulders. Underparts dirty white, without underfur; hairs unicolor throughout. Hind feet white with a faint buffy wash. Hairs on the ears Pinkish Cinnamon, without black marking.

SKULL AND DENTITION.—The skull of the single specimen examined is injured. It agrees closely with that of *Rhabdomys p. angolae*, but bullae larger. Teeth similar to those of *Rhabdomys p. angolae*.

MEASUREMENTS.—See table, p. 194.

FIELD NOTES.—The specimen secured was running about under bushes near a large rock (H. Lang).

Thomas considered this form only a race of *Rhabdomys pumilio*, but the difference between the two is marked and intergradation has not been demonstrated. Shortridge (1934) says that *bechuanae* does not appear to intergrade with adjacent races of *pumilio*. Until collections show some evidence of blending between the two forms, we think it best to treat them as separate species.

Although from a place far removed geographically from the type locality, the single specimen in the collections of the American Museum agrees closely with the type of *R. bechuanae*; it is slightly paler and with a longer tail. The climatic and ecological conditions in the two places, however, are similar.

Dendromurinae

The use of the name Dendromurinae in place of the older Dendromyinae is required by the International Rules of Zoological Nomenclature, since the typical genus is *Dendromus*. There are five genera of this group known to occur in Angola; the following key gives the chief diagnostic characters of these genera.

- 1.—(a) Tail as long as, or longer than head and body; size small (head and body length less than 83 mm.) 2.
- (b) Tail shorter than head and body; size larger (head and body usually more

- than 83 mm. in adults, except in *Malacothrix*).....3.
- 2.—(a) Fore feet with only three digits well developed. Skull with braincase rounded and zygomata squarish. Incisors deeply grooved.....*Dendromus* (p. 103).
- (b) Fore feet with four digits well developed. Skull elongate, shallow and flattened. Incisors smooth.....*Petromyscus* (p. 104).
- 3.—(a) Size small (head and body 83 to 118 mm.; skull length 23.5 to 30 mm.). Body stout; tail about half length of body. Hind feet with five digits, the first and fifth subequal. Incisors grooved.....*Steatomys* (p. 105).
- (b) Size small (head and body about 75 mm.; skull length about 25 mm.). Hind feet with only four digits developed. Incisors deeply grooved.....*Malacothrix* (p. 107).
- (c) Size larger (head and body 116 to 125 mm.; skull length 30 to 33 mm.). Tail less than half head and body length; mouth with cheek-pouches. Incisors smooth or faintly grooved.....*Saccostomus* (p. 108).

DENDROMUS A. SMITH

Dendromus A. SMITH, 1829 (Jan.-May), Zool. Jour., IV, pp. 438-439. Genotype: *Dendromus typicus* Smith (= *Mus mesomelas* Brants). "Oxine," native name, Bocage, 1890.

There are at least four species of these small mice found in Angola:

- 1.—(a) Fifth toe of hind foot armed with a claw 2.
(b) Fifth toe with a nail.....3.
- 2.—(a) A black middorsal stripe, pelage long, silky. *D. mesomelas vernayi* (p. 103).
(b) No middorsal stripe; pelage shorter.....*D. ansorgei* (p. 103).
- 3.—(a) A black middorsal stripe; pelage short, soft and woolly.....*D. n. angolensis* (p. 104).
(b) No middorsal stripe; pelage longer.....*D. leucostomus* (p. 104).

Dendromus mesomelas vernayi Hill and Carter

Dendromus mesomelas vernayi HILL AND CARTER, 1937 (Mar.), Amer. Mus. Novit., No. 913, p. 4. Type locality: Chitau, alt. 4930 ft., Angola. The type specimen is in the American Museum.

There are 14 specimens, including the type, from Chitau in the American Museum. *Dendromus m. vernayi* is known only from the type locality. There are no published records identifiable with this race.

EXTERNAL CHARACTERS.—*Dendromus m. vernayi* agrees closely with *D. ansorgei* externally; but pelage longer, more silky; scales of tail larger, from 22 to 25 rings per centimeter.

COLORATION.—Upperparts between Ochraceous-Tawny and Cinnamon-Brown (about 14'j). Middorsal stripe wide (about 4.5 mm.). Tail bicolored, Drab above, whitish below. Underparts not sharply set off from the upperparts, paler than Pinkish Buff (about 17"e). Fore and hind feet near Pinkish Buff above; fine hairs clothing the insides of the ears, near Orange-Cinnamon; hairs on the outside near Bister. On the back, bases of hairs are Dark Plumbeous; below, they are slightly paler. In most specimens a patch of hair on the throat and one in the axillary region are pure white.

SKULL.—Rostrum heavier and shorter than in other species of *Dendromus* found in Angola. Interorbital region moderately narrow.

DENTITION.—Incisors moderately heavy. M¹ larger than in *Dendromus ansorgei*.

MEASUREMENTS.—See table, p. 195.

Dendromus ansorgei Thomas and Wroughton

Dendromus ansorgei THOMAS AND WROUGHTON, 1905 (Aug.), Ann. Mag. Nat. Hist., (7) XVI, p. 173. Type locality: Caconda, Angola.

The American Museum has 12 specimens of this species from Chitau, Angola. Thomas and Wroughton (*loc. cit.*) record it from Caiala, in addition to the type locality. The three localities from which *Dendromus ansorgei* is known, are all in central interior Angola.

EXTERNAL CHARACTERS.—Hind feet elongate; fifth digit clawed, subequal with the second; hallux minute. Tail thinly clad with short hairs; scales small, arranged in rings about 27 per centimeter.

COLORATION.—Upperparts between Ochraceous-Tawny and Cinnamon, with a slight admixture of black in the middorsal region. Sides become paler, passing over into pale Cinnamon-Buff underparts. Usually a small white marking on the throat. Tail Drab above, only slightly paler below. Feet colored as the sides, but some grayish on the toes. Ears

colored like the upperparts; no facial markings.

SKULL.—Interorbital region extremely narrow; braincase small. Zygomata squarish; rostrum slender, moderately long. Incisive foramina short but wide; infra-orbital foramina wide.

DENTITION.—Incisors deeply grooved, yellowish. M^1 considerably larger than M^2 and M^3 combined.

MEASUREMENTS.—See table, p. 195.

Dendromus nigrifrons angolensis
Roberts

Dendromus (Poemys) angolensis ROBERTS, 1929 (July 6), Ann. Transvaal Mus., XIII, p. 115. Type locality: Mombolo (Namba), Angola. The type is in the Transvaal Museum.

The Angolan collections of the American Museum contain 64 specimens of this species: Chitau, 63; Monte Victoria Verdun, 1. The probable range of *Dendromus angolensis* is northern interior Angola.

EXTERNAL CHARACTERS.—*Dendromus angolensis* agrees with other species of this genus in most external features; but pelage short and woolly; fifth digit of the hind foot armed with a nail.

COLORATION.—Upperparts do not correspond to any of the standards in Ridgway (1912) but are colored between Army Brown and Buffy Brown (about 15''i). Middorsal black stripe narrow, especially in some individuals. Sides only slightly paler than the back; upper part of the head also paler. Ears vary in color from near Clove Brown to Olive-Brown; a conspicuous white spot at posterior base of the ear. Tail usually unicolor, near Drab, but it may be Hair Brown above and paler than Drab-Gray below. Underparts whitish, basal Plumbeous of the hairs showing through; throat with hairs entirely white. Inner sides of arms and legs colored like the belly. Upper sides of fore and hind feet whitish. In four individuals there is a black spot of varying size on the forehead.

SKULL.—Rostrum long, relatively stout; interorbital region averages wider than in other species from Angola; braincase also wider. Tympanic bullae larger than in *Dendromus ansorgei*, about as in *Dendromus mesomelas*.

DENTITION.—Much as in *Dendromus ansorgei*.

MEASUREMENTS.—See table, p. 195.

Although the series examined came from some distance to the east of the type locality of *angolensis*, Roberts' description fits these mice closely. Authors have treated this species as belonging to a distinct genus *Poemys*, but there is some variation individually in the character on which the group is based, the possession of a nail on the fifth toe, and the character itself seems hardly important enough for generic rank.

***Dendromus leucostomus* Monard**

Dendromus leucostomus MONARD, 1933 (1932), Bull. Soc. Nat. Neuchâtel., LVII, pp. 55–56, Figs. 7–8. Type locality: Caluquembe [Mission], Angola. No type was designated.

This species is known only from the Monard's descriptions (1933, 1935) here translated and condensed.

EXTERNAL CHARACTERS.—Ears large, posterior border nearly straight. Fore feet with tubercular soles, first digit with a flat nail. Hind feet with naked sole, both first and fifth toes with nails. Tail longer than head and body, the scales about 25 to 26 rings per centimeter. Mammary 2–2 = 8.

COLORATION.—Pelage of black hairs and brown hairs with blackish tips, less russet than in *D. ansorgei*. No middorsal stripe. Belly with hairs basally slate-colored, the tips yellowish white. Muzzle, cheeks and throat pure white, as are fore and hind feet and tail.

MEASUREMENTS.—See table, p. 195.

PETROMYSCUS THOMAS

Petromyscus THOMAS, 1926, Ann. Mag. Nat. Hist., (9) XVII, p. 179. Genotype: *Praomys collinus* Thomas (original designation).

In addition to the characters used in the key, *Petromyscus* exhibits long silky pelage and a stout, coarsely scaled tail.

***Petromyscus shortridgei* Thomas**

Figure 27

Petromyscus shortridgei THOMAS, 1926 (April 29), Proc. Zool. Soc. London, p. 302. Type locality: Cunene Falls, alt. 3350 ft., north-western Ovamboland, South West Africa. The type specimen is in the British Museum.

A single specimen of this mouse was

collected at Caporolo, alt. 800 ft., by Mr. Lee S. Bradley; this is apparently the only record of *Petromyscus* in Angola.

EXTERNAL CHARACTERS.—Pelage long and silky; vibrissae are very long. Hind feet broad, nearly naked; all digits with claws; fifth digit about as long as the second, hallux of moderate size. Rings of scales on the tail, about 18 per centimeter.

COLORATION.—Upperparts near Hair Brown; rump more blackish; top of head slightly paler. Sides scarcely paler than the back; abruptly set off from white of underparts. Bases of the hairs Blackish

posteriorly to level of first root of M^1 . Interpterygoid notch moderately narrow; pterygoid fossae broad, flattened.

DENTITION.—First upper molar relatively smaller than in other *Dendromurinae*. Cusps of molars alternate. M^1 has three roots.

MEASUREMENTS.—See table, p. 195.

The single specimen of this mouse may possibly represent a new race of *Petromyscus*, since it was collected rather far from the type locality. It compares quite closely with the type of *P. shortridgei*, however, being slightly less grayish; tail less penciled and less grayish.

STEATOMYS PETERS

Steatomys PETERS, 1846 (Aug.), Monatsber. Königl. Preuss. Akad. Wissen. Berlin, p. 258. Genotype: *Steatomys pratensis* Peters.

There are three species of this genus found in Angola, and two of these are represented by two races.

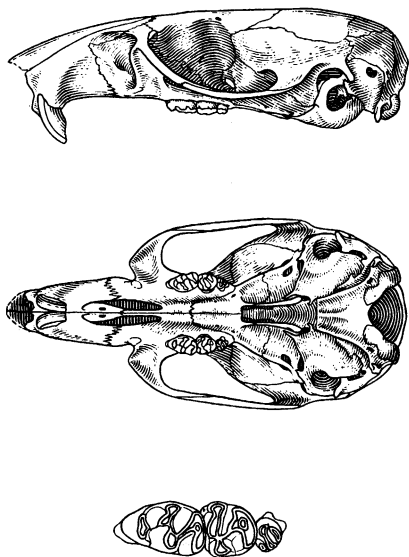
- 1.—(a) Size larger (head and body more than 95 mm.; skull length 28 to 30 mm.). Coloration dull reddish brown.*S. bocagei* (p. 105).
- (b) Size smaller (head and body 90 to 92 mm.; skull length 25 to 27 mm.). Coloration grayish brown. Ears large; tail relatively long (55 to 59 mm.).2.
- (c) Size small (head and body less than 90 mm.; skull length less than 25 mm.). Ears small.3.
- 2.—(a) Upperparts between Hair Brown and Fuscous.*S. a. angolensis* (p. 107).
- (b) Upperparts paler than Hair Brown, near Cinnamon Drab.*S. a. bradleyi* (p. 107).
- 3.—(a) Upperparts near Hair Brown.*S. m. minutus* (p. 106).
- (b) Upperparts near Fawn Color, decidedly paler than in *S. m. minutus*.*S. m. leucorhynchus* (p. 106).

Steatomys bocagei Thomas

Steatomys bocagei THOMAS, 1892, Ann. Mag. Nat. Hist., (6) X, pp. 264–265. Type locality: Caconda, Angola. The type specimen is in the British Museum.

Steatomys edulis. Bocage, 1882, 1890. "Canena," native name, Bocage, 1890.

The American Museum has 62 specimens of this mouse from Angola: Chitau, 60; Chissonque, 20 mi. E. Dando, 2. In addition to the type locality it is recorded from Quindumbo (Bocage, 1890); Duque



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Fig. 27. *Petromyscus shortridgei*, skull and right upper molars.

Plumbeous, showing faintly through the white of the belly. Tail pale proximally; distally black hairs increase in length and the pigmentation of the epidermis increases. Fore and hind feet, and a small spot on the throat, pure white; medial sides of legs like the underparts. Ears colored like the back.

SKULL.—Skull elongate and shallow. Zygomatic arches narrow in spread; zygomatic plate barely visible from above. Interorbital region relatively broad. Top of skull flattened. Incisive foramina reach

de Bragança (Thomas, 1904); and Chiffambe and Bingondo, Bihé District (Thomas and Wroughton, 1905). The range of *Steatomys bocagei* is thus throughout most of the central interior region of Angola.

EXTERNAL CHARACTERS.—Ears relatively small. Fore feet armed with long claws. Hind feet short and broad, with fifth digit small. Tail well clothed with hairs, hiding rings of scales; these about 22 per centimeter. Mammae 2-2 = 8.

COLORATION.—Upperparts between Army Brown and Natal Brown, with slightly more grayish than either (about 13''h). Sides and top of muzzle paler, near Cinnamon-Drab. Dorsal part of tail paler than Fuscous. Cheeks are duller, more grayish than Cinnamon. Underparts, including medial sides of fore and hind legs, and region around the mouth, pure white. Feet white; under side of tail dirty whitish.

SKULL.—Skull relatively elongate, with long, heavy rostrum and long nasals. Zygomatic arches narrow in spread; zygomatic plate small. Infraorbital and incisive foramina large; the latter extend posteriorly to the level of the middle loph of M¹. Tympanic bullae moderately large.

DENTITION.—Upper molar very large; M³ reduced greatly in size. Cusps arranged in definite lophs as in *Dendromys*.

MEASUREMENTS.—See table, p. 196.

***Steatomys minutus minutus* Thomas and Wroughton**

Steatomys minutus THOMAS AND WROUGHTON, 1905 (Aug.), Ann. Mag. Nat. Hist., (7) XVI, p. 174. Type locality: Fort Quilengues, Benguela District, Angola. The type specimen is in the British Museum.

A single immature specimen of this small *Steatomys* was collected at Caporolo by the Phipps-Bradley Expedition. It has been recorded previously only from the type locality.

EXTERNAL CHARACTERS.—Hind feet short, broad; soles have a naked stripe from heel to base of the toes, gradually increasing in size distally. Claws of fore feet large. Tail finely haired; about 27 rings of scales per centimeter.

COLORATION.—Upperparts near Hair Brown, paling to Light Drab on sides of

body and head. Ears darker than the back; with white margins and a white spot at the posterior base of each. Underparts pure white, this including front legs and medial sides of hind legs, feet, lower part of the face, region around mouth and nose, and mystacial patch. Tail white below, with a narrow Drab stripe above.

SKULL.—Skull short and broad compared with that of *S. bocagei*, with short rostrum and widely spreading zygomatic arches. Tympanic bullae more rounded, the basioccipital between them narrow.

DENTITION.—In the specimen available the incisors are grayish, instead of yellowish. Molars agree with those of *S. bocagei*, but are smaller.

MEASUREMENTS.—See table, p. 196.

Although the specimen from Caporolo is young, it agrees very well with the type in everything but size.

***Steatomys minutus leucorhynchus* Hill and Carter**

Steatomys minutus leucorhynchus HILL AND CARTER, 1937 (Mar.), Amer. Mus. Novit. No. 913, p. 4. Type locality: Capelongo, Huila District, Angola. The type specimen is in the American Museum.

The Vernay Angola Expedition collected 3 other specimens of this subspecies at Capelongo. It is possible that this form is the one recorded as *Steatomys pratensis* by Monard (1933) from Tumbolé, vicinity of Kutato, so that it may range throughout the southern plateau region of Angola.

EXTERNAL CHARACTERS.—Externally *Steatomys m. leucorhynchus* closely agrees with *S. m. minutus*.

COLORATION.—Upperparts between Wood Brown and Fawn Color (about 15''a). Sides and cheeks slightly paler. Dorsal tail stripe near Army Brown, about one-third the circumference of the tail. Hairs of outer side of ear from Natal Brown to nearly Fuscous. Underparts pure white, this including medial sides of fore and hind legs, feet, under side of tail, and lower facial region. Rhinarium and most of the mystacial pad also white.

SKULL AND DENTITION.—Skull of the same general appearance as that of *Steatomys m. minutus*, but larger; relatively much shorter than in *S. bocagei*, with

shorter rostrum and braincase. The incisors are more slender and the molars smaller than in *S. bocagei*.

MEASUREMENTS.—See table, p. 196.

Steatomys m. leucorhynchus is larger than the typical race, the tail is relatively longer, and the coloration is paler, slightly more reddish in tone. It is, however, of the same type cranially.

***Steatomys angolensis angolensis* Hill and Carter**

Steatomys angolensis HILL AND CARTER, 1937 (Mar.), Amer. Mus. Novit. No. 913, p. 5. Type locality: Chitau, alt. 4930 ft., Angola. The type specimen is in the American Museum.

This mouse is known only from the type specimen.

EXTERNAL CHARACTERS.—External ears larger, tail and hind feet relatively longer, than in other species of *Steatomys*. Scales of the tail in rings about 26 per centimeter. Pelage soft.

COLORATION.—Upperparts between Hair Brown and Fuscous (about 15''''j); paler on the sides of body and head. Tail Drab above, whitish below. Ears like the back in coloration, with narrow whitish margins and a conspicuous white spot at the posterior base of each. Underparts pure white, this including front legs, medial sides of hind legs, feet, lower face and tip of the muzzle.

SKULL.—Skull smaller than that of *S. bocagei*, but elongate. Rostrum weaker; nasals appreciably narrower. Tympanic bullae more inflated.

DENTITION.—Molars relatively smaller than in *S. bocagei*; incisors are more opisthodont.

MEASUREMENTS.—See table, p. 196.

This species shows resemblance to *Malacothrix* in relatively larger ears and longer hind feet than is usual in *Steatomys*. However, in the number and size of the digits of the hind feet, and cranially, *S. angolensis* differs from *Malacothrix*.

***Steatomys angolensis bradleyi* Hill and Carter**

Steatomys angolensis bradleyi HILL AND CARTER, 1937 (Mar.), Amer. Mus. Novit. No. 913, p. 5. Type locality: Humpata, alt. 6300 ft., Huila District, Angola. The type specimen is in the American Museum.

This form is known only from the type specimen.

EXTERNAL CHARACTERS.—These agree closely with the typical race.

COLORATION.—Upperparts between Hair Brown and Cinnamon-Drab (about 15''''h), considerably paler than in *S. a. angolensis*. Rump is brighter and the sides are paler than the back, with an overlay of Pinkish Cinnamon. Ears like the back in color. Tail whitish below, with a Drab stripe above. Underparts pure white.

SKULL AND DENTITION.—Skull and teeth agree closely with those in *S. a. angolensis*.

MEASUREMENTS.—See table, p. 196.

MALACOTHRIX WAGNER

Malacothrix WAGNER, 1843, "Suppl. Schreber's Die Säugethiere," III, pp. 496-499. New name for *Otomys* A. Smith, 1834, preoccupied by *Otomys* Cuvier, 1823. Genotype: *Otomys typicus* A. Smith (Original designation).

***Malacothrix typica egeria* Thomas**

Malacothrix egeria THOMAS, 1926 (April), Proc. Zool. Soc. London, 1926, p. 301. Type locality: Ondongwa, Central Ovamboland, South West Africa. The type specimen is in the British Museum.

This species is recorded from Angola by St. Leger (1935) and Monard (1935) on the basis of a single specimen from Mupanda near the southern border of Angola.

EXTERNAL CHARACTERS.—Ears large (18 to 19 mm. in dry skin). Fore feet with four digits, the middle pair longer; hind feet also with four digits. Under sides of feet covered with minute hairs. Tail short, scales barely visible through covering of short hairs. Pelage soft and long.

COLORATION.—Upperparts between Tile Buff and Pale Olive-Buff, faintly clouded with blackish. Narrow dorsal stripe of predominantly blackish hairs and on either side of this, two irregular dark areas. Hairs at base of ears almost white, other hairs blackish except near the tips where there is a frosting of whitish. Underparts white, this extending to medial sides of hind limbs and most of the fore limbs.

SKULL.—Braincase short and broad. Rostrum compressed, elongate. Zygomata relatively heavy, widely spreading. Inter-

orbital region narrow. Incisive foramina as in *Steatomys*, extending posteriorly to middle of M^1 . Pterygoid fossae broad. Posterior choanae constricted.

DENTITION.—Tooth-rows nearly parallel. M^1 and M^2 about same in width, M^1 with a small anterior cusp.

MEASUREMENTS.—See table, p. 197.

SACCOSTOMUS PETERS

Figure 28

Saccostomus PETERS, 1846, Ber. Verh. Königl. Preuss. Akad. Wissen., Berlin, p. 258. Genotype: *Saccostomus campestris* Peters.

Saccostomus lapidarius. Bocage, 1882, 1890.
Saccostomus mashonae. De Winton, 1897; Monard, 1933.

Saccostomus anderssoni angolae ROBERTS, 1938 (Oct.), Ann. Transvaal Mus., XIX, pt. 2, p. 240. Type locality: Ondjiwa, southern Angola. The type specimen is in the Transvaal Museum.

The American Museum has 11 specimens of this species: Hanha, 5; Capelongo, 3; Mulondo, 3. It has been recorded from Caconda (Bocage, 1882); Catumbela, Dondo, Quindumbo, and the banks of the Rio Cuce (Bocage, 1890); Caluquembe

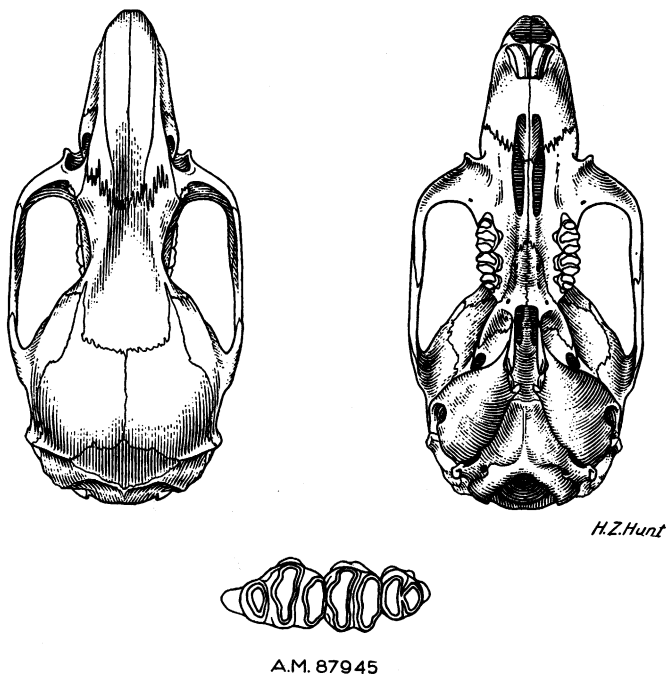


Fig. 28. *Saccostomus anderssoni*, skull and right upper molars.

Eosaccomys PALMER, 1903 (May 29), Science, (N.S.) XVII, p. 873. New name for *Saccostomys* Peters (presumed to be preoccupied by *Saccostoma* Fitzinger, 1843, a genus of Reptilia).

A single species of this fossorial mouse is found in Angola.

Saccostomus anderssoni De Winton

Saccostomus anderssoni DE WINTON, 1898. (Aug.), Ann. Mag. Nat. Hist., (7) II, p. 6, footnote. (Proc. Zool. Soc. London, 1882, p. 266, Pl. xiv.) Type locality: Damaraland, South West Africa. The type specimen is in the British Museum.

and Ebanga (Monard, 1933). The range thus includes most of the interior of Angola, south of Hanha and west of the Cubango River.

EXTERNAL CHARACTERS.—Muzzle pointed. Soles of the hind feet naked; five plantar pads close together. Claws small and ears moderately large for a fossorial mammal. Tail short, fleshy; its sparse hairs stand out at an angle, shrew-like. Mammae 3-2 = 10. Internal cheek-

SKULL.—Braincase large; rostrum slender. Zygomatic arches narrow in spread, with a shelf-like maxillary root; zygomatic plate large. Infraorbital foramen narrow.

especially ventrally. Incisive foramina short but moderately wide; there are large posterior palatine foramina. Tympanic bullae large.

DENTITION.—Upper incisors deeply grooved. Molars small, M^1 about the size of the other two. There are 3 lophs to M^1 , 2 to M^2 .

MEASUREMENTS.—See table, p. 197.

GERBILLISCUS THOMAS

Gerbilliscus THOMAS, 1897, Proc. Zool. Soc. London, p. 433. Genotype: *Gerbillus böhmi* Noack.

Gerbilliscus böhmi (Noack)

Gerbillus böhmi NOACK, 1887, Jahrb. Zool., Syst. Abt., II, p. 241. Type locality: Qua Mpala, Marungu, southwest of Lake Tanganyika.

This species is reported from Angola by Monard (1935), on the basis of one specimen from south central Angola, the first recorded from any part of southwestern Africa.

COLORATION.—Yellowish brown above, pure white below. Feet above, near ankles, dark brown. Tail with whitish hairs and white tip.

SKULL AND DENTITION.—Upper incisors pale with two shallow grooves. Skull much as in *T. valida* but tympanic bullae, from Noack's figure, shorter and more rounded.

MEASUREMENTS.—See table, p. 197.

TATERA LATASTE

Tatera LATASTE, 1882, Le Naturaliste, IV, p. 126. Genotype: *Gerbillus indicus* Hartwicke.

Taterona WROUGHTON, 1917 (March), Jour. Bombay Nat. Hist. Soc., XXV, pp. 40–41. Genotype: *Gerbillus afer* Gray.

There are four forms of *Tatera* found in Angola; the genus ranges from Capetown to Gambia and West Africa. It is also found in southern Asia, Palestine east to Burma.

- 1.—(a) Size larger (head and body usually more than 140 mm.; skull length usually more than 38.5 mm.). Coloration dark brown. 2.
 - (b) Size smaller (head and body usually less than 140 mm.; skull length usually less than 38.5 mm.). Coloration paler, ochraceous brown. 2.
- *T. schinzi angolae* (p. 112).
Also. *T. joanae* (p. 113).

- 2.—(a) Underparts white. Size larger (skull in adults more than 40 mm. long)

..... *T. valida* (p. 110).

- (b) Underparts washed with buffy. Size smaller (skull in adults less than 40 mm. long) . . . *T. humpatensis* (p. 111).

Tatera valida (Bocage)

Gerbillus validus BOCAGE, 1890 (Sept.), Journ. Sci. Math. Phys. Nat., Lisbon, (2) II, pp. 6–7, Pl. I, figs. 1–1a. Type locality: here restricted to Rio Cuando, Angola. The type specimen is in the Museu Bocage, Lisbon.

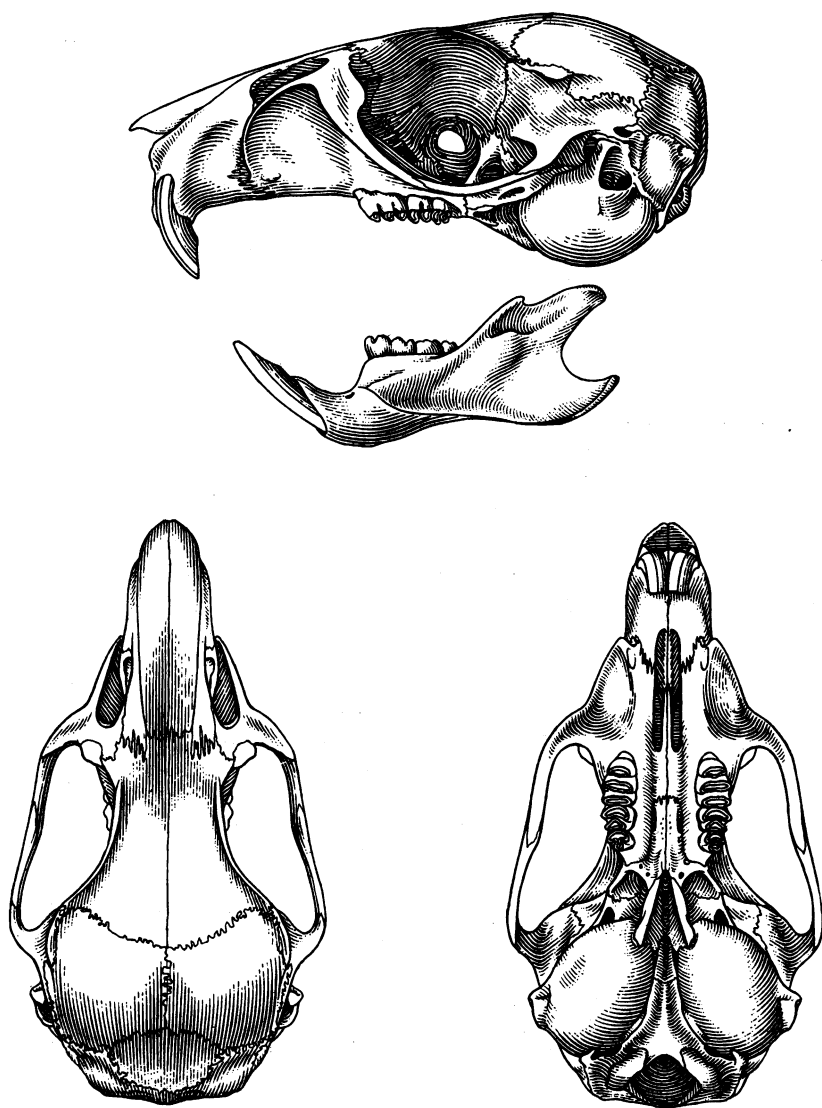
Tatera valida. Thomas, 1904.

The American Museum has 63 specimens from Angola: Luimbale, 2; Chitau, 52; Chissonque, 20 km. E. Dando, 9. In addition to the type locality, *Tatera valida* has been recorded from the following localities in Angola: Ambaca, Quissange, and Caconda (Bocage, 1890); Duque de Bragança and Pungo Andongo (Thomas, 1904); Mombutu (Wroughton, 1906); Osi R. (Monard, 1935). It appears to be distributed throughout northern Angola.

EXTERNAL CHARACTERS.—Tail well haired, about length of head and body. Hind feet broad, moderately elongate, with naked soles and fairly well-developed plantar pads; fifth digit extends slightly beyond base of fourth. Claws long and stout. Pelage short, moderately soft. Mammae 2–2 = 8.

COLORATION.—Upperparts between Olive-Brown and Natal Brown (about 15''k), paler on the sides, becoming nearly Cinnamon. A black circumorbital ring and a broad black line from eye to ear. Tip of muzzle black; ears almost black. Underparts, medial sides of fore and hind legs, feet, and lips, white, for the most part without underlying plumbeous. Sides with a number of white hairs mixed with the Cinnamon ones. Top of tail like the back; sides Pale Pinkish Cinnamon; most of the under side white, but basally, Pale Pinkish Cinnamon.

SKULL.—Skull elongate and high. Zygomatic plate very large; maxillary root of zygoma forms a shelf over anterior part of the orbit; rest of the arch slender. Infraorbital foramen large dorsally, narrow and slit-like ventrally. Incisive foramina elongate, but do not reach so far posteriorly as the anterior margin of M^1 .



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H.Z.Hunt

Fig. 29. *Tatera humpatensis*, skull and mandible.

Posterior palatine foramina large. Interpterygoid region narrowly V-shaped; pterygoid fossae large and deep. Tympanic bullae large.

DENTITION.—Incisors with shallow groove, moderately opisthodont. Molars large; M^3 somewhat like a trefoil in shape; M^1 larger than M^2 and M^3 together.

MEASUREMENTS.—See table, p. 197.

***Tatera humpatensis* (Hill and Carter)**

Figure 29

Taterona humpatensis HILL AND CARTER, 1937 (Mar.) Amer. Mus. Novit., No. 913, pp. 5-7. Type locality: Humpata, alt. 6300 ft., Angola. The type specimen is in the American Museum.

The American Museum has a series of 7 from the type locality; it occurs also at Dandi, near Bêla Vista.

EXTERNAL CHARACTERS.—Tail longer than head and body. Hind feet relatively more elongate and more slender than in *T. valida*; pelage softer and longer. Mammae, in the two adult females, 1-2 = 6.

COLORATION.—Upperparts slightly paler than in *T. valida*, the sides with more white hairs. Region between eye and ear whitish; end of muzzle blackish brown; an area of blackish below the eye. Underparts not sharply set off from upperparts, usually paler than Tilleul Buff (one individual is near Pinkish Buff), the basal Plumbeous showing through. Fore feet and proximal two-thirds of hind feet, Pinkish Buff, distal one-third, white. Tail paler above than the back; below, near Tilleul Buff. Ears pale basally, with a large white area behind each.

SKULL.—Skull much shorter than in *T. valida*, with short, rounded braincase and wide, gently tapering nasals; lower and more convex in dorsal outline. Incisive foramina relatively wider.

DENTITION.—Incisors more strongly grooved than in *T. valida*; molars smaller.

MEASUREMENTS.—See table, p. 198.

***Tatera schinzi angolae* Wroughton**

Tatera angolae WROUGHTON, 1906 (May), Ann. Mag. Nat. Hist., (7) XVII, pp. 488-489. Type locality: Fort Quilenges, Angola. The type specimen is in the British Museum.

Gerbillus schlegeli. Peters, 1865; Jentink, 1888.

Meriones afer. Peters, 1870.

Gerbillus sp. Bocage, 1890.

Tatera sp. Thomas and Wroughton, 1905.

Gerbillus afer (?). Monard, 1933.

Taterona schinzi. St. Leger, 1936b.

Gerbillus nigrotibialis MONARD; 1933 (1932) Bull. Soc. Neuchâtel. Sci. Nat., LVII, pp. 54-55, Figs. 5-6. Type locality: vicinity of Cubango (Vila da Ponte).

The American Museum has 38 specimens from Angola: Lobito, 1; Catumbela, 1; Luvando, 5; Mulondo, 28. It is recorded from the following other localities: near Loando [?] (Peters, 1865); Huila (Peters, 1870); Mossamedes (Jentink, 1888); Pungo Andongo, Rio Coroca, and Bibale (Bocage, 1890); Rio Mbale (Monard, 1933); Tyihumbwe River [Chiumbe], Kuvelai River, Humbe, Osi, Kamba, and Kambisa (St. Leger, 1935).

Tatera s. angolae appears to be distributed over most of the western half of Angola; although the collections from Chitau are quite complete, they do not include this species.

EXTERNAL CHARACTERS.—Tail usually longer than head and body. Hind feet long; ears moderately large. Pelage silky. Mammae 2-2 = 8.

COLORATION.—Specimens taken from April to July: back near Tawny-Olive; color bands of hairs near Cinnamon, tips Blackish. Sides paler, near Cinnamon-Buff, mixed with numerous white hairs and many buff hairs have white bands below the buff. An indefinite broad whitish stripe from muzzle to, and surrounding, base of the ear. Underparts white, this including lips, medial sides of legs and feet. Forearm largely white. Back of the ankles near Bister. Tail colored like the back above, or with considerable blackish admixture; below whitish. October and December specimens from farther south: upperparts paler; sides, forelegs, and face, more whitish.

SKULL.—Facial portion weak; braincase short, broad, and angular. Bullae larger than in other Angolan species of the genus. Interpterygoid and interorbital regions narrow.

DENTITION.—Incisors strongly opisthodont, deeply grooved. Molars much as in *T. humpatensis*.

MEASUREMENTS.—See table, p. 198.

FIELD NOTES.—This species "lives in holes in sandy ground."

A female from Lobito, collected May 2, 1925, contained three embryos. Male specimens from Hanha, May 18, and from Mulondo, October 19 to 22, had enlarged, scrotal testes.

The series of gerbils from Mulondo appear to show intergradation with *Tatera s. schinzi* which is found in nearby Ovambo-land. Cranially they differ slightly from examples collected at Hanha, not far from the type locality of *angolae*: the rostrum is longer; the nasals tend to be more truncate posteriorly; the incisive foramina are slightly larger. They are paler in coloration.

FIELD NOTES.—“Vole, made a screeching noise like squirrel; the old ones could be mistaken for a squirrel when heard for the first time.” (H. Lang.) Female specimens taken in August were lactating and males had enlarged and scrotal testes.

Otomys irroratus maximus Roberts

Otomys irroratus maximus ROBERTS, 1924 (Jan.), Ann. Transvaal Mus., X, pt. 2, p. 70. Type locality: Machile River, southwestern part of Northern Rhodesia. The type specimen is in the Transvaal Museum.

Otomys irroratus. Peters, 1870; Jentink, 1887, 1888.

Euryotis irrorata. Bocage, 1890.

The Phipps-Bradley Expedition collected 12 specimens at Humpata, Angola. Other localities from which specimens referable to this race have been recorded are: Huila (Peters, 1870); Rio Mbalé and Caluquembe (Monard, 1933). The record of *Otomys irroratus* (Bocage, 1896) from Hanha probably belongs to this subspecies. *Otomys irroratus maximus* lives along the tributaries of the Kubango, Zambezi and Cunene Rivers, in Angola, South West Africa, Ngamiland, and Northern Rhodesia.

EXTERNAL CHARACTERS.—Tail more than half as long as head and body, sparsely haired, with scales in rings, 12 or 13 per centimeter. In males, but not in females, the pelage is stiff and harsh on the cheeks; elsewhere it is soft in both sexes. Mammae 0-2 = 4.

COLORATION.—Agrees closely with that of *O. i. irroratus* according to descriptions. Upperparts grizzled, black and near Pinkish Buff; underparts Neutral Gray, faintly overlaid with Tilleul Buff, not sharply set off from the upperparts. Cheeks, muzzle, feet, and under side of the tail about as the underparts. Tail almost black dorsally.

SKULL.—Skull elongate, with narrow braincase and roughly square interparietal. Rostrum heavy, with nasals widely expanded anteriorly. Interorbital region narrow, temporal crests strong and close together. Tympanic bullae small; antero-dorsal wall of external auditory meatus not thickened as in *O. anchietae*.

DENTITION.—Incisors much as in *O. anchietae*; molars smaller. M^3 has 6 plates, M_1 only 4.

MEASUREMENTS.—See table, p. 199.

The Angolan specimens are smaller than Roberts' type, with shorter tails and smaller skulls. However, they agree closely in other respects, so that it is considered best

to identify them with the Rhodesian subspecies.

Female specimens taken in November were lactating and two young were taken November 13, with head and body lengths of 83 and 89 mm.

Otomys cuanzensis Hill and Carter

Figure 30

Otomys cuanzensis HILL AND CARTER, 1937 (Mar.), Amer. Mus. Novit., No. 913, pp. 7-9, Fig. 4. Type locality: Chitau, alt. 4930 ft., Angola. The type specimen is in the American Museum.

In addition to 7 paratypes, the American Museum has a single specimen from Namba. Probably two Angolan records of "*Otomys irroratus*" refer to this form: Pungo Andongo and Duque de Bragança (Thomas, 1904). The range of *O. cuanzensis* probably includes the drainage of the Cuanza River.

EXTERNAL CHARACTERS.—Tail a little longer than half head and body length, clothed with stiff hairs which partly hide the scales; scales in rings about 11 per centimeter. Hind feet short, especially digits; plantar pads large. Pelage moderately soft, long and shaggy.

COLORATION.—Upperparts near Sayal Brown, heavily mixed with iridescent black; general color near Bister. Black overlay less evident on the sides. Underparts paler, Deep Neutral Gray, overlaid with Cinnamon-Buff or even paler. Feet colored as the underparts. Tail with a dorsal black stripe; the hairs on each side of this stripe near Tawny, the other hairs of the sides and underneath near Cinnamon.

SKULL AND DENTITION.—Skull resembles that of *O. irroratus maximus*, but braincase wider, interparietal much wider, temporal ridges farther apart. External auditory meatus thickened anterodorsally. Molars slightly weaker.

MEASUREMENTS.—See table, p. 199.

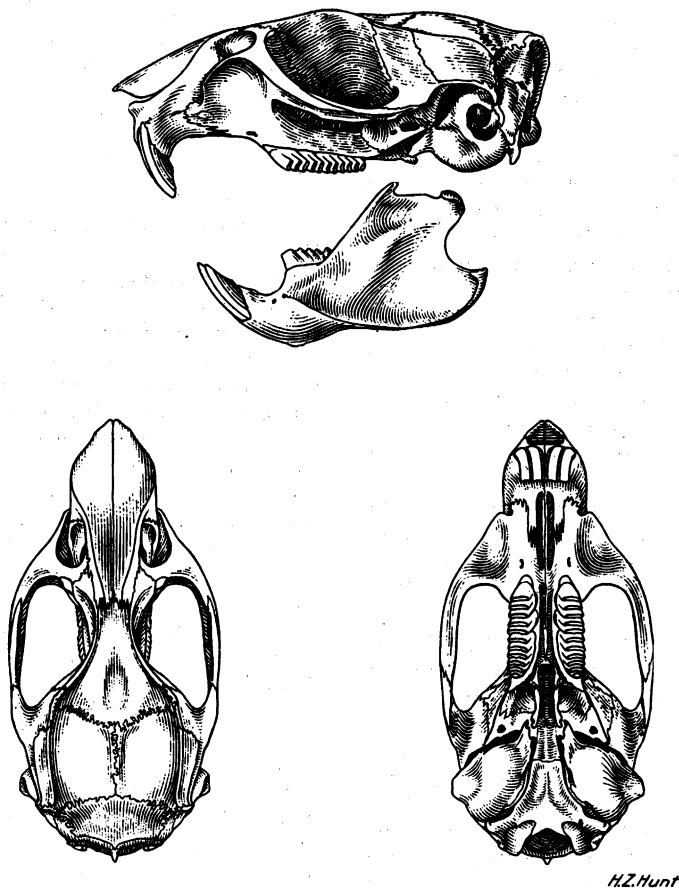
BATHYERGIDAE

The mole rats, or blesmoles, are medium-sized rodents of fossorial habits, with minute ears and eyes, stout body, and short tail. The pelage is short and velvety, except on the tail where the hairs are long

and bristle-like. The claws of the fore feet are large; those of the hind feet are nail-like. The skull is massive with a long, heavy rostrum, and widely spreading, heavy zygomatic arches. The braincase and tympanic bullae are small. The palate ends far behind the last molar. The incisive foramina are minute; the infra-

the corpus; the coronoid is low and the condyle is situated over the root of the incisor. The incisors are proödont and chisel-like; the molar teeth are high-crowned and wear down in adults to simple cylinders.

A single genus, *Cryptomys*, is found in Angola with at least two species. The



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Fig. 30. *Otomys cuanzensis*, skull and mandible.

orbital foramina moderate in size. The pterygoid fossae open into the cranial cavity, so that the internal pterygoid muscle extends forward to the orbit. The lacrimal canal runs posteroventrally and passes medially, rather than laterally, around the root of the incisor. The large angle of the lower jaw springs from the lateral size of

mole rats range from the Cape to Togo and Kenya.

CRYPTOMYS GRAY

Cryptomys GRAY, 1864, Proc. Zool. Soc. London, p. 124, Figs. 3, 6. Genotype: *Georychus holisericeus* Wagner.

(a) Size large (head and body in adults more than 200 mm.; skull length more than

- 47 mm.). Pale yellowish brown in color
 *Cryptomys mechowii*.
 (b) Size smaller (head and body from 125 to
 150 mm.; skull length 32 to 40 mm.).
 Coloration darker.
 *Cryptomys bocagei*.

Cryptomys mechowii (Peters)

Figure 31

Georychus mechowii PETERS, 1881 (Oct.), Sitz-ber. Ges. Naturf. Freunde, Berlin, p. 133. Type locality: Malange, Angola. The type specimen is in the Berlin Museum.

Georychus ansorgei THOMAS AND WROUGHTON, 1905 (Aug.), Ann. Mag. Nat. Hist., (7) XVI, p. 175. Type locality: Coquema (Kukema) River, alt. 5900 ft., near Bihé, Angola. The type specimen is in the British Museum.

Cryptomys blainei HINTON, 1921, Ann. Mag. Nat. Hist., (9) VII, p. 372. Type locality: Chisongwe, Angola. The type specimen is in the British Museum.

"Oguio," native name, Bocage, 1890.

The American Museum has 31 specimens of this large mole rat from Angola, as follows: Cuanza, 20 mi. S. Caconda, 1; Chitau, 26; Chissonque, 20 km. E. Dando, 3; near Silva Porto, 1. The Carnegie Museum has 14 specimens from Chitau and 3 from Gauca, 20 km. E. Dando. Specimens from Concordia have been examined in Berlin. Other localities for this species are: Quissange and Quindumbo (Bocage, 1890); Hanha (Bocage, 1896, 1897); Galanga (De Winton, 1897); Duque de Bragança (Thomas, 1904); Bango (Seabra, 1905); Elende and Bimbe (Monard, 1935). These localities are all in the northern two-thirds of Angola.

EXTERNAL CHARACTERS.—Most agree with those given in the discussion of the family Bathyergidae. Fore foot with second and third digits the largest, the latter slightly longer than the former; first and fifth subequal, small; fourth intermediate between fifth and first. Hind foot with third digit the largest; second only slightly smaller; first and fourth subequal; fifth the smallest.

COLORATION.—Upperparts variable, near Cinnamon, Vinaceous-Cinnamon, Wood Brown, or duller than Cinnamon-Buff. Underparts slightly more grayish, the hair being scantier. Feet like underparts. An area on each side of the mouth near Chestnut-Brown, or darker, probably stained from food.

SKULL AND DENTITION.—These have been described in the discussion of the family. The skull is extremely variable. Males usually have larger, more rugose skulls than females, and both sexes appear to continue growing throughout life.

MEASUREMENTS.—See table, p. 200.

Georychus ansorgei Thomas and Wroughton and *C. blainei* Hinton are apparently based on large specimens of this species. The series examined by us shows such variation in the characters these authors used, as to make the validity of their species highly improbable.

Cryptomys bocagei (De Winton)

Georychus bocagei DE WINTON, 1897 (Sept.), Ann. Mag. Nat. Hist., (6) XX, p. 323. Type locality: Hanha, Angola. The type specimen is in the British Museum.

Heliophobius argenticinereus. Peters, 1870.

Georychus hottentotus. Peters, 1872; Jentink, 1887.

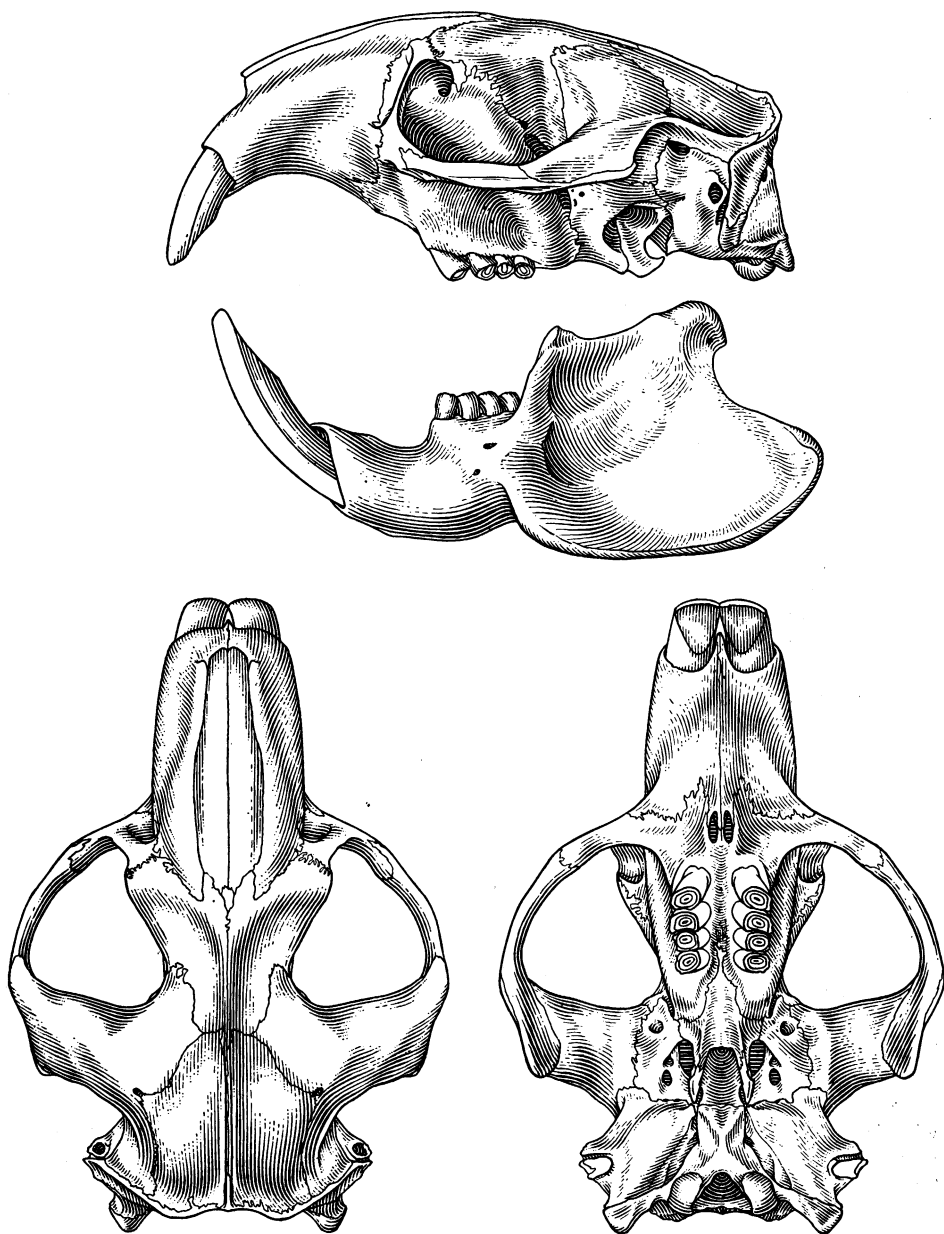
Georychus sp. Bocage, 1890; Seabra, 1905; Thomas and Wroughton, 1905.

Georychus kubangensis MONARD, 1933, Bull. Soc. Neuchâtel. Sci. Nat., LVII, pp. 58–60. Type specimen not designated, probably from Rio Mbalé.

"Néte," native name, Bocage, 1890.

The American Museum has 127 specimens of this small mole rat from Angola: Chitau, 81; Chissonque, 13; Humpata, 32; without data, 1. The Carnegie Museum has a total of 11: 2 from Chitau, 8 from Gauca, and 1 without data. Other localities from which this species has been recorded are: Caconda (Peters, 1870; Bocage, 1882); Cambembe (Peters, 1872); Otjipahe, Otjipompenima, and Catumbela (Jentink, 1887); Huila, Dondo, Quilengues, Quindumbo, and Duque de Bragança (Bocage, 1890); Ambaca and Pungo Andongo (Thomas, 1904); Galungo Alto (Seabra, 1905); Pedreira and Bunhe (Thomas and Wroughton, 1905); Rio Mbalé, Vila da Ponte, Chimpopo, and Tumbolo (Monard, 1933). It thus is found over most of interior Angola, exclusive of the deserts.

EXTERNAL CHARACTERS.—These agree closely with the external features of *Cryptomys mechowii*, but second and fifth digits of hind foot relatively smaller, fourth digit larger, hallux about intermediate in size between the fifth and fourth digits.



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H.Z. Hunt

Fig. 31. *Cryptomys mechowii*, skull and mandible.

COLORATION.—Extremely variable, individually, and the same individual varies according to the amount and angle of the light. *Cryptomys bocagei* is usually much darker than *C. mechowii*, specimens from the same locality being variously near Fuscous, Natal Brown, Snuff Brown, Pecan Brown, Sayal Brown, Cinnamon over Dark Neutral Gray, and (one) Pinkish Buff. Young near Blackish Plumbeous. Coloration of underparts dilute; Dark Neutral Gray of the bases of the hairs shows through conspicuously. A white frontal spot usually present; it varies greatly in size and may be absent.

SKULL AND DENTITION.—Skull resembles that of *C. mechowii*, but less convex dorsally; the zygomatic arches relatively more widely spreading; braincase and mastoid region wider; tympanic bullae more inflated. Teeth described in the discussion of the family characters.

MEASUREMENTS.—See table, p. 200.

The great variability in coloration and in cranial features makes the systematic treatment of the mole rats extremely difficult. It is possible that *bocagei* is synonymous with *damarensis* from South West Africa, or it may be, more probably, a race of that species.

THRYONOMYIDAE

Pocock (1922) erected this family for the single genus *Thryonomys* basing it chiefly on external characters. The cane rats are about the size of marmots or woodchucks, with small eyes and ears, short legs and tail, and coarse spiny pelage. The hallux is absent in the hind foot.

The skull is massive, with a very large infraorbital foramen, heavy rostrum, and wide interorbital region. The angle of the mandible is everted. Cheek-teeth are $\frac{4}{1}$. The upper incisor bears 3 deep grooves on its anterior face.

The cane rats occur in the lowland swamps throughout Africa south of the Sahara.

THRYONOMYS FITZINGER

Thryonomys FITZINGER, 1867, Sitz.-ber. Kais. Akad. Wissen., Wien, Math. Nat. Kl., LVI, p. 141. Genotype: *Aulacodus semipalmatus* Heuglin (= *Aulacodus s. variegatus* Peters).

A race of *Thryonomys swinderianus* is found in Angola.

Thryonomys swinderianus angolae

Thomas

Figure 32

Thryonomys swinderianus angolae THOMAS, 1922 (April), Ann. Mag. Nat. Hist., (9) IX, p. 392. Type locality: Junction of the Luando and Cuje Rivers, Angola. The type specimen is in the British Museum.

Aulacodus swinderianus. Bocage, 1890.

The American Museum has 3 specimens from Angola: Chitau, 2; Chissonque, 20 km. E. Dando, 1. This rodent has been previously recorded from the following localities: Catumbela, Maconjo, and Canda (Bocage, 1890); Hanha (Seabra, 1908). It is an animal of the swamp and riverbank, and probably occurs wherever these environments are found in Angola, since this race extends into South West Africa (St. Leger, 1932).

EXTERNAL CHARACTERS.—These have been discussed in connection with the family Thryonomyidae.

COLORATION.—Upperparts variegated Cinnamon-Buff, or paler, and shining black, becoming near Tilleul Buff and Sepia on the sides; underparts whitish and Drab. Feet colored like the sides. Bases of hairs on the back, usually near Drab.

SKULL.—In addition to the features discussed in characterizing the family, the skull exhibits strongly developed temporal, lambdoidal and external occipital crests. Rostrum nearly square in section; tympanic bullae thick-walled, rounded; paroccipital processes long; incisive foramina large; interpterygoid region wide.

DENTITION.—Upper cheek-teeth exhibit an E-pattern, the longitudinal ridge being on the lingual side. The pattern is reversed in M_{1-3} and P_4 has an extra transverse loph.

MEASUREMENTS.—Hind foot (c.u.), 82. Skull: greatest length, 83.9; basilar length, 67.7; diastema, 18.6; length nasals, 28.8; zygomatic breadth, 51.7; interorbital breadth, 26.4; mastoid breadth, 35.9; length bulla, 14.3; length incisive foramina, 10.5; maxillary alveoli, 18.4; breadth M^1 , 7.1; width palate inside M^1 — M^1 , 6.2.

HYSTRICIDAE

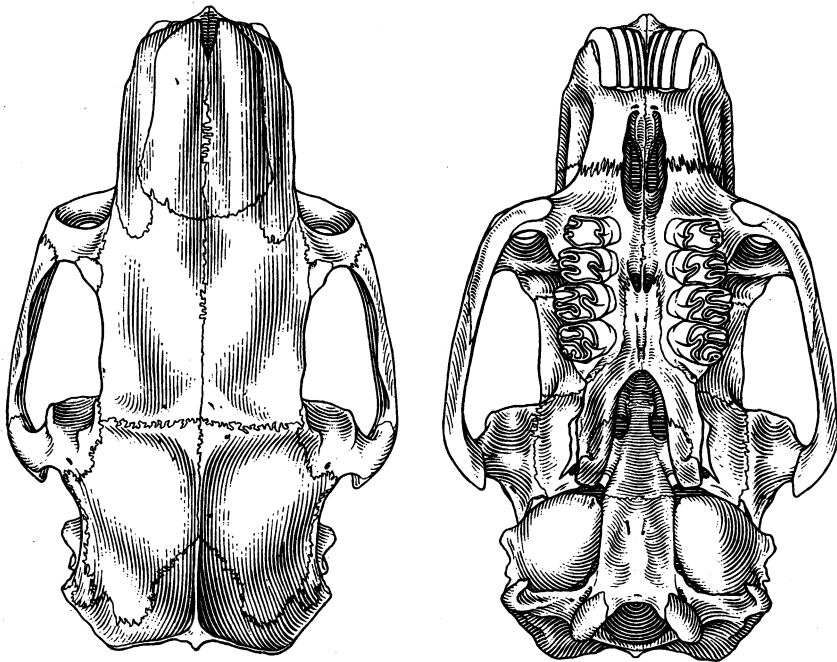
The African porcupines are large rodents with long quills, some of which may be two feet in length. The skull is strongly inflated, especially the rostrum; the nasals are broad. The molar teeth are very complicated in pattern, and the incisors are relatively weak.

HYSTRIX LINNAEUS

Hystrix LINNAEUS, 1758, "Systema Naturae," 10th Ed., I, pp. 56-57. Genotype: *Hystrix*

previously recorded from Angola: Benguela and Huila (Bocage, 1890); Vila da Ponte and Chimpopo (Monard, 1933); Mulondo and Humbe (Monard, 1935). *Hystrix africae-australis* probably occurs throughout most of Angola.

EXTERNAL CHARACTERS.—Large quills on the posterior half of the body. Anterior part of the body covered with short spines. A crest of long white bristles from forehead to middle of the back; vibrissae long.



A.M. 80821

Fig. 32. *Thryonomys swinderianus angolae*, skull.

cristata Linnaeus (subsequent designation, Sclater, 1901).

A single species of this genus occurs in Angola. *Hystrix* is found throughout Africa, southern Asia, and southern Europe.

***Hystrix africae-australis* Peters**

Hystrix africae australis PETERS, 1852, "Reise nach Mossambique," I, Säugethiere, pp. 170-172. Type locality: Tete, Mozambique. No type specimen was designated.

The Phipps-Bradley Expedition collected a single specimen at Chitau. It has been

Digits short and stout; pollex vestigial; digits of fore feet armed with stout claws; claws of hind feet short.

COLORATION.—From near Drab on the forehead to Fuscous-Black on the lower sides and belly; most of the long quills banded with white; a white crest as mentioned above. An area of white in front of the shoulder.

SKULL.—Skull distinguished from that of other African species by shorter nasals, which reach no farther posteriorly than the

anterior margins of the orbits, and small temporal fossae.

DENTITION.—Incisors relatively weak, ovoid in section, whitish in color. Molariform teeth complicated in pattern; high crowned but rooted.

MEASUREMENTS.—The single specimen is immature so that its measurements are not significant for comparison.

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ORDER LAGOMORPHA

Lagamorphs differ from rodents in possessing a second pair of upper incisors, more cheek-teeth, and they chew laterally rather than backward and forward. The Angolan members of this order are hares of the genus *Lepus*.

LEPORIDAE

Hares are too well known to require much description. Those found in Angola are only slightly different from American, European, and Asiatic species. The ears and hind legs are long, the tail short, the eyes large, the pelage soft and fluffy. The skull is elongate, with lacy "openwork" in front of the orbit and bullae. The supraorbital processes are large, with anterior and posterior limbs. The hard palate is reduced to a small bridge between the incisive foramina

and the choanal opening. The upper first incisors are grooved. The cheek-teeth are $\frac{6}{5}$.

LEPUS LINNAEUS

Lepus LINNAEUS, 1758, "Systema Naturae," 10th Ed., I pp. 57-58. Genotype: *Lepus timidus* Linnaeus (subsequent designation, Sclater, 1901).

There are two well-marked species of hare in Angola: *Lepus* is found in the Holarctic, Oriental, and Ethiopian Regions.

- (a) Ears longer (120 to 128 mm. from crown).
Molars small. Tympanic bullae large (13.3 to 14.1 mm. in length).....*Lepus capensis salae*.
- (b) Ears shorter (100 to 110 mm. from crown).
Molars large. Bullae small (10.5 to 12.7 mm.).....*Lepus saxatilis angolensis*.

Lepus saxatilis angolensis Thomas

Plate V,a

Lepus angolensis THOMAS, 1904 (June), Ann. Mag. Nat. Hist., (7) XIII, p. 420. Type locality: Ambaca, 800 m., Angola. The type specimen is in the British Museum.

Lepus ansorgei THOMAS AND WROUGHTON, 1905 (Aug.), Ann. Mag. Nat. Hist., (7) XVI, p. 176. Type locality: Caiala, alt. 6000 ft., Bihé district, Angola.

Lepus angolensis meridionalis MONARD, 1933 (1932), Bull. Soc. Neuchâtel. Sci. Nat., LVII, p. 61. No type or type locality was designated.

Lepus ochropus. Bocage, 1890; Seabra, 1903. "Candimba," native name, Bocage, 1890.

The American Museum has 26 specimens from Angola: Mombola (Namba), 1; Chitau, 7; Capelongo, 18. The Carnegie Museum has a single specimen from Mombola. Other localities from which this hare has been recorded are the following: Humpata (Jentink, 1887); Caconda, Rio Cuce, Huila, and Humbe (Bocage, 1890); Cazengo (Seabra, 1903); Pungo Andongo (Thomas, 1904); Chingwari (Chinguar) and Chiyuka, Bihé district (Thomas and Wroughton, 1905); Rio Mbalé, Vila da Ponte, and Caquindo (Monard, 1933). *Lepus angolensis* is probably found throughout most of Angola, exclusive of the true desert.

EXTERNAL CHARACTERS.—Ears smaller than in *Lepus c. salae*.

COLORATION.—Upperparts relatively variable, Pinkish Buff or Pale Pinkish Buff heavily overlaid with black or with Fuscous. Sides with less dark overlay, passing gradually into the white of the belly. Ruff and fore legs near Cinnamon or duller. Hind legs and feet paler, near Cinnamon-Buff. Head more grayish, or darker, than the back. Usually a spot of white on the forehead. Posterior margin of the ear whitish basally, becoming pale buffy and then blackish brown distally; anterior margin near Olive-Buff basally, becoming blackish near the tip. Nape near Cinnamon. Tail black dorsally, dirty white on the sides and ventrally.

SKULL AND DENTITION.—Cranially there is considerable variation, especially in the width of the nasals, which may be from 46 to 60 per cent of their lengths. Tympanic bullae, however, uniformly small. Molars, on the average, larger than in *L. c. salae*.

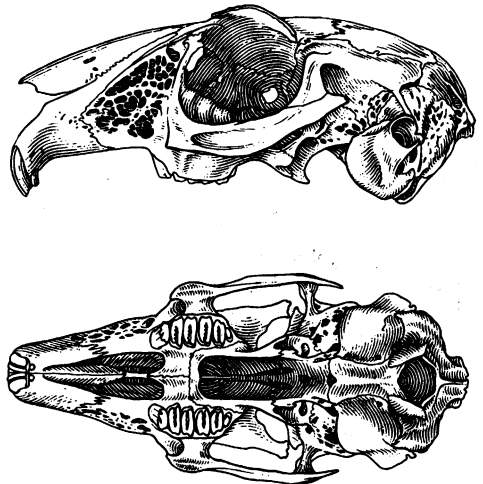
MEASUREMENTS.—See table, p. 201.

The hares from Angola in the collections of the American Museum and the British Museum show so much variation in color as to call into question the validity of several names proposed in recent years based on minor color differences.

Lepus capensis salae Jentink

Plate V,b; Figure 33

Lepus salae JENTINK, 1880, Notes Leyden Mus., II, pp. 57-58. Type locality: Mossamedes, Angola. The type specimen is in the Rijksmuseum van Natuurlijke Historie, Leiden. (A race of *L. capensis*, Thomas, 1926.)



A.M. 80830

H.Z. Hunt

Fig. 33. *Lepus capensis salae*, skull.

The Vernay Angola Expedition collected 2 specimens at Pico Azevedo and 2 at 101 km. [N.] E. Mossamedes. The Pulitzer Expedition collected a single specimen at Mucungu for the Carnegie Museum. There are specimens of *Lepus c. salae* in the British Museum from near Benguela; it is probably restricted to the southwestern desert district in Angola.

EXTERNAL CHARACTERS.—The ears are long, but otherwise this species presents little of interest externally.

COLORATION.—Back between Light and Pale Pinkish Cinnamon (about 15''e), heavily clouded with black; sides slightly paler and duller. Underparts, except for the throat, pure white, as are medial sides

of legs and part of the feet. Ear margined with white, ends in a black tip. An indefinite white streak extends from muzzle to ear, surrounding the eye. Posterior bases of ears and the nape whitish; usually a small white spot on the forehead. Tail black above, white on the sides and below. Lateral sides of fore legs, upper side of feet, and throat-ruff near Cinnamon-Buff. Soles of feet more olive than Cinnamon-Buff.

SKULL.—Supraorbital processes large; tympanic bullae large and rounded.

DENTITION.—Incisors whitish; molariform teeth small.

MEASUREMENTS.—See table, p. 201.

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ORDER NOMARTHRA

MANIDAE

The pangolins or scaly anteaters are represented in Angola by two genera: both are toothless and covered with scales, thus differing from other African mammals.

- (a) Tail longer than head and body, scales smaller.....*Phataginus*.
- (b) Tail about the length of head and body; scales larger.....*Smutsia*.

PHATAGINUS RAFINESQUE

Phataginus RAFINESQUE, 1821, *Ann. Gén. Sci. Phys. Bruxelles*, VII, pp. 214–215. Genotype: *Manis tricuspis* Rafinesque.

Phataginus tricuspis Rafinesque

Manis tricuspis RAFINESQUE, 1821, *Ann. Gén. Sci. Phys. Bruxelles*, VII, p. 215. Type locality: West Africa.

This species has been recorded from Angola: Bembe (Sclater, 1860); Central Angola (Hatt, 1934); Ndalla Tando and Cazengo (Seabra, 1903); Golungo Alta (Seabra, 1905); Bimbi (Monard, 1935). Specimens were not secured by the Ameri-

can Museum expeditions. The small anteater is found from Liberia to Central Angola, including most of the Congo basin in its range.

SMUTSIA GRAY

Smutsia GRAY, 1865, *Proc. Zool. Soc. London*, pp. 369–370. Genotype: *Manis temminckii* Smuts.

Smutsia temminckii (Smuts)

Manis temminckii SMUTS, 1832, "*Enumeratio Mammalium Capensium*," p. 54. Type locality: Latakou (Litakun?) Bechuanaland.

Three specimens of the giant scaly anteater were collected by the Vernay Angola Expedition: Chitau, 2; Mombolo (Namba), 1. Other records for this species in Angola: Caconda and Mossamedes (Bocage, 1890); Benguela (Themido, 1929); between Kului and Kubango Rivers (Monard, 1935). *Smutsia temminckii* is found from the Orange River to Angola and Uganda.

ORDER TUBULIDENTATA

ORYCTEROPODIDAE

ORYCTEROPUS GEOFFROY

Orycteropus E. GEOFFROY, 1796, Bull. Soc. Philom., I, p. 103. Genotype: *Myrmecophaga capensis* Gmelin (= *M. afra* Pallas).

The aardvark or antbear is found from the Cape to Abyssinia, the Sudan, and Senegal.

Orycteropus afer albicaudus

Rothschild

Orycteropus afer albicaudus ROTHSCILD, 1907 (March), Novit. Zool. XIV, p. 506. Type locality: South West Africa. The type specimen is in the Tring Museum.

A skin only from Quipungo, was secured by the Vernay Angola Expedition. The aardvark is recorded from Benguela, Catumbela, Huila, and Caconda (Bocage, 1890); Hanha (Themido, 1929); Cubango River (Monard, 1935); it probably occurs throughout most of Angola.

NOMARTHA AND TUBULIDENTATA

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ORDER CARNIVORA

The Angolan carnivora vary in size from the smaller viverrids, the size of a weasel or stoat, to the lion. All have three upper and three lower incisors, and most species have large shearing cheek-teeth.

There are six families in Angola. These are briefly characterized below.

- 1.—(a) Skull with auditory bullae divided into two chambers by a partition, or imperfect.....2.
- (b) Auditory bullae not divided, completely ossified.....3.
- 2.—(a) Skull with alisphenoid canal usually present. Head elongate, pointed. Limbs short, tail long....VIVERRIDAE (p. 124).
- (b) Alisphenoid canal absent. Fore limb longer than hind, hyaena-like in appearance.....
-PROTELIDAE (p. 133).
- (c) Alisphenoid canal absent. Head short, rounded; limbs nearly

equal, short or long. Cats....

.....FELIDAE (p. 135).

- 3.—(a) Front limbs longer than hind; digits 4-4. Skull short, with high sagittal crest; no alisphenoid or postglenoid canals. Teeth massive. Hyaenas....

.....HYAENIDAE (p. 135).

- (b) Limbs short, subequal; digits 5-5. Skull without alisphenoid or postglenoid canals. M¹ with medial lobe larger than lateral portion of tooth.....

.....MUSTELIDAE (p. 138).

- (c) Limbs relatively long; digits 5-4 or 4-4. Skull with rostrum elongate; alisphenoid and postglenoid canals present.....

.....CANIDAE (p. 142).

VIVERRIDAE

The viverrids are small or moderately small carnivores with elongate body and

short legs. In the skull the auditory bullae are divided internally and constricted externally, or incomplete, and the alisphenoid canal is usually present. Two subfamilies containing together 12 genera are found in Angola.

- 1.—(a) Claws at least partly retractile, strongly curved. Color pattern of spots and longitudinal stripes. Skull with palate ending posteriorly in front of the optic foramen. *VIVERRINAE*, 2.
- (b) Claws not retractile and only slightly curved. Color pattern grizzled, punctulated, or transversely striped. Skull with palate extending at least as far posteriorly as the optic foramen. *HERPESTINAE*, 4.
- 2.—(a) Size large (head and body usually more than 800 mm.; skull length more than 140 mm.). Gray, with black spots and stripes. *Civettictis* (p. 125).
- (b) Size considerably smaller. 3.
- 3.—(a) A well-marked dorsal stripe, ground color grayish. Skull with auditory bullae complete. M^2 transversely elongate. *Genetta* (p. 126).
- (b) No dorsal stripe; color brownish, with inconspicuous yellow shoulder spots. Skull with ring-like tympanic bones and incomplete bullae. M^2 rounded and peg-like. *Nandinia* (p. 127).
- 4.—(a) Size larger (head and body more than 500 mm.; skull length greater than 90 mm.). 5.
- (b) Size smaller. 7.
- 5.—(a) Skull high and narrow; least width of rostrum behind canine less than 32 per cent of palatilar length. Pelage grayish, guard hairs many-banded blackish and whitish; underfur sparse. *Herpestes* (p. 127).
- (b) Skull broader; least width of rostrum behind canine more than 32 per cent of palatilar length. Underfur abundant. 6.
- 6.—(a) Intertemporal region considerably narrower than interorbital. P^1 absent. General color dark brown; guard-hairs many-banded; tail darker distally. *Atilax* (p. 129).
- (b) Intertemporal region considerably narrower than interorbital. P^1 present. General color gray; tail with distal two-thirds whitish. Feet blackish, with 4 toes. *Galeriscus* (p. 129).
- (c) Intertemporal region of skull about as wide as interorbital. P^1 present. General color grayish; guard-hairs black; tail white distally. Feet blackish, with 5 toes. *Ichneumia* (p. 129).
- 7.—(a) P^1 present. Orbits completely or almost closed in adults. 8.
- (b) P^1 absent. Orbits open posteriorly. . . . 9.

- 8.—(a) Size larger (head and body more than 350 mm.; skull length more than 75 mm.). Fore and hind feet with 4 digits. General coloration gray; tail white-tipped. . . *Paracynictis* (p. 131).
- (b) Size medium (head and body 310 to 325 mm.; skull length 60 to 68 mm.). Fore feet with 5 digits. *Cynictis* (p. 131).
- (c) Size smaller (head and body 250 to 310 mm.; skull length 58 to 63 mm.). Extremities with 5 digits. General coloration ochraceous. *Galerella* (p. 127).
- 9.—(a) Coloration grizzled brownish. Size small (head and body less than 260 mm.; skull length less than 55 mm.). *Helogale* (p. 132).
- (b) Upperparts with transverse light and dark bands or grizzled blackish and reddish brown. Size larger (head and body 300 to 350 mm.; skull length 60 to 75 mm.). *Mungos* (p. 132).

Viverrinae

CIVETTICTIS Pocock

Civettictis Pocock, 1915 (March), Proc. Zool. Soc. London, I, p. 134. Genotype: *Viverra civetta* Schreber (original designation).

Civettictis civetta civetta (Schreber)

Viverra civetta SCHREBER, 1877, "Saugethiere," III, pp. 418, 587, Pl. III. Type locality: French Guinea.

Viverra civetta. Bocage, 1890b, and authors.

The Vernay Angola Expedition obtained two native skins at Hanha. The civet is reported from other localities in Angola: Duque de Bragança, Quindumbo, and the Quissumbue, a tributary of the Cassai River (Bocage, 1890b); Golungo Alto and Pungo Andongo (Thomas, 1904); Cazengo (Seabra, 1903); Loanda (Seabra, 1905); Cutato River (Monard, 1931). It appears to be widely distributed, but relatively rare, in Angola. The species is found from South of the Sahara and Sudan to Transvaal.

COLORATION.—Pale gray, spotted on the back, sides, and belly with black; a broad black mask across the face; throat black; three oblique black stripes on the neck; a middorsal black stripe from between the shoulders; black extremities; black tail, the proximal half or more with a row of grayish spots down each side.

SKULL.—There are no skulls of civets from Angola available.

The two skins are apparently of young adults. The gray color is brighter than in the specimens from eastern Belgian Congo.

GENETTA OKEN

Genetta OKEN, 1816, "Lehrbuch der Naturgeschichte," Th. 3, Zool., Abt. 2, pp. 1010-1012. Genotype: *Viverra genetia* Linnaeus.

There are three forms of genet known to occur in Angola:

- (a) Color pale; five rows of small dark brown spots on each side of the well-marked black middorsal crest. Tip of tail whitish; pelage harsh. *G. genetia pulchra*.
- (b) Color dark grayish; three rows of large blackish or brownish spots on each side of a black crest. Tip of tail black; pelage soft, long. *G. angolensis*.
- (c) Dorsal crest poorly developed; middorsal stripe and spots reddish. Tip of tail black; pelage soft, short. *G. tigrina rubiginosa*.

Genetta genetia pulchra Matschie

Plate VI

Genetta pulchra MATSCHIE, 1902, "Verhandl. 5^{te} Internat. Zoöl. Kongress," Berlin, p. 1139. Type locality: Okawango (Cubango) River, South West Africa (Shortridge, 1935, p. 112). The type specimen is in the Berlin Museum.

Genetta bella MATSCHIE, 1902, idem, p. 1140. Type locality: Loanda, Angola. The type specimen is in the Berlin Museum.

Genetta felina. Bocage, 1890b.

The Vernay Angola Expedition secured 5 specimens of this genet in Angola: Lobito, 1; Hanha, 1; Capelongo, 2; 101 km. [N] E. Mossamedes, 1. (The last 3 are skins with skulls, the other 2 are native skins only.) In addition to Matschie's localities (above) this form is recorded from the following: Vila da Ponte, Rio Mbalé, and Caquindo (Monard, 1931), Mupanda and Mupa (Monard, 1935). It is apparently not common in Angola, although widely distributed. The species is found from southern Europe to the Cape of Good Hope.

COLORATION.—Ground color paler than Cartridge Buff, pure on the belly but lightly overlaid with black above, producing a pale grayish color. Spots dark brownish, or rusty, dorsally, shading laterally to almost black. Two dark brown oblique stripes on the neck. Middorsal crest marked, black. Muzzle white; a grayish-black spot in

front of the eye; a white spot below the eye. Toes whitish; medial sides of feet and lower legs, blackish. Tail black, with eight incomplete white rings and white tip.

MEASUREMENTS.—See table, p. 202.

Genetta angolensis Bocage

Genetta angolensis, BOCAGE, 1882, Journ. Sci. Math. Phys. Nat., Lisbon, (1) IX, p. 29. Type locality: Caconda.

Genetta gleimi MATSCHIE, 1902 (Nov.), "Verhandl. 5^{te} Internat. Zoöl. Kongress," Berlin, p. 1142. Type locality: Loanda, Angola (*sic* Schwarz, 1930, p. 278).

Genetta pardina. Bocage, 1890b.

The American Museum has 28 specimens of *G. angolensis* from Angola: Lobito, 7; Chitau, 18 (3 of which are melanistic); Chissouque, 1; Capelongo, 2 (1 melanistic). It has been previously recorded from Duque de Bragança and Lunda (Bocage, 1890); Hanha (Bocage, 1895). This species is apparently fairly common throughout Western Angola, and is found from near Central Angola to Tanganyika.

COLORATION.—There are two color phases, one melanistic, and a large degree of individual variation. More normal ground color: Pinkish Buff overlaid with brown and black. Blackish blotches near Saccardo's Umber. Facial markings much as in *G. g. pulchra*. Tail thicker, with 5 complete pale rings followed by two incomplete ones; tip black. Most of lower hind leg black, also the middorsal crest, which is moderately developed.

In the melanistic specimens: ground color a dark gray, caused by the mixture of pale Cartridge Buff with black. Spots slightly redder than Fuscous-Black. Extremities near Fuscous-Black, also region between the ears. White on the face much reduced; light bands on the tail only slightly paler than the dark bands.

Some specimens are intermediate between these color phases, and others are paler and with more reddish spots than the typical skins.

SKULL.—Skull not evidently different from that of *G. g. pulchra*.

MEASUREMENTS.—See table, p. 202.

Genetta tigrina rubiginosa Pucheran

Genetta rubiginosa PUCHERAN, 1855, Rev. Zool., (2) VII, p. 154. Type locality: "Cape

Colony," probably Bechuanaland. The type is in the Paris Museum.

Genetta rubiginosa. Bocage, 1890b; Seabra, 1909; Themido, 1928.

The Vernay Angola Expedition secured 16 specimens, all native skins, of the red-spotted genet: Lobito, 9; Chitau, 6; Capelongo, 1. This genet is recorded from Caconda (Bocage, 1890b), from the country of the Cuamates (Seabra, 1909); Benguela (Themido, 1928), Campulu, Nyemba, and Vila da Ponte (Monard, 1935).

COLORATION.—Coloration relatively variable. In a fairly typical skin: Ground color between Light and Warm Buff (about 17'e) with some Fuscous overlay dorsally. Spots and middorsal stripe near Russet (in other specimens they may be near Prout's Brown or bright Hazel). Legs and feet largely buffy. Tail with nine or ten incomplete whitish rings and a black tip; thinner than in *G. angolensis*. Dark tail-rings blackish mixed with Russet.

SKULL AND MEASUREMENTS.—There are no skulls or measurements for the Angolan specimens.

NANDINIA GRAY

Nandinia GRAY, 1843, "List Spec. Mamm. British Mus.," pp. xx, 54. Genotype: *Viverra binotata* Gray.

Nandinia binotata (Gray)

Viverra binotata ("Reinwardt") GRAY, 1830 (Aug.), "Spicilegium Zoologica," II, p. 9. Type locality: Ashanti, Gold Coast.

The Vernay Angola Expedition secured an incomplete native skin at Chitau. *Nandinia* is recorded from Bembe (Schlatter, 1860); Golungo Alto (Thomas, 1904). It is probably rare in northern Angola, but occurs from there east to Kenya and Nyasaland and north to Liberia.

COLORATION.—From near Cinnamon-Buff ventrally to Verona Brown dorsally; a row of blackish spots about 10 mm. in diameter down the middorsal line, some of which coalesce. About five rows of variously sized spots on either side of the middorsal line. Legs unspotted. A small yellowish spot on each shoulder; a large blackish spot behind each ear. Tail irregularly annulated black and near Snuff Brown.

SKULL.—There is no skull for the skin from Angola.

Herpestinae

HERPESTES ILLIGER

Herpestes ILLIGER, 1811, "Prodromus Syst. Mamm. Avium," p. 135. Genotype: *Viverra ichneumon* Gmelin (subsequent designation, Anderson, 1878).

Herpestes ichneumon angolensis Bocage

Herpestes angolensis BOCAGE, 1890 (Sept.), Journ. Sci. Math. Phys. Nat., Lisbon, (2) II, pp. 31-32. Type locality: Quissange, Angola.

Herpestes ichneumon. Bocage, 1890b.

Mungos angolensis. Monard, 1935.

The Vernay Angola Expedition obtained two specimens of this mongoose at Chitau. It is recorded from Duque de Brangança (Bocage, 1890b) and Cubango Mission (Monard, 1935) in addition to the type locality. The large gray mongoose is apparently rare, but widely distributed in Angola. The species is found from the Iberian peninsula to the Cape.

COLORATION.—Upperparts gray, the numerous long guard-hairs being alternately banded blackish and white, the black predominating slightly. Underfur Orange - Cinnamon, showing through faintly. Sides and underparts paler than the back; underfur of belly Drab. Legs dark brownish gray laterally; medially, like the belly. Tail like the back in color, with a black terminal tuft.

SKULL.—There are no skulls for the specimens we have examined from Angola.

GALERELLA GRAY

Galerella GRAY, 1864, Proc. Zool. Soc. London, p. 564. Genotype (by monotypy). *Herpestes ochraceus* Gray.

Myonax THOMAS, 1928 (Nov.), Ann. Mag. Nat. Hist., (10) II, p. 408. Genotype: *Herpestes gracilis* Rüppell. *Myonax* does not appear to be generically distinct from *Galerella*.

There are at least two forms of *Galerella* in Angola:

- (a) Bright tawny in color, not punctulated on the under side nor distal half of tail. Hind feet less than 60 mm. Skull slender; auditory bullae angular posteriorly. *G. s. bocagei*.
- (b) Dull yellowish brown; punctulated on the under side and to black tip of tail. Hind feet larger. Skull broader; auditory bullae rounded posteriorly. *G. caurii kaokoensis*.

***Galerella bocagei* (Thomas and Wroughton)**

Herpestes bocagei THOMAS AND WROUGHTON, 1905 (Aug.), Ann. Mag. Nat. Hist., (7) XVI, pp. 170-171. Type locality: Caconda, alt. 5700 ft., Angola.

Herpestes gracilis, var. *punctulatus* BOCAGE, 1890, Jorn. Sci. Math. Phys. Nat., Lisbon, (2) I, p. 179 (not *Herpestes punctulatus* Gray, 1849).

?*Herpestes gracilis* var. *flavescens* BOCAGE, 1890, Jorn. Sci. Math. Phys. Nat., Lisbon, (2) I, p. 179. Type locality: Benguela, Angola. The type specimen is in the Museu Bocage, Lisbon.

Myonax melanurus bocagei. MONARD, 1935.

Myonax melanurus lundensis. MONARD, 1935, Arquiv. Mus. Bocage, No. 6, pp. 213-214. Type locality: Tyihumbué (Chiumbé) R., 11° S., 20°15' E., Angola.

The American Museum has 24 specimens of this mongoose from Angola (15 are native skins): Lobito Bay, 1; Luimbale, 1; Chitau, 22. Other Angolan records are: Humbe and the interior of Angola between 12° and 15° South, 15° and 17° East (Bocage, 1890b); Chiumbé, Missions Kuvangu (Cubango) and Caluquembe (Monard, 1935). It is the common slender mongoose of central and northern Angola.

EXTERNAL CHARACTERS.—Body slender and elongate. Tail slightly shorter than head and body. Soles of hind feet naked except the tarsal portion; claws short, curved. Pelage moderately short and fairly coarse, much shorter and finer than in *Herpestes*.

COLORATION.—Relatively variable; above from near Ochraceous-Orange finely flecked with black and overlaid with near Cinnamon - Rufous, to Ochraceous - Buff mixed with black, with the rufous overlay slight. Sides nearly ochraceous (15'a), or like the back. Feet and belly ochraceous (15'a), unmixed with other colors. Crown usually near Kaiser Brown with a slight mixture of Pale Ochraceous-Buff and black, or mixed buffy and black with no reddish brown. Sides of head grayish. Tail basally like the back, but hairs of the distal part Hazel or Kaiser Brown, not banded with black; approximately the last quarter, pure black.

SKULL.—Facial portion much reduced. Orbit completely closed posteriorly or almost so. Lambdoidal crests and posterior part of sagittal crest, well developed. Braincase shows convolutions of the

cerebral hemispheres externally; it is inflated at the squamosal root of the zygomatic arch. Anterior portions of auditory bullae poorly inflated; bullae somewhat angular posteriorly.

DENTITION.—First upper and lower premolars minute, also M²; both may be absent. Teeth otherwise much like those of *Herpestes* but relatively lighter.

MEASUREMENTS.—See table, p. 202.

There is such a range of variation in color in animals from the same locality as to make forms based only on slight differences in coloration questionable.

***Galerella cauii kaokoensis* (Roberts)**

Myonax cauii kaokoensis ROBERTS, 1932 (Oct.), Ann. Transvaal Mus., XV, p. 2. Type locality: Okorosave, Kaokoveld, South West Africa.

Herpestes gracilis, var. *punctulatus*. Monard, 1931.

The Phipps-Bradley Expedition secured a single specimen of this mongoose at Mulando. Monard reports specimens from Caquindo (2 days south of Rio Mbalé on the Cubango River). *G. cauii* is found from southern Angola to the Orange River and Pondoland.

EXTERNAL CHARACTERS.—Hind feet long; the bare area extends almost to the heel.

COLORATION.—A brownish gray; Pinkish Buff, Cinnamon-Buff, and black, coarsely mixed. Rump with a light overlay of Sayal Brown. Colors finely mixed on the head. Feet colored like the underparts, near Cinnamon-Buff. Tail proximally like the back; distally becoming nearly Cinnamon; underneath, near Cinnamon-Orange. Hairs banded as far as the black tip; the latter extensive (about 85 mm.).

SKULL.—Skull broader than in *G. bocagei*. Postglenoid process stronger; bullae more rounded posteriorly, with anterior portion more inflated.

DENTITION.—Teeth as in *G. bocagei*.

MEASUREMENTS.—See table, p. 202.

The specimen from Mulando resembles closely a specimen of *Galerella cauii cauii* from Gaberones, Bechuanaland, but has longer hind feet, larger naked plantar area, and brighter coloration. It does not agree

exactly in coloration with Roberts' description of *G. c. kaokoensis* but variability in coloration is so extreme in *Galerella* that it seems best to refer the specimen to that race, which is geographically the nearest.

ATILAX CUVIER

Atilax F. CUVIER, 1826, "Histoire Naturelle des Mammifères," livre 54, pp. 169-173. Genotype, by monotypy: "Vansire," F. Cuvier (= *Herpestes paludinosus* G. Cuvier).

Atilax paludinosus (G. Cuvier)

Herpestes paludinosus G. CUVIER, 1829, "Le Règne Animal," 2nd Ed., I, p. 158. Type locality: "West Africa."

Herpestes galera. Bocage, 1890b; Thomas, 1904.

Atilax paludinosus, Monard, 1935.

The Vernay Angola Expedition obtained 4 native skins of *Atilax*: Lobito Bay, 1; Hanha, 1; Chitau, 1; Capango, 1. It is recorded from Golungo Alto (Thomas, 1904), Kuvangu (Cubango) and Eyambo (Nyemba) (Monard, 1935), and Bocage (1890b) had a specimen from Angola without further data. The species occurs throughout most of Africa, south of the Sahara.

COLORATION.—Apparently two pelages: One near Warm Sepia punctulated with Ferruginous except on lower legs and end of the tail. The other near Fuscous grizzled with Pinkish Buff; one specimen exhibits this pelage on the head, the rest of the body covered with worn pelage of Warm Sepia and Ferruginous. Underfur near Cinnamon-Drab. End of tail nearly black; feet Blackish-Brown.

SKULL.—No skulls are available for the Angolan specimens.

MEASUREMENTS.—See table, p. 202.

ICHNEUMIA GEOFFROY

Ichneumia I. GEOFFROY, 1837 (October), Ann. Sci. Nat. Paris, (2) VIII, p. 251; 1839, Mag. de Zool. Mamm., (2) I, pp. 4-5, Pls. xi-xvi. Genotype: *Herpestes albicaudus* G. Cuvier (original designation).

Ichneumia albicauda loandae (Thomas)

Herpestes albicaudus loandae THOMAS, 1904 (May), Ann. Mag. Nat. Hist., (7) XIII, pp. 408-410. Type locality: Pungo Andongo, alt. 1200 m., Angola. The type specimen is in the British Museum.

Herpestes albicauda. Bocage, 1890b; Monard, 1931.

The Vernay Angola Expedition secured six native skins: Lobito Bay, 3; Chitau, 2; without data, 1. Bocage (1890b) records this species from Duque de Bragança and Quilengues; Monard found it at Rio Mbalé (1931) and Kuvangu (1935). *Ichneumia* is doubtless found throughout Angola, since it ranges from the Sudan and Senegal to the Cape Province.

COLORATION.—Dark gray: Guard-hairs dirty whitish with a blackish band and a long black tip. Abundant woolly underfur, near Cinnamon-Drab basally and Drab-Gray distally. Underfur of tail whitish, guard-hairs lacking black tips; tail nearly white distally. Feet nearly black, of a slightly brownish hue. In two juvenile skins the exposed parts of the guard-hairs were black.

SKULL.—The skull of the type specimen is the only one examined. Rostrum heavier than in *Herpestes* or *Paracynictis*. Zygomatic arches less abruptly sloping inward posteriorly.

DENTITION.—Cheek-teeth much heavier than in *Herpestes* and *Paracynictis*. M² about three-quarters as large as M¹ instead of about half, as in *Herpestes*.

MEASUREMENTS.—See table, p. 203.

GALERISCUS THOMAS

Galeriscus THOMAS, 1894 (June), Ann. Mag. Nat. Hist., (6) XIII, p. 522. Genotype: *Galeriscus jacksoni* Thomas.

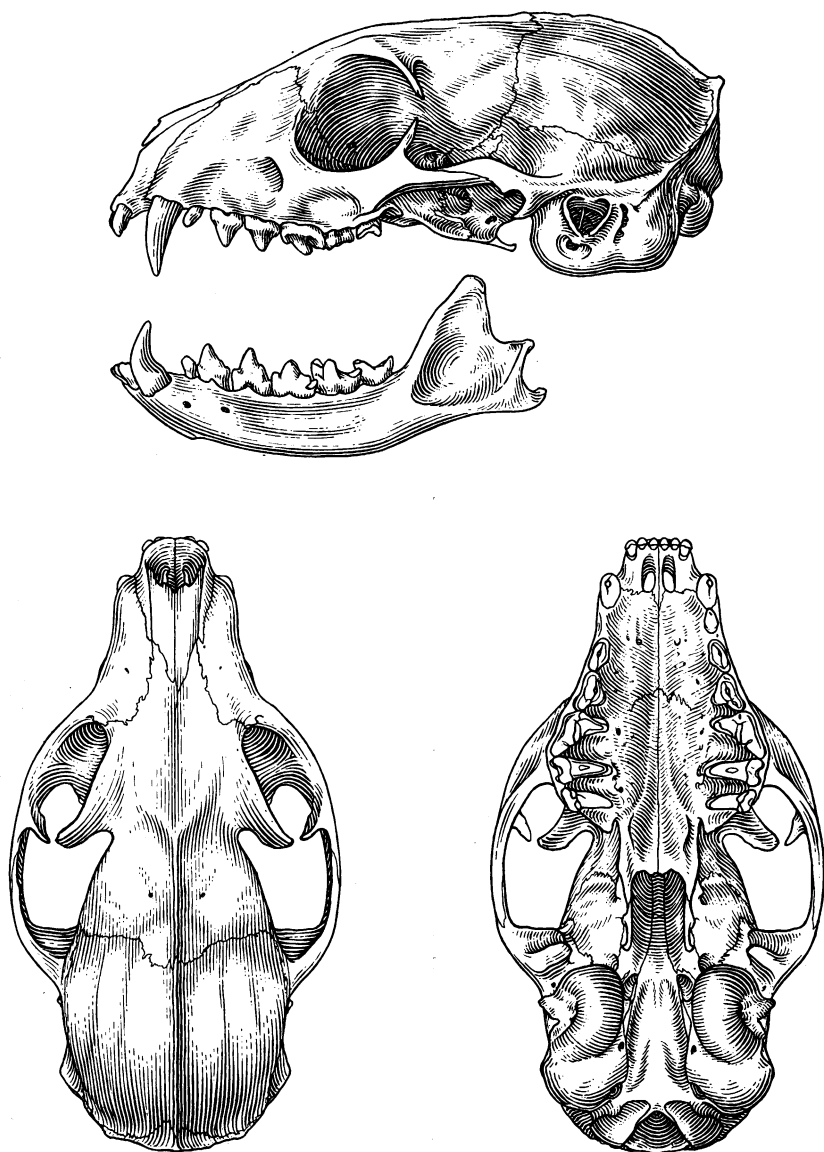
Galeriscus nigripes (Pucheran)

Bdeogale nigripes PUCHERAN, 1855, Rev. Mag. Zool., (2) VII, p. 111. Type locality: Gaboon, West Africa.

This species has been reported several times from Angola: district of Duque de Bragança (Bocage, 1865); country of the Cuamates (Seabra, 1909); Cassoco or Cacoco, Benguela District (Themido, 1928). Possibly some of the specimens are really *Paracynictis selousi*, but *Galeriscus* probably occurs in northern Angola. The species is found in the Congo and in West Africa, at least as far north as Nigeria.

EXTERNAL CHARACTERS.—Pelage short and dense. Fore and hind feet with four toes.

COLORATION.—Grizzled Saccardo's Umber and shining pale Straw Yellow above;



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Fig. 34. *Paracynictis selousi*, skull and mandible.

near Clove-Brown below and on limbs. Tail whitish.

SKULL.—Like that of *Ichneumia*, but broader and flatter, with intertemporal region more constricted.

DENTITION.—Cheek-teeth of same type as those in *Ichneumia* but less elongate transversely. P^4 almost molariform and M_1 also like M_2 . Upper canine flattened laterally.

No measurements are known for Angola specimens.

PARACYNICTIS Pocock

Paracynictis Pocock, 1916, Ann. Mag. Nat. Hist., (8) XVII, p. 177. Genotype: *Cynictis selousi* De Winton (original designation).

Paracynictis selousi (De Winton)

Figure 34

Cynictis selousi DE WINTON, 1896, Ann. Mag. Nat. Hist., (6) XVIII, p. 469. Type locality: Essex Vale (near Bulawayo), Southern Rhodesia. The type specimen is in the British Museum (a skull only).

Herpestes sp. Bocage, 1890b.

The American Museum has 8 specimens from Angola: Lobito Bay, 2; Chitau, 4; Humpata, 2. The Carnegie Museum has a single immature skull from Chitau. It has been recorded previously from Humbe and Caconda (Bocage, 1890b); country of the Cuamates (Seabra, 1909); Caquindo, Vila da Ponte, and Rio Mbalé (Monard, 1931); and Mupa (Monard, 1935). *Paracynictis* is probably found throughout Angola south of the Congo District, and it is moderately common. It is known to occur from Angola to northern Transvaal and northern South West Africa.

EXTERNAL CHARACTERS.—Tail little shorter than the body without the head. Fore and hind feet with only four digits; hind feet long and tapering, soles hairy up to the three interdigital pads. Ears and eyes large. Rhinarium small, connected with the upper lip by a naked groove. Pelage consists of soft woolly underfur and somewhat longer, moderately coarse, guard-hairs.

COLORATION.—Grayish, faintly tinged with pale buff, the exact shade of gray varying individually and with wear. Underfur from Cinnamon-Drab to near Fuscous basally; tips near Pale Olive-Buff. Guard-

hairs on the back white for the basal half, the rest black, or distal half with a white band about 5 mm. long near the black tip. Belly near Light Grayish Olive; guard-hairs sparsely distributed, with extensive white bands, or entirely white. Fore legs Fuscous-Black laterally; fore feet black; hind feet, black dorsally and grayish on the soles. Base of tail like the back, but the guard-hairs have more white and lack black tips, end of tail becoming pure white.

SKULL.—Skull resembles that of *Ichneumia*: Rostrum depressed; frontal region bulging; braincase ovoid and not especially elongate. But anterior portion of the auditory bulla inflated and nearly as large as the posterior chamber.

DENTITION.—Teeth small, like those in *Cynictis*. As in that genus there are 40 permanent teeth. Medial cusp of P^4 large; medial cusps of M^{1-2} , slender compared with those in other mongooses. P^1 moderately large, separated by small diastemas from the canine and from P^2 .

MEASUREMENTS.—See table, p. 203.

CYNICTIS OGILBY

Cynictis OGILBY, 1833, Proc. Zool. Soc. London, p. 48. Genotype: *Herpestes pencillatus* G. Cuvier.

Cynictis pencillata cinderella Thomas

Cynictis bradfieldi cinderella THOMAS, 1927, Proc. Zool. Soc. London, pt. 2, pp. 375-376. Type locality: Ondongwa, Ovamboland, South West Africa. The type specimen is in the British Museum.

This mierkat has been recently found in Angola by Monard (1935) at Mupanda near the southern border. It probably occurs only in a limited portion of Angola, between the Cunene and the Cubango and south of 16° S. latitude. *C. pencillata* is found from Cape Province to northern Bechuanaland and southern Angola.

Cynictis resembles *Paracynictis* externally except for the presence of the pollex on the front feet. The coloration is pale, "silvery whitish" anteriorly. Fore and hind feet almost white; tail overlaid with white above, and with median white line below.

The skull and dentition are smaller but similar to those in *Paracynictis selousi*.

MEASUREMENTS.—See table, p. 203.

MUNGOS GEOFFROY AND CUVIER

Mungos GEOFFROY AND CUVIER, 1795, *Magasin Encyclopédique*, II, pp. 184, 187. Genotype, by tautonymy: *Herpestes mungo* Gmelin.

Crossarchus F. CUVIER, 1825 (Feb.), "Histoire Naturelle des Mammifères," V, livre 47, 3 pp. and 1 pl., with genotype, *C. obscurus* F. Cuvier. This appears to differ only slightly from *Mungos* and is here included. Two species of *Mungos* occur in Angola.

- (a) A dorsal pattern of transverse stripes.
..... *M. mungo grisonax*.
- (b) Upperparts grizzled reddish brown and black.
..... *M. ansorgei*.

***Mungos mungo grisonax* Thomas**

Mungos mungo grisonax THOMAS, 1926, Proc. Zool. Soc. London, I, pp. 294-295. Type locality: Ekandua, Ovamboland (Shortridge, 1935). The type specimen is in the British Museum.

Crossarchus fasciatus. Bocage, 1890b and authors.

The American Museum has 10 specimens from Angola: Lobito, 3; Chitau, 4; Chis-souque, 20 km. E. Dando, 2; 35 km. E. Dando, 1. The Carnegie Museum has specimens from Gaucha. Other records of *Mungos* from Angola are: the country of the Cuamates (Seabra, 1909); near Vila da Ponte (Monard, 1931). This species is probably found throughout Angola. This or closely related species are found throughout Africa south of the Sahara.

EXTERNAL CHARACTERS.—Tail more than half the head and body length. Hind feet broad, with naked soles and long, strong claws; claws of fore feet also large. Pelage moderately long, coarse; underfur sparse.

COLORATION.—Extremely variable; upperparts usually a brownish gray, transversely banded with black on the back and rump. In individuals the ground color between the stripes is near Pale Olive-Buff, while at the other extreme it is near Hazel. Neck and head gray. Feet and tip of tail near Fuscous-Black. Belly scantily haired, near Avellaneous, or mixed with Fuscous. Muzzle and chin washed with Cinnamon.

SKULL.—Skull slender and elongate. Lambdoidal crests large; sagittal crest not developed. Orbit open posteriorly. Anterior portion of the auditory bulla, not inflated, but small and roughened.

DENTITION.—Premolars $\frac{3}{3}$. Cheek-teeth relatively large. Medial lobe of P⁴ large. **MEASUREMENTS.**—See table, p. 203.

***Mungos ansorgei* (Thomas)**

Crossarchus ansorgei THOMAS, 1912 (Feb.), Ann. Mag. Nat. Hist., (8) V, p. 195. Type locality: Dalla Tando, 800 m., Northern Angola. The type specimen is in the British Museum.

This species is known only from the type which was examined in London.

M. ansorgei is a small species, little more than a half meter in total length; tail about one-third shorter than head and body.

COLORATION.—"Near Mars Brown" both above and below. Top of head and ears blackish. Face much paler than rest of body, becoming near Cinnamon-Buff on chin and lower cheeks. Forearms, hands, and toes of hind feet blackish. Tail reddish brown and blackish basally, the tawny progressively less distally; end of tail black. Pelage badly worn.

SKULL.—Much like that in *M. alexandri* but bullae more inflated; hard palate relatively shorter and with evenly emarginated posterior border rather than with a cordate one. Sagittal crest present only in interparietal region.

MEASUREMENTS.—See table, p. 203.

HELOGALE GRAY

Helogale GRAY, 1861, Proc. Zool. Soc. London, p. 308. Genotype, by monotypy: *Herpestes parvulus* Sundevall.

Several species of *Helogale* occur in Africa, from the Congo and Somaliland south to Natal and South West Africa.

***Helogale parvula brunetta* Thomas**

Helogale brunetta THOMAS, 1926, Proc. Zool. Soc. London, I, p. 293. Type locality: Rua Cana Falls, Ovamboland.

Helogale mimetra THOMAS, 1926, Ann. Mag. Nat. Hist., (9) XVII, pp. 183-184. Type locality: Ganguella, Angola.

Helogale parvula. Bocage, 1890b.

The American Museum has 14 specimens from Angola: Chitau, 9; Humpata, 1; Quipungo, 1; Mulando, 3. The Carnegie Museum has a single specimen from the Gaucha River. *Helogale* has been reported from the following additional localities: Bibale, Benguela, Quilengues, and Caconda

(Bocage, 1890b). It is fairly common throughout most of Angola, at least south of the Cuanza River. The species occurs from Angola and Southern Rhodesia to Natal.

EXTERNAL CHARACTERS.—Externally *Helogale* resembles *Galerella* closely, but claws of both fore and hind feet much larger; tail relatively shorter.

COLORATION.—General coloration not matched by any of Ridgeway's color plates, between Natal Brown and Olive-Brown (about 15''k or j). Sparse underfur between Wood Brown and Army Brown (about 15'''h). Guard-hairs almost black, banded two or three times with Pinkish Buff. Underparts and tail much the same color as the upperparts, but belly usually sparsely haired.

SKULL.—Skull short and moderately broad; zygomatic arches widely spreading. Orbit incomplete, but postorbital processes well developed in adults. Posterior chamber of the auditory bulla inflated, anterior chamber only moderately so; external auditory meatus flattened.

DENTITION.—Premolars $\frac{3}{3}$. Medial lobe of P⁴ large, extending medially about as far as the length of the tooth.

MEASUREMENTS.—See table, p. 204.

FIELD NOTES.—One specimen was found living with hyraxes.

Subadult specimens are darker in color than adults, with much russet on the face, ears, and belly. The underfur is more abundant, near Clay Color. The guard-hairs are black and the subterminal band of Pinkish Buff is narrow. The differences in color between young animals and adults made Bocage (1890b) wonder if he had only a single species.

H. mimetra Thomas, based on two skins only, does not seem to be sufficiently distinct from *H. brunetta* to merit recognition.

PROTELIDAE

The aardwolf resembles the hyaenas in general external appearance, but is much smaller and more delicately built. It is said to feed almost exclusively on termites, and correlated with this, has a vestigial dentition, a weak mandible and weak jaw musculature.

PROTELES GEOFFROY

Proteles I. GEOFFROY, 1824, Mém. Mus. Hist. Nat., Paris, XI, pp. 355-371, Pl. xx. Genotype: *Proteles lalandii* Geoffroy (= *Viverra cristata* Sparrman).

Proteles cristatus harrisoni Rothschild

Figure 35

Proteles cristatus harrisoni ROTHSCHILD, 1902 (July), Novit. Zool., IX, p. 443. Type locality: Umpata (= Humpata), Mossamedes District, Angola. The type specimen is in the Tring Museum.

Proteles lalandei. Jentink, 1887; Bocage, 1890b.

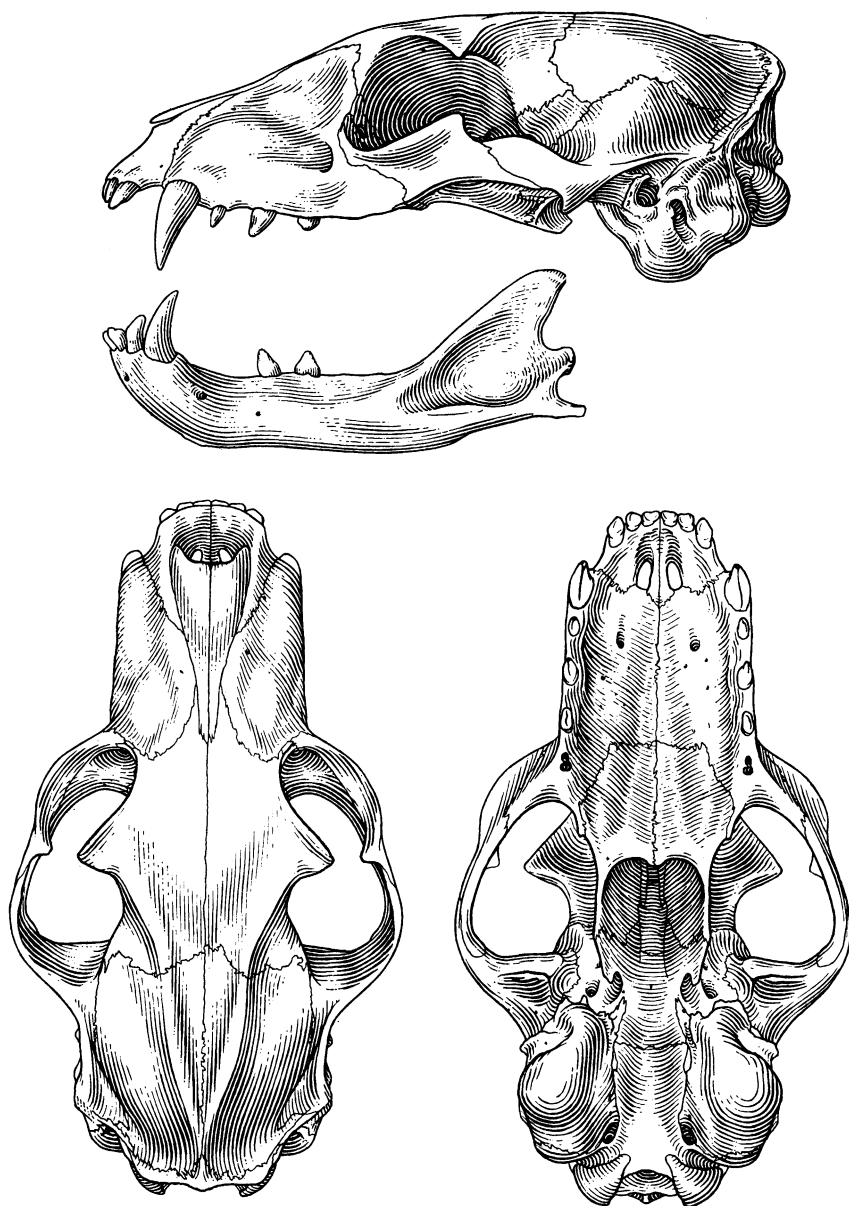
Proteles cristatus. Monard, 1931.

The American Museum has 3 specimens of aardwolf from Angola: Humpata, 1; Capelongo, 1; without data, 1. Jentink (1887) records it from Otjipahe, vicinity of Huila, and Monard (1931) reports a skin from Vila da Ponte. Bocage (1890b) knew of only one specimen, that recorded by Jentink, and doubtless *P. c. harrisoni* occurs rarely in southern Angola.

EXTERNAL CHARACTERS.—Ears long and narrow, tail moderately short, and feet small. Fore feet with 5 toes. Claws large and strong. Pelage consists of a woolly underfur and long, coarse guard-hairs; a high "mane" of coarse hairs (about 140 mm. long) runs from occiput to tail; hairs of tail long, crinkled, and jointed.

COLORATION.—General coloration near Cartridge Buff, with appreciably more yellowish pigment than in the typical race. A number (7 or 8) transverse bars of black on the sides and several on the legs. Dorsal crest tipped with blackish or Fuscous-Black; dorsal sides of fore and hind feet this color. Scattered blackish hairs over the back. Silky white hairs around the eyes and behind the ears; forehead slightly grayish.

SKULL.—Rostrum very broad, but nasals narrow. Postorbital processes well developed. Palate broad; it extends far posteriorly. Incisive foramina large; alisphenoid canal absent; hypoglossal and jugular foramina confluent. Auditory bulla divided by a partition; posterior chamber produced ventrally. Temporal fossae large. Mandibular joint weak; the glenoid fossa shallow. Lower jaw weak,



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Fig. 35. *Proteles cristatus harrisoni*, skull and mandible.

with long symphysis, low condyle, and peg-like angular process.

DENTITION.—Dental formula: $I_3^3; C_1^1; P_3^3; M_1^1$; some cheek-teeth frequently lost. Incisors small and blunt; canine, slender and sharp. Cheek-teeth peg-like and vestigial.

MEASUREMENTS.—See table, p. 204.

HYAENIDAE

Both genera of hyaenas are probably present in Angola, although specimens are known of only one.

- (a) Ears long, pointed; pelage shaggy and brownish; Skull elongate. M^1 large. *Hyaena*.
- (b) Ears rounded; pelage short, yellowish gray, spotted with fuscous. Skull shortened. M^1 reduced or absent. *Crocuta*.

HYAENA BRISSON

Hyaena BRISSON, 1762, "Regnum Animale," 2nd Ed., pp. 13, 169. Genotype: *Canis hyaena* Linnaeus.

***Hyaena brunnea melampus* Pocock**

[*Hyaena brunnea*] *melampus* Pocock, 1935 (Jan.), Proc. Zool. Soc. London, 1934, pt. 4, p. 824. Type locality: Otjitundua, alt. about 2400 ft., Central Kaokoveld, South West Africa. The type specimen is in the British Museum.

Hyaena brunnea. Statham, 1922, p. 272.

This species is included in the fauna of Angola on the authority of Colonel Statham, reinforced by the probability that since *Hyaena b. melampus* is relatively common on the southern side of the Cunene River, it occurs, at least rarely, in southern Angola.

CROCUTA KAUP

Crocuta KAUP, 1828, Oken's "Isis," XXI, Heft 11, p. 1145. Genotype: *Canis crocuta* Erxleben.

***Crocuta crocuta* (Erxleben)**

Canis crocuta EXLEBEN, 1777, "Syst. Regn. Animalis," p. 578. Type locality: Cape of Good Hope.

Hyaena (Crocuta) wissmanni MATSCHIE, 1900, Sitz.-ber. Ges. Naturf. Freunde, Berlin, pp. 21-22. Type locality: Epukiro, South West Africa. The type specimen is in the Berlin Museum.

Hyaena crocuta. Bocage, 1890b; Monard, 1931.

The Vernay Angola Expedition secured a single specimen, a native skin with badly

broken skull, at Chitau. Monard (1931) secured 2 specimens at Chimpora in southern Angola, and Bocage (1890b) says that it is common throughout the interior of Angola.

EXTERNAL CHARACTERS.—In the specimen examined, mammae inguinal, 0-1 = 2.

COLORATION.—In the specimen examined, general coloration of upperparts between Avellaneous and Olive-Buff, brighter on the head and paler on the sides. Spots obsolete or faint dorsally; spots on the sides, near Fuscous. Tail short, becoming Fuscous distally; feet also Fuscous. Throat and medial sides of the legs, Pale Olive-Buff; belly much as the sides, with large spots.

SKULL.—The skull of the Angolan specimen is badly injured.

MEASUREMENTS.—See table, p. 204. In addition: P^4 , length times breadth, 35.9×21.0 .

FELIDAE

Three genera, here recognized, occur in Angola.

- 1.—(a) Claws without cutaneous sheathes into which they can be retracted. Skull with strongly inflated frontal region. *Acinonyx* (p. 138).
- (b) Claws retractile into cutaneous sheathes. Frontal region of skull normal. 2.
- 2.—(a) Cheek-teeth $\frac{4}{3}$. A dorsal pattern of spots or (and) stripes (except in the lion) *Felis* (p. 135).
- (b) Cheek-teeth $\frac{3}{3}$. Coloration uniform without a pattern of stripes or spots dorsally. *Lynx* (p. 138).

FELIS LINNAEUS

Felis LINNAEUS, 1758, "Systema Naturae," 10th Ed., I, p. 41. Genotype: *Felis catus* Linnaeus.

Five species, here referred to *Felis*, are found in Angola. The genus is world wide except for the Australian and Oceanic regions.

- 1.—(a) Size very large (head and body more than 1400 mm.; skull length more than 280 mm.). General coloration grayish buff without markings in the adult. *Felis leo bleyenberghi* (p. 136).
- (b) Size large (head and body 1000 to 1280 mm.; skull length 175 to 250 mm.). Pattern of dark rosettes on buffy ground color. *Felis pardus shortridgei* (p. 136).

- (c) Size medium (head and body 650 to 880 mm.; skull length 100 to 120 mm.). Pattern of large or small solid spots and short longitudinal stripes. 2.
- (d) Size small (head and body less than 600 mm.) skull length less than 100 mm..
*Felis lybica griselda* (p. 136).
- 2.—(a) Pattern of longitudinal dorsal stripes: large blackish spots on sides of body.
*Felis serval lönnbergi* (p. 137).
- (b) Pattern of closely placed, small, blackish spots, most numerous dorsally...
*Felis brachyura* (p. 137).

***Felis leo bleyenberghi* Lönnberg**

Felis leo bleyenberghi LÖNNBERG, 1913 (Dec.), Rev. Zool. Afr., III, p. 273. Type locality: Katanga Province, Belgian Congo. The type specimen is in the Musée du Congo Belge, Tervueren.

Felis leo. Bocage, 1890b, and authors.

The Vernay Angola Expedition secured an old male lion at Capelongo. Lions were formerly common throughout Angola but, with the destruction of the larger game, they have become greatly reduced in number. Formerly the species occurred throughout Africa and Asia Minor to Northern India; now few are known except in Africa south of the Sahara.

EXTERNAL CHARACTERS.—As in most southern specimens, the pelage is short and the mane scanty.

COLORATION.—Ground color of upperparts near Pinkish Buff, darker dorsally, finely and lightly overlaid with a blackish brown; general effect between Avellaneous and Deep Olive-Buff. Underparts without overlay and paling to nearly white mid-ventrally. Pre-auricular tuft of hair and part of mane near Warm Buff; many Fuscous-Black hairs mixed in the mane. Pale rings around eyes and lips. Outsides of legs like the back, insides like the underparts; feet Pinkish Buff with paler lines between the toes. Tail grayish above, ending in a tuft of Fuscous-Black.

SKULL.—*E. l. bleyenberghi* agrees cranially with the East African lions, differing in shorter nasal bones, in the specimens examined.

MEASUREMENTS.—See table, p. 204.

The status of the geographic races of the lion in Africa is far from satisfactory. Coloration appears to vary widely in the same locality, and cranial diagnoses are usually based on far too few specimens.

***Felis pardus shortridgei* (Pocock)**

Panthera pardus shortridgei Pocock, 1932, Abstr. Proc. Zool. Soc. London, No. 347, p. 33. Type locality: Gangongo, alt. 3560 ft., Western Caprivi, South West Africa. The type specimen is in the British Museum.

Felis pardus. Bocage, 1890b; Monard, 1931. "Ongue," native name, Bocage, 1890b.

The Vernay Angola Expedition secured 7 native skins and 1 injured skull at Chitau. Bocage (1890) says that the leopard is common throughout Angola; he had specimens from Benguela, Quilengues, Caconda, and Mussumba. Monard (1931) saw individuals at Rio Mbalé and Chimpopo and reports others from Vila da Ponte, Santa Amaro, Peku and Vulumba but collected none. The leopard is found throughout the brush and forests of Africa, and from India to Persia, southern Siberia and Manchuria, south to the Malay Peninsula.

COLORATION.—In the adult specimen available: Ground color middorsally, paler than Cinnamon-Buff; paling gradually down the sides, passing into the white of the belly. Spots small and numerous, black dorsally and Blackish Brown elsewhere. Legs medially, white; a faint buffy wash extends to the claws laterally. Dorsally, centers of the rosettes indistinguishable from the ground coloration; on the sides they are darker than the interspaces.

SKULL.—Skull of single old adult badly injured. Compared with skulls of *P. p. ituriensis* Allen, it is narrower behind the postorbital processes, but otherwise fairly similar.

MEASUREMENTS.—See table, p. 205.

Probably *Felis pardus puella* Pocock, of the Kaokoveld, South West Africa, extends into southern Angola, but this race is only questionably distinct from *F. p. shortridgei*.

***Felis lybica griselda* Thomas**

Felis ocreata griselda THOMAS, 1926 (Jan.), Ann. Mag. Nat. Hist., (9) XVII, p. 180. Type locality: 50 mi. S. Dombe Grande, Benguela District, Angola. The type specimen is in the British Museum.

Felis sp. (? *caligata*). Peters, 1865.

Felis caffra. Bocage, 1890b; Monard, 1930.

The American Museum has 12 specimens from Angola: Lobito, 8; Chitau, 4. The

wildcat is recorded from Ambaca (Peters, 1865); Huila, Humbe, and Dondo (Bocage, 1890b); Rio Mbalé, Tumbale, and Vila da Ponte (Monard, 1931); Campulu (Monard, 1935). It is found throughout Angola, and the species occurs throughout Africa.

EXTERNAL CHARACTERS.—Externally the wildcat agrees closely with the common cat, *Felis catus*.

COLORATION.—Upperparts near Pale Olive-Gray; middorsal region considerably darker; sides with, or without, faint Drab transverse stripes. Forehead dark, like the middorsal region; nose and markings on cheek near Cinnamon. Throat and lips white; also the supraorbital bands and a spot in the pectoral region; rest of underparts near Pinkish Buff. Ears externally near Mikado Brown; hairs inside the ears, white. Tail like the middorsal region proximally; distally, paler with Blackish Brown rings and tip. One skin shows irregular spotting of Cream Color. Young wildcats are near Pinkish Buff, with a well-marked pattern of stripes.

SKULL.—The only skull is that of a young kitten.

Felis serval lönnbergi Cabrera

F[elis] togoensis lönnbergi and *F[elis] serval lönnbergi*. CABRERA, 1910 (Nov.), Bol. Real Soc. Españ. Hist. Nat., X, p. 427. New name for *Felis togoensis niger* Lönnberg, 1898 (not *Felis nigra* Erxleben, 1777).

Felis togoensis niger Lönnberg, 1898, Zool. Jahrb., Syst. Abt., X, p. 571. Type locality: Junction of Cunene and Caculovar Rivers, SW. Angola. The type specimen, a melanistic individual, is in the Museum at Uppsala.

Felis serval. Bocage, 1890b; Monard, 1931, and other authors.

The American Museum has 7 skins and 1 skull of this cat from Angola: Lobito, 2; N. of Hanha, 1; Chitau, 3; without data, 1. It has been recorded from the following localities: Duque de Brangança, Ambaca, Quilengues, and Huila (Bocage, 1890b); vicinity of Cubango (Monard, 1931). It probably occurs throughout Angola, and the species is found south of the Sahara, from Sudan to the Cape.

EXTERNAL CHARACTERS.—Legs long, tail short (about one-third of head and body length), and ears large.

COLORATION.—Ground color of upperparts near Warm Buff, darker middorsally and slightly paler laterally. Spots and stripes nearly black. Underparts whitish, basal Drab showing through. Chin, lips, and lines over and under the eyes white. Ears with black tips followed externally by a subterminal band of buffy white; below this a triangular area of black. Tail with five rings and tip black. General color pattern consists of dorsal stripes and lateral spots of black. Ground coloration subject to considerable variation, but pattern relatively constant. One specimen from Chitau, not fully adult, extremely pale, near Cartridge Buff.

SKULL AND DENTITION.—Skull like that of a large cat, but somewhat more elongate. The specimen examined has bullae more inflated than in examples from Faradje, Belgian Congo, and from British East Africa, rostrum slightly more slender, and frontal region more flattened.

MEASUREMENTS.—See table, p. 205.

Felis brachyura Wagner

Felis brachyura WAGNER, 1841, Suppl. II, "Schreber's Säugethiere," p. 547. New name for *F. servalina* Ogilby, not *F. servalina* Jardine.

Felis ogilbyi SCHINZ, 1844, "Systematisches Vergleichniss aller bis jetzt bekannten Säugethiere." (Solothurn, 8^{vo}). Type locality: Sierra Leone.

Felis servalina. Bocage, 1890b.

Felis servalina larseni THOMAS, 1913 (July), Ann. Mag. Nat. Hist., (8) XII, p. 91. Type locality: Near Bembe, Congo District, Angola. The type specimen is in the British Museum.

The Vernay Angola Expedition secured a native skin and part of another (without skulls) at Chitau and Lobito, respectively. Bocage (1890b) records this species from Caconda and Quissange; the specimen on which Thomas based his race *larseni* came from near Bembe. *Felis brachyura* probably occurs throughout northern Angola, and outside of this region is found from Senegal and Belgian Congo to Uganda.

EXTERNAL CHARACTERS.—Much as in *Felis serval*.

COLORATION.—Ground color above slightly paler than Cinnamon-Buff, gradually passing into the Pinkish Buff, or paler of the underparts. Lateral sides of legs brighter than the back. Spots small and

extremely numerous middorsally; larger and wider apart on the sides and belly. In addition to the blackish spots, numerous black hairs are present in the middorsal region; in the specimens examined they form an indefinite black stripe. Tail ringed with blackish. Forehead strongly marked with blackish; a triangular area of this color below the eye. Lips and throat whitish, also the medial sides of fore and hind legs.

MEASUREMENTS.—No measurements are available for the specimens examined, but the species does not differ in size from *F. serval*.

There appears to be considerable variation in exact color tone and the spots in the dorsal region may be entirely suppressed in certain individuals (see Lönnberg, 1920, Rev. Zool. Afr., VII, pp. 236–241). These variations do not appear to have geographic significance, and so do not seem to be valid bases for names.

LYNX KERR

Lynx KERR, 1792, "Animal Kingdom," I, p. 155. Genotype: *Lynx vulgaris* Kerr = *Felis lynx* Linnaeus.

Lynx caracal damarensis Roberts

Lynx caracal damarensis ROBERTS, 1926 (Sept.), Ann. Transvaal Mus., XI, p. 248. Type locality: Quickborn, Okahandja, South West Africa. The type specimen is in the Transvaal Museum.

The caracal is included here on the authority of Statham (1922); no specimens appear to have been secured, and no definite localities are recorded. The species is found from North Africa to the Cape except for the rain-forest areas of West Africa and the Congo. It is also found in southwestern Asia to northern India.

The characters given in the key to the genera of the Felidae are sufficient to identify this cat. In addition, the coloration is uniformly reddish brown or gray, the tail is about one-third the length of head and body, the limbs are elongate, and the anterior upper premolar (P^2) is absent.

ACINONYX BROOKES

Acinonyx BROOKES, 1828, "Cat. Anat. and Zool. Mus. Joshua Brookes," p. 16. Genotype:

Acinonyx venator Brookes (= *Felis venatica* Smith).

Acinonyx jubatus jubatus (Schreber)

Felis jubatus SCHREBER, 1777, "Säugethiere," III, pp. 392–393, Pl. ciii (plate issued 1776). Type locality: Cape of Good Hope.

Felis (Cynaelurus) guttata. Peters, 1865.

Cynailurus jubatus. Bocage, 1890b; Monard, 1931.

Cynaelurus jubatus. Thomas and Wroughton, 1905.

The Vernay Angola Expedition obtained 6 specimens of the cheetah, only 1 of which was adult, from the following localities: Chitau, 5; Huambo, 1. Other records from Angola are: between Pungo Andongo and Cassango (Peters, 1865); Mataba and sources of the Cuando River (Bocage, 1890b); Benguela (Thomas and Wroughton, 1905); Santo Amaro, near Huambo (Monard, 1931). The cheetah appears to be widely distributed in central and southern Angola, but it is rare. Outside of Angola it occurs from South Africa to Egypt, west to Nigeria and east as far as Bengal in India.

EXTERNAL CHARACTERS.—Legs and tail long; head short. Pelage long and somewhat woolly; a crest of longer fur from the occiput to the shoulder region. Claws not retractile into sheaths of skin.

COLORATION.—Ground color of back near Pinkish Buff; shoulders and head near Cinnamon-Buff. Color of sides becoming paler and passing gradually into the whitish of the underparts. Pattern of large and small spots, almost black but with a faint indication of red-brown. Spots on the flanks, nearer Blackish Brown (3). Spots run down the legs to the toes and on the tail to the tip.

SKULL.—Facial region much shortened and deepened. Postorbital processes poorly developed. Frontal sinus strongly inflated, giving the interorbital region a dome-like appearance.

MEASUREMENTS.—See table, p. 205.

MUSTELIDAE

The Mustelidae are short-legged, pentadactyl carnivores with the tympanic bullae undivided, molars reduced in number to $\frac{1}{2}$ or $\frac{1}{1}$, and M^1 with the medial portion ex-

panded, longer (measured parallel to main axis of skull) than the lateral portion. In Angola there are five genera belonging to two subfamilies: the genera may be separated by the following key.

- 1.—(a) No dorsal color pattern. Premolars $\frac{4}{3}$;
P¹ small, set medially to the canine;
P⁴ with a broad medial lobe.
SUBFAMILY LUTRINAE, 2.
- (b) Dorsal region with white stripes, or
with a broad grayish band. P¹ ab-
sent; P⁴ with medial lobe small.
SUBFAMILY MUSTELINAE, 3.
- 2.—(a) Feet webbed, with small claws. Size
smaller (head and body 560 to 625
mm.). Skull with interorbital re-
gion narrow (15 to 19 mm.).
Lutra (p. 139).
- (b) Feet with webs and claws absent or
vestigial. Size larger (head and
body 625 to 830 mm.). Skull with
interorbital region wide (26 to 33
mm.). *Aonyx* (p. 139).
- 3.—(a) A broad dorsal band of grayish from
forehead to base of tail. Body stout,
badger-like. Skull massive. Medial
half of M¹ much larger than lateral
half. *Mellivora* (p. 139).
- (b) Dorsal region with longitudinal whitish
stripes. 4.
- 4.—(a) Size larger (head and body more than
330 mm.; skull length more than 60
mm.); body stouter. Pelage long.
Ictonyx (p. 141).
- (b) Size smaller (head and body less than
330 mm.; skull length less than 60
mm.); body extremely slender,
weasel-like. Pelage short.
Poecilogale (p. 141).

Lutrinae

LUTRA BRISSON

Lutra BRISSON, 1762, "Regnum Animale," 2nd Ed., pp. 13, 201-203. Genotype: *Mustela lutra* Linnaeus (by tautonymy, fixed by Merriam, 1895).

Hydrogale GRAY, 1865, Proc. Zool. Soc. London, p. 131. Genotype (monotypy): *Lutra maculicollis* Lichtenstein (not *Hydrogale* Kaup, 1829).

Hydrictis Pocock, 1921, Proc. Zool. Soc. London, p. 543. New name for *Hydrogale* Gray, preoccupied. *Hydrictis* is probably worthy of at least subgeneric rank.

Lutra maculicollis Lichtenstein

Lutra maculicollis LICHTENSTEIN, 1835, Arch. f. Naturg. I, p. 89, Pl. II, fig. 1. Type locality: "Kafferlande" [= Bambusbergen, Orange River, according to Shortridge, 1934].

The Vernay Angola Expedition brought back 9 native skins of this species from

Chitau. *Lutra maculicollis* has been previously recorded at Benguela and the country between the Cuando and Quiacapa Rivers (Bocage, 1890b); in the Cubango River (Monard, 1935); in the Cunene River above Rua Cana Falls (Shortridge, 1934). It probably occurs rarely in all the larger streams of Angola.

COLORATION.—Upperparts darker than Mars Brown (about 13'n), paling to near Verona Brown on the sides and belly. Irregular whitish markings on the throat and in the inguinal region; upper lips whitish. Young otters somewhat paler than adults.

MEASUREMENTS.—See table, p. 205.

AONYX LESSON

Aonyx LESSON, 1827, "Manual de Mammalogie," p. 157. Genotype: *Aonyx delalandi* Lesson (= *Lutra capensis* Schinz).

Aonyx capensis (Schinz)

Lutra capensis SCHINZ, 1821, "Cuvier's Thierreich," I, p. 214. Type locality: Salt Lakes, east coast of Cape Colony.

Aonyx inunguis. Jentink, 1887; Bocage, 1890b.

Aonyx capensis angolae THOMAS, 1908, Ann. Mag. Nat. Hist., (8) I, pp. 388-389. Type locality: Coporole (Caporole) River, Angola.

The Vernay Angola Expedition secured a single native skin without skull, at Chitau. This species has been recorded from Otjipahe, near Huila (Jentink, 1887); Uiôlo River, Gambos (Bocage, 1890). *A. capensis* is rare in Angola, or difficult to secure and observe, but it is probably present in all the larger streams.

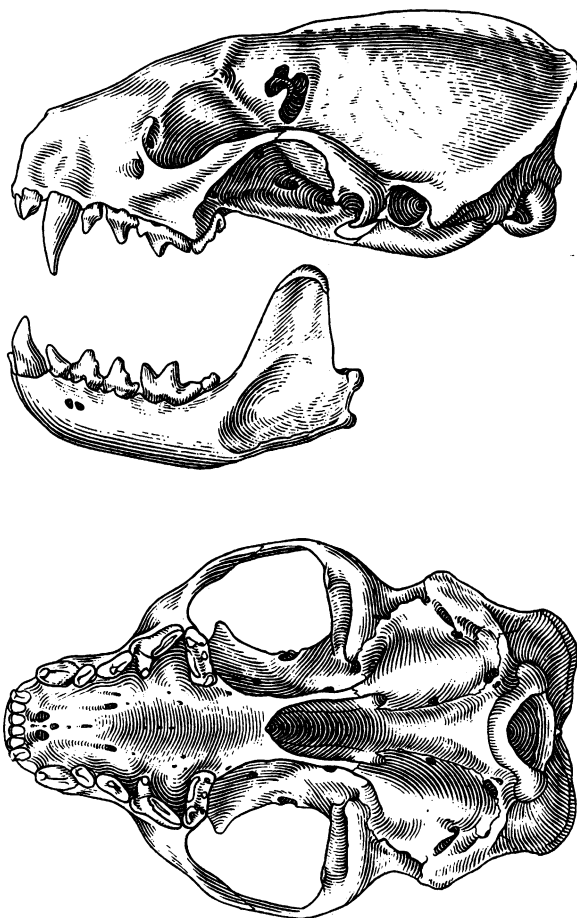
COLORATION.—General coloration, above and below, darker than Mars Brown (about 13'n), grizzled by the presence of dirty whitish tips, especially on the anterior part. Cheeks, nose, throat, and sides of the neck, dirty whitish; a Y-shaped whitish marking from the rhinarium over the eyes; a whitish stripe along dorsal margin of the ear. A large triangular area of near Mars Brown in front of each eye.

MEASUREMENTS.—See table, p. 205.

Mustelinae

MELLIVORA STORR

Mellivora STORR, 1780, "Prodromus Methodi Mammalium," p. 34, table A. Genotype:



A.M. 80664

H. Z. Hunt

Fig. 36. *Ictonyx striatus shortridgei*, skull and mandible.

Viverra ratel Sparrman (= *Viverra capensis* Schreber).

***Mellivora capensis vernayi* Roberts**

Mellivora capensis vernayi ROBERTS, 1932, Ann. Transvaal Mus., XV, p. 7. Type locality: Kwaai, Mababe Flats, Kalahari Desert, Bechuanaland.

Mellivora ratel. Bocage, 1890b.

Ratelus leuconotus. Jentink, 1893.

The Vernay Angola Expedition secured a single native skin without skull or data. The ratel is recorded from Bibale and the interior of Mossamedes (Bocage, 1890b), Cahama (Jentink, 1893), and near Cas-singa, Cuvelai River, and Cubango Mission

(Monard, 1935). It is probably sparsely but widely dispersed in Angola.

COLORATION.—Belly, sides, legs, tail, and face, almost black. Dorsal area from above the eyes to base of tail, dirty whitish mixed with Fuscous, paler on head and margins and becoming less whitish toward the tail.

MEASUREMENTS.—See table, p. 205.

The coloration of the specimen examined does not agree closely with the description of *vernayi* given by Roberts, but apparently there is some variability in the tone of coloration in this species.

ICTONYX KAUP

Ictonyx KAUP, 1835, "Das Thierreich," I, p. 352. Genotype: *Ictonyx capensis* Kaup (= *Bradypus striatus* Perry).

Ictonyx striatus shortridgei Roberts

Figure 36

Ictonyx striatus shortridgei ROBERTS, 1932, Ann. Transvaal Mus. XV, p. 8. Type locality: Maschi River, Caprivi border, South West Africa. The type specimen is in the Kaffrarian Museum, King William's Town.

Zorilla africana. Peters, 1865.

Zorilla striata. Bocage, 1890b.

Ictonyx sp. Thomas and Wroughton, 1905.

Ictonyx capensis. Themido, 1928.

Ictonyx striatus arenarius. Monard, 1935.

Ictonyx striatus maximus. Monard, 1935.

The American Museum has 14 specimens of this species from Angola, as follows: Chipengo, 3; Chitau, 10; Monte Victoria Verdun, 1. *Ictonyx* is recorded from the following other localities: Golungo Alto (Peters, 1865); Genguela, Catumbela, Caconda, Quilengues and Humbe (Bocage, 1890b); Bulu Bulu, Bihé District (Thomas and Wroughton, 1905); Hanha (Themido, 1928); Cubango Mission, Mupa, and country of the Cuanyamas (Monard, 1935). It is found probably throughout Angola.

COLORATION.—The width of the white and black stripes varies considerably individually, as does the amount of white on the tail. Lateral white stripes considerably wider than medial ones; black stripes enclosed in the white, very narrow anteriorly. Middle black stripe extends farther forward than the lateral ones, but does not quite reach the black area between the ears. Small frontal white spot almost or quite connected on either side with larger white area between eye and ear. Tip of ear white; tail mixed white and black, the white becoming predominant distally. Belly, sides and legs, black with a slightly brownish cast.

SKULL.—Skull with a moderately short facial region. Palate extends some distance behind last molar. Auditory bullae large, somewhat flattened; they form a suture with the hamular process of the pterygoid.

DENTITION.—Dental formula: $I_3^3; C_1^1; P_3^3; M_2^2$. Second lower molar moderate in size, as are first upper and lower premolars (P_2^2).

MEASUREMENTS.—See table, p. 206.

Most specimens of the zorilla are parasitized by worms which inhabit the frontal sinus and frequently erode the bone, as shown in the drawing of the skull (Fig. 36).

POECILOGALE THOMAS

Poecilogle THOMAS, 1883 (May), Ann. Mag. Nat. Hist., (5) XI, pp. 370-371, 1 fig. Genotype: *Zorilla albinucha* Gray.

Poecilogle albinucha (Gray)

Plate VII

Zorilla albinucha GRAY, 1864, Proc. Zool. Soc. London, p. 69, Pl. x. Type locality: Cape Colony. The type specimen is in the British Museum.

Zorilla africana PETERS, 1865, Proc. Zool. Soc. London, p. 400. Type locality: Golungo Alto, Angola (*nomen nudum*).

Zorilla flavistriata BOCAGE, 1865, Proc. Zool. Soc. London, p. 402. Type locality: Near Duque de Bragança, Angola.

Mustela albinucha. BOCAGE, 1882.

The Vernay Angola Expedition secured 9 specimens for the American Museum: Chitau, 8; Capelongo, 1. The Carnegie Museum has a single specimen from Gauca, 20 mi. E. Dando. *Poecilogle* is recorded from other localities in Angola: Golungo Alto (Peters, 1865); near Duque de Bragança (Bocage, 1865); Caconda (Bocage, 1882); Ambaca, Quindumbo, and Lunda (Bocage, 1890b); Marimba and Bange Ngola, Jingo Country (Thomas, 1904); Pedreira, Bihé District (Thomas and Wroughton, 1905). It is apparently fairly common throughout Angola. Elsewhere, *Poecilogle* is found from Cape Province to Uganda and to the Congo.

COLORATION.—The crown of the head, including the upper half of the ears, and the nape of the neck are white. The white divides near the first thoracic vertebra and each stripe again divides behind the shoulder region. There are frequently "islands" of black anterior to each of these divisions of the white. The stripes reunite on the rump and basal sixth of the tail. The latter is white, with the underlying blackish showing through. The dorsal stripes frequently are near Deep Colonial Buff or even near Honey Yellow. However, these have the appearance of discolorations

and in animals from the same locality the stripes may be nearly pure white, so that no systematic value can be attached to these variations.

SKULL.—Skull characterized by greatly reduced facial region and jaw. Hard palate extends far behind the tooth-row. Skull long and narrow, with rostrum broad and rounded; interorbital region narrow; auditory bullae flattened; and temporal and lambdoidal crests strongly developed.

DENTITION.—Dental formula: $I_3^3, C_1^1, P_2^2, M_{2-1}^{-1}$. M^1 wide but short.

MEASUREMENTS.—See table, p. 206.

CANIDAE

Three genera of the dog family are known to occur in Angola; a fourth, *Vulpes*, is said to be found there (Shortridge, 1934).

- 1.—(a) Size larger (head and body usually more than 950 mm.; skull length 180 to 220 mm.). Color variegated, black, ochraceous, and white. Fore feet with four digits. . . . *Lycaon* (p. 142).
 (b) Size smaller. Fore feet with five digits. . . . 2.
- 2.—(a) Molars $\frac{4-3}{4}$; jaws weak. External ears very large. Head and body 470 to 580 mm.; skull length 95 to 110 mm. . . . *Otocyon* (p. 143).
 (b) Molars $\frac{2}{3}$; jaws stronger. . . . 3.
- 3.—(a) Tail vertebrae less than half the length of head and body; ears moderate in size. Skull with temporal ridges united to form a sagittal crest. Head and body, 600 to 800 mm.; skull length 130 to 160 mm. . . . *Canis* (p. 143).
 (b) Tail more than half length of head and body; ears very large. (Head and body 450 to 580 mm.; skull length 100 to 120 mm.) *Vulpes* (p. 144).

LYCAON BROOKES

Lycaon BROOKES, 1827, in Griffith: Cuvier's "Animal Kingdom," V, p. 151. Genotype: *Lycaon tricolor* Brookes (= *Hyaena picta* Temminck).

Lycaon pictus (Temminck)

Hyaena picta TEMMINCK, 1820, Ann. Gén. Sci. Phys., III, p. 54. Type locality: Mozambique.

Lycaon fuchsi Matschie, 1915 (Oct.), Sitz.-ber. Gesell. Naturf. Freunde Berlin, pp. 371-373. Type locality: Rio Cubal, Benguela District, Angola. The type specimen is in the Berlin Museum.

Lycaon cacondae MATSCHIE, 1915, idem, p. 373. Type locality: Caconda, Angola. The type specimen is in the Museu Bocage, Lisbon.

Lycaon pictus. Bocage, 1898; Monard, 1931. *Lycaon pictus lupinus*. Themido, 1928.

The Vernay Angola Expedition secured a single specimen of hunting dog at Chitau, a native skin, without skull or measurements. In addition to Matschie's localities (above), *Lycaon* is recorded from near Lobito and between Vila da Ponte and Huila (Monard, 1931); near Benguela (Themido, 1928); between Cubango and Capelongo, and Mulondo (Monard, 1935). Statham (1922) says that the hunting dog is found locally in small numbers in the interior. *Lycaon* is found throughout the savanna and plains country of Africa, south of the Sahara and Egypt.

EXTERNAL CHARACTERS.—Fore feet with only 4 toes; ears large and rounded. General appearance dog-like.

COLORATION.—Color variegated. In our specimen Pinkish Buff to Cinnamon-Buff color predominates; face, throat, ears, marking across the back in front of the shoulders, spots on the rump, an irregular middorsal area, and dapplings on the sides, from Fuscous ventrally to black dorsally. Irregular markings of white in the pectoral region, on the shoulder, a spot before the base of the tail, and blotches on the posterior medial side of the thigh. Base of tail buffy, followed by a narrow band of Fuscous-Black; rest of tail white.

SKULL AND DENTITION.—Skull slender and elongate, especially the rostrum. Palate narrow; laterocaudal angle of auditory bulla pronounced. Molars relatively long and narrow.

MEASUREMENTS.—See table, p. 206.

REMARKS.—In Matschie's key this specimen runs down to *L. venaticus*, but color is such a variable character in these animals that the key and most of the species of this author cannot be considered seriously. The large number of hunting dogs in the Berlin Museum were examined, and show nearly as wide variation in proportions of cranium as in color. No geographic tendencies were found, however, and it seems best to consider them all as a single monotypic species.

OTOCYON MÜLLER

Otocyon MÜLLER, 1836, Arch. Anat. Physiol., 1835, p. 1. Genotype: *Otocyon caffer* Lichtenstein (= *Canis megalotis* Desmarest).

Otocyon megalotis (Desmarest)

Canis megalotis DESMAREST, 1822, "Mammalogie," Suppl., p. 538. Type locality: Cape of Good Hope.

The Vernay Angola Expedition collected a single specimen of this fox at Pico Azevedo. There are no other records of specimens from Angola, but Monard (1931), reports this species in the country of the Cuanyamas, near Evalé, and Shortridge (1934, p. 175) says that its range extends into southern Angola, both in the east and west. The species occurs from the Cape to Angola, and to the Sudan, and Abyssinia in East Africa.

EXTERNAL CHARACTERS.—Ears large. Head pointed, fox-like.

COLORATION.—General coloration above grayish. Underfur near Cartridge Buff. Guard-hairs blackish with wide sub-terminal band of nearly white. Underparts Pinkish Buff. Lower parts of legs blackish, feet black. Tail buffy mixed with blackish; distal third black.

SKULL.—Temporal crests strongly marked and lyrate. Area of origin of temporal muscle roughened. Braincase large; rostrum slender. Zygomatic arches widely spreading.

DENTITION.—Molars $\frac{3-4}{4}$. Upper carnassial with well-developed protocone, but poorly marked shearing blade. In the lower carnassial the cusps do not form a blade.

FIELD NOTES.—"Taken at night with a trap-gun." H. Lang.

CANIS LINNAEUS

Canis LINNAEUS, 1758, "Systema Naturae," 10th Ed., I, pp. 38-41. Genotype: *Canis familiaris* Linnaeus.

Thos OKEN, 1816, "Lehrbuch der Naturgeschichte," Th. 3, Abt. 2, p. 1037. Genotype: *Thos vulgaris* Oken (= *Canis aureus* Linnaeus), by subsequent designation (Heller, 1914).

There are two kinds of jackal found in Angola:

- (a) Ears long, reddish brown; back black, mingled with some white, sharply set off from reddish-brown sides. Skull broad (zygomatic breadth about 65 per cent of

basilar length); palate also broad.

- *C. mesomelas arenarum*.
(b) Ears short, grayish; less black on the back; in fresh pelage, a lateral stripe of white bordered by one of black on the sides. Skull elongate (zygomatic breadth less than 60 per cent of basilar length)
..... *C. a. adustus*.

Canis mesomelas arenarum (Thomas)

Thos mesomelas arenarum THOMAS, 1926 (Apr.), Proc. Zool. Soc. London, p. 295. Type locality: Berseba, alt. 3067 ft., South West Africa. The type specimen is in the British Museum.

Canis mesomelas. Bocage, 1890b.

Vulpes mesomelas. Jentink, 1893.

The Vernay Angola Expedition collected 2 specimens of the black-backed jackal: Capelongo, 1; Pico Azevedo, 1. This species is recorded from Capangombe and Huila (Bocage, 1890b) and from Cahama (Jentink, 1893). It probably occurs throughout southwestern Angola. The species is found in open country from the Cape to Angola and the Sudan, but is absent in many places.

EXTERNAL CHARACTERS.—Ears long and fox-like; tail also fox-like. Legs shorter than in *C. adustus*. Pelage rather coarse.

COLORATION.—Back, black mixed with white; underfur Pinkish Cinnamon, showing through slightly. Sides slightly paler than Pinkish Cinnamon, becoming brighter, between Tawny and Cinnamon, on the thighs, and near Cinnamon on the shoulders. Throat, belly, and medial sides of fore and hind legs pure white; this shades into the color of the sides laterally. Ears near Ochraceous-Tawny laterally; hairs inside of ears, whitish.

SKULL.—Skull relatively short and broad. Palate broad. Laterocaudal angle of the auditory bulla rounded.

DENTITION.—Molars relatively short and wide; incisors project forward more than in *C. adustus*.

MEASUREMENTS.—See table, p. 206.

Canis adustus adustus Sundevall

Canis adustus SUNDEVALL, 1847, Oefvers. Akad. Förhandl., Stockholm, III, p. 121. Type locality: The Magaiesberg, Transvaal. The type specimen is in the Stockholm Museum (?).

Thos adustus. Themido, 1928.

The Vernay Angola Expedition brought

back 18 specimens, 12 of which are native skins, from the following localities: Lobito 7; Mombola (Namba), 1; Chitau, 8; without data, 2 (skulls only). The side-striped jackal is recorded from other localities in Angola: Golungo Alto (Peters, 1865); Bailundo, Duque de Bragança, Caconda, Malange, and Lunda (Bocage, 1890b); Cazengo (Seabra, 1903); Chimporo (Monard, 1931); Benguela (Themido, 1928). This species apparently occupies most of Angola; it occurs also from northern Natal to southern Sudan and Katanga.

EXTERNAL CHARACTERS.—Ears shorter and legs longer than in *Thos mesomelas arenarum*; tail longer and less fox-like.

COLORATION.—Extremely variable, probably seasonal and due in part to wear. Fresh pelage gray, darker dorsally and with some of the Fawn Color of the underfur showing through. A whitish stripe, bordered laterally by a black one on each side. Legs washed with Cinnamon, thigh with an ill-defined black stripe, running almost at right angles to the lateral stripe. Tail near Cartridge Buff and black, often with a white tip. Ears near Mouse Gray laterally. Throat, belly, and medial sides of the legs, whitish. In worn pelage the black may be near Tawny-Olive and the general coloration is more brownish.

MEASUREMENTS.—See table, p. 206.

VULPES OKEN

Vulpes OKEN, 1816, "Lehrbuch der Naturgeschichte," III, pp. 1033-1034. Genotype: *Canis vulpes* Linnaeus.

Vulpes chama (Smith)

Canis chama A. SMITH, 1834, South African Quart. Jour. II, pp. 89-90. Type locality: Little Namaqualand. The type specimen is in the South African Museum (Shortridge, 1935).

The South African long-eared fox is said to occur in southern Angola (Shortridge, 1934, I, p. 178), but there appears to be no record of specimens from there. It has a long tail and large ears and is the smallest member of the dog family in southern Africa. The general coloration is grayish, and the tail has a blackish tip. The skull has a weak rostrum and large braincase.

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ORDER HYRACOIDEA

Hyraxes, conies, or dassies, are about the size of rabbits and have the general appearance of rodents. There are two lower incisors on either side, however, seven cheek-teeth above and below, and the upper incisors are triangular in cross section.

PROCAVIIDAE

Of the three genera of hyraxes usually recognized there are probably only two found in Angola; "*Dendrohyrax grayi*" is probably only an individual variant of *Heterohyrax s. bocagei*. Hahn (1934) has reviewed the hyraxes.

- (a) Size smaller (head and body about 430 mm.; skull length usually less than 82 mm.). Pelage coarse and hairy. Rostrum of skull short; palate and interpterygoid region narrow. *Procapia capensis welwitschii*.
 (b) Size larger (head and body more than 450 mm.; skull length usually more than 85 mm.). Pelage soft and woolly. Rostrum long and slender. *Heterohyrax syriacus bocagei*.

PROCAVIA STORR

Procapia STORR, 1780, "Prodromus Methodi Mamm.," p. 40, Pl. B. Genotype: *Cavia capensis* Pallas.

Procapia capensis welwitschii (Gray)

Hyrax welwitschii GRAY, 1868 (Jan.), Ann. Mag. Nat. Hist., (4) I, pp. 43-44. Type locality: Maiomba River (between Capangombe and Mossamedes), Mossamedes District, Angola. The type specimen is in the Museu Bocage, Lisbon.

Hyrax arboreus. Peters, 1865.

The Vernay Angola Expedition collected 4 specimens: Hanha, 1; 101 km. [N] E. Mossamedes, 2; Pico Azevedo, 1. The Carnegie Museum has 1 skull from Pico Azevedo. This species has been recorded from the littoral zone of Benguela and Mossamedes; at Capangombe, alt. 600 m. and Rio Chimba (Bocage, 1889, 1890, 1897). The range of *Procapia c. welwitschii* is probably restricted to the desert region in southern Angola; it is found in northern South West Africa (Shortridge, 1934).

EXTERNAL CHARACTERS.—External ear small; tail absent. Legs short; digits 4-3; palmar and plantar surfaces of the feet naked, covered with thick, cornified skin;

palmar and plantar pads are enlarged to cover most of the palm and sole. Pelage harsh and coarse.

COLORATION.—Back grizzled, near Tilleul Buff and Fuscous-Black, irregularly spotted with the latter color. Sides paler, gradually merging into the whitish olive of the underparts. Medial sides of fore and hind legs, feet, around the eyes and ears, whitish olive. Middorsal spot near Cream-Buff. Long vibrissae and tactile hairs black.

SKULL.—Rostrum slender; interorbital region wide. Postorbital processes well developed, both frontal and parietal bones contribute; ascending processes from the zygomatic arches well developed; orbit may be shut off from temporal fossa. Braincase large; apparently the brain is fairly highly developed.

DENTITION.—Dental formula, $I_2^1, C_0^0, P_4^4, M_3^3$. Upper incisors triangular in cross section; lower ones comb-like. Premolars, except the first, molariform; pattern of upper molars II-like, resembling that in the rhinoceros; pattern of lower molars W-like. Molars relatively high-crowned.

MEASUREMENTS.—See table, p. 207.

HETEROHYRAX GRAY

Heterohyrax GRAY, 1868 (Jan.), Ann. Mag. Nat. Hist., (4) I, pp. 50-51. Genotype: *Dendrohyrax blainvillii* Gray (= *Hyrax syriacus* Schreber).

Heterohyrax syriacus bocagei (Gray)

Hyrax bocagei GRAY, 1869 (Mar.), Ann. Mag. Nat. Hist., (4) III, pp. 242-243. Type locality: Angola. The type specimen is in the British Museum.

Euhyrax bocagei. Gray, 1873.

Hyrax arboreus. Bocage, 1882.

Dendrohyrax grayi BOCAGE, 1889 (Dec.), Journ. Sci. Math. Phys. Nat., Lisbon, (2) I, pp. 190-191. Type locality: Quissange, Benguela District, Angola.

Procapia bocagei. Thomas, 1892; Hatt, 1933.

Procapia arborea. Monard, 1935.

The American Museum has 8 specimens from the following localities: Chitau, 2; Luimbale, 1; Humpata, 4; Lubango, 1. Other localities from which this species has been recorded are: Caconda (Bocage, 1882); Bibala, Capangombe, Serra de Chela, Huila, and Quindumbo (Bocage, 1889, 1890); Pungo Andongo (Thomas,

1904); Ebanga (Monard, 1935); Bocage (1889) remarks that *Heterohyrax bocagei* has not been taken at elevations of less than 500 meters, and that it inhabits the plateau region of Angola.

EXTERNAL CHARACTERS.—Pelage long, soft, and woolly.

COLORATION.—Only one skin is from an adult specimen, a native skin from Chitau which may not be typical. It is near Hair Brown above; hairs basally between Light Drab and Light Cinnamon-Drab, becoming Hair Brown, followed by a band of Pale Olive-Buff, and ending in a black tip. Elongate middorsal area Ivory Yellow. Underparts Cream Color with areas of near Warm Buff irregularly present.

SKULL.—Skull elongate, with especially long, narrow rostrum. Dorsal outline flattened. Temporal fossae do not approach closely the lambdoidal crests. Interparietal fuses with parietals at an early age. Interparietal region wide; palate arched. Incisive foramina larger than in *P. c. welwitschii*. Rarely the orbits are completely surrounded by bone.

DENTITION.—Molariform teeth smaller, less high-crowned than in *P. c. welwitschii*.

MEASUREMENTS.—See table, p. 207.

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ORDER PROBOSCIDEA

ELEPHANTIDAE

LOXODONTA CUVIER

Loxodonta F. CUVIER, 1827, Zool. Jour., III, p. 140. Genotype: *Elephas africanus* Blumenbach.

Three races of the African elephant probably occur in Angola.

Loxodonta africana cyclotis (Matschie)

Elephas cyclotis MATSCHIE, 1900, Sitz.-ber. Naturf. Freunde, Berlin, p. 194. Type locality: South Cameroons, West Africa. The type specimen is in the Berlin Museum.

Elephas africanus, part. Bocage, 1890.

Loxodonta cyclotis. Frade, 1933.

This race occurs in the tropical forests of northern Angola, Congo, Malange, and Lunda districts. The Museu Bocage, Lisbon, has specimens from Sacandica, near Cuango and Macolu, near Bembe, both in Congo District (Frade, 1933).

Loxodonta africana knochenhaueri (Matschie)

Elephas (Loxodonta) knochenhaueri MATSCHIE, 1900, Sitz.-ber. Ges. Naturf. Freunde, Berlin, p. 197. Type locality: Barikiwa, Tanganyika Territory. The type specimen is in the Berlin Museum.

Loxodonta africana, subsp. Wilhelm, 1933.

This race probably occurs in the southeastern part of Angola, east of the Cubango River. No specimens were obtained by the American Museum Expeditions.

Loxodonta africana zukowskyi Strand

Loxodonta africana zukowskyi STRAND, 1924, Arch. Naturg., Ann. 90, Abt. A., Heft I, p. 68, footnote. Based on Zukowsky's edition of Steinhart's field notes. Type locality: Kaokoveld, South West Africa.

Elephas africanus. Bocage, 1890.

Loxodonta africana angolensis FRADE, 1928 (June), Tit. e Trabal. Cien. (Curriculum

vitae), pp. 15-16, Lisbon. Type locality: Upper Cunene R., Angola. The type is a living animal in the Zoological Garden of Lisbon.

The Vernay Angola Expedition secured two elephants at Mulondo, 65 km. SW. Capelongo. One of these was young, the other an old male with large tusks. This race of elephant occurs between the Cunene and Caporolo Rivers, southwestern Angola (see Frade, 1933, Bull. Soc. Portugaise Sci. Nat., XI, No. 30).

SKULL.—Compared with Frade's figures (1933) of *L. a. cyclotis*, the adult skull examined (A.M.N.H. 80598) is less depressed at the vertex; occiput more flattened, and rostrum slightly turned up distally rather than depressed. Last molars in place, with 6 and 7 lozenges showing wear, respectively; the last lozenge in each case worn slightly. Upper penultimate molar has 6 lozenges; lower one badly worn on one side, lost on the other. Basioccipito-sphenoidal, coronary, sagittal, nasal, and parietal portion of the lambdoidal sutures, obliterated. Premaxillary suture, maxillary (except that with the frontal) palatine, fronto-squamous, and squamo-alisphenoidal sutures open or at least evident.

MEASUREMENTS.—Head and body, 7000 mm.; tail, 1700; height at shoulder, 3450. Skull: greatest length, 998; basal length, 920; palatal length, 641; occipito-nasal length (medial), 330; greatest breadth rostrum, 638; least breadth rostrum, 424; zygomatic breadth, 831; interorbital breadth, 540; breadth at

postorbital processes, 708; breadth between temporal ridges, 360; mastoid breadth, 698; greatest postzygomatic breadth, 782; greatest interpterygoid breadth, 111; breadth premaxillary fossa, 258; height occiput, basion toinion, 625; tusk alveolus, 153×137 ; last upper molar at alveolus, 238×88 . Mandible: length, 601; height at condyles, 437; greatest breadth at condyles, 514; length symphysis, 128; last lower molar at alveolus, 232×82 .

These measurements are larger than those of a slightly older male (judging from condition of last molar) from Sacandica (Frade, 1933). The mandible is smaller in ours, however, with much shorter symphysis.

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ORDER PERISSODACTYLA

ODD-TOED UNGULATES

RHINOCEROTIDAE

The black rhinoceros (*Diceros*) is found in the southern half of Angola, the square-mouthed rhinoceros (*Ceratotherium*) formerly occurred in the southeast.

DICEROS GRAY

Diceros GRAY, 1821, London Med. Repos., XV, p. 306. Genotype: *Rhinoceros bicornis* Linnaeus.

Diceros bicornis (Linnaeus)

Rhinoceros bicornis LINNAEUS, 1758, "Systema Naturae," 10th Ed., p. 56. Type locality: "India" probably from the Cape of Good Hope.

No specimen of rhinoceros was collected by the expeditions of the American Museum in Angola. Jentink (1887) records a horn from Mossamedes District and Bocache (1890) reports the black rhinoceros in southern Angola, as do more recent authors (Shortridge, 1934, "Mam. S. W. Africa," I, p. 414). This rhinoceros was found throughout Africa south of the Sahara exclusive of the rain forest and high mountains.

CERATOTHERIUM GRAY

Ceratotherium GRAY, 1867, Proc. Zool. Soc. London, p. 1027. Genotype: *Rhinoceros simus* Burchell.

Ceratotherium simum simum (Burchell)

Rhinoceros simus BURCHELL, 1817, Bull. Soc. Philom., Paris, p. 96. Type locality: Kuruman, Bechuanaland.

This species is undoubtedly now extinct in Angola, but evidence that it formerly was found in the southeastern region is given by Shortridge (1934, "Mam. S. W. Africa," I, p. 425). Formerly the square-mouthed rhinoceros was found from Zululand and Namaqualand to Ngamiland and Northern Rhodesia. The northern race occurs from northern Uganda to French Equatorial Africa.

EQUIDAE**EQUUS LINNAEUS**

Equus LINNAEUS, 1758, "Systema Naturae," 10th Ed., I, 73-74. Genotype: *Equus caballus* Linnaeus.

Two species of zebra are found in Angola.

- (a) Dewlap on throat. No "shadow stripes" between blackish stripes; croup stripes forming a definite grid-pattern. *E. hartmannae*.
- (b) Dewlap absent. "Shadow stripes" between blackish stripes; grid-pattern restricted to base of tail. *E. b. antiquorum*.

Equus (Hippotigris) hartmannae
Matschie

Plate VIII, a

Equus hartmannae MATSCHIE, 1898, Sitz.-ber. Ges. Naturf. Freunde, Berlin, p. 174. Type locality: Höanib and Uniab Rivers, the Kaoko-veld, South West Africa. The type specimen is in the Berlin Museum.

Equus zebra. Bocage, 1890.

Equus penricei THOMAS, 1900, Ann. Mag. Nat. Hist., (7) VI, p. 465. Type locality: S.W. Angola, about 70 km. N. Mossamedes.

Equus (Hippotigris) zebra, var. *hartmannae*. Monard, 1930.

A single specimen of mountain zebra was secured by the Vernay Angola Expedition at Pico Azevedo, about 57 km. SE. Mossamedes. The range of this species in Angola is restricted to the southwestern corner, from about 130 km. N. Mossamedes southward (Shortridge, 1934, "Mam. S. W. Africa" I, p. 391). It is

also found in the western part of South West Africa.

Equus (Quagga) burchelli antiquorum
(H. Smith)

Plate VIII, b

Hippotigris antiquorum H. SMITH, 1841, Jardine's "Naturalist's Library," XII, p. 327, Pl. xxii. Type locality: Angola.

Equus burchellii. Bocage, 1890.

Four specimens were secured by the Vernay Angola Expedition: 101 km. E. Mossamedes, 2; Luvando, 2. This race occurs throughout the southern part of Angola, as well as in northern South West Africa and Bechuanaland (cf. Cabrera, 1936, Jour. Mammal., XVII, pp. 89-112). Burchell zebra occur from Zululand (also formerly from Orange River) to Angola, Katanga, and Abyssinia.

The four specimens examined have weak stripes to the hooves, much like the Transvaal and Zululand examples figured by Cabrera (idem, p. 99). Shadow stripes are extremely faint and the ground color is dirty whitish in one zebra from Luvando.

PERISSODACTYLA

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GRAY, J. E.

1821. London Med. Repos., XV, p. 306.

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1758. "Systema Naturae," 10th Ed., pp. 56, 73-74.

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SHORTIDGE, G. C.

1934. "Mammals of South West Africa," I, pp. 391, 414, 425.

SMITH, H.

1841. Jardine's "Naturalist's Library," XII, p. 327, Pl. xxii.

THOMAS, O.

1900. Ann. Mag. Nat. Hist., (7) VI, p. 465.

ORDER ARTIODACTYLA

EVEN-TOED UNGULATES

SUIDAE

Two genera of pigs occur in Angola.

- (a) Ears pointed; body covered with coarse hairs. Incisors large. Last molars normal. *Koiropotamus*.
 (b) Ears rounded at tip; body nearly naked. Incisors vestigial, frequently reduced in number in adults. Last molars above and below extremely large, flat-crowned, of numerous cylinders. *Phacochoerus*.

KOIROPOTAMUS GRAY

Koiropotamus GRAY, 1843, "List Spec. Mamm. Brit. Mus.," XXVII. Genotype: *Sus africanus* Gmelin (= *S. porcus* Linnaeus).

A bush pig occurs in Angola. The genus is found throughout the Ethiopian region except in the most arid areas.

***Koiropotamus porcus cottoni* (Pinfold)**

Potamochoerus chasopotamus cottoni PINFOLD, 1928 (July), Ann. Mag. Nat. Hist., (10) II, p. 99. Type locality: Tunda, Quanza District, Angola. The type specimen is in the Powell-Cotton Museum, Birchington, England.

Potamochoerus africanus. Bocage, 1890.

The American Museum has 5 specimens from Angola: Andulu, 1 skull; Mombolo (Namba), 2 skins only; without data, 2 skins with skulls. Bocage (1890) reported the bush pig from Caconda; Monard (1931) from Vila da Ponte. *K. porcus* occurs from Cape Province to Abyssinia, and Senegal.

The four specimens from Angola exhibit a large degree of individual variation. One has black markings and blackish limbs. Another is nearly black with few reddish hairs and more grayish, grayish predominating in the crest, face pale grayish, marked with black, and a black ring around the snout. A large specimen from Mombolo is black and rufous mixed, crest hardly different in color from sides, face colored like the back, but with blackish markings. The other specimen from Mombolo is young: it resembles the larger animal but has a blackish marking around the snout.

One of the large pigs without data has a large conical growth on the face. The others show no indication of this in the skins.

MEASUREMENTS.—Skull: occipitonasal length, 371; condylobasal length, 325; basal length, 315; palatal length, 246; breadth rostrum behind canines, 75; zygomatic breadth, 192; interorbital breadth, 71; height, basion toinion, 116. Teeth: M^2 , length by breadth, 22.4×21.2 ; M^3 , 35.6×22.5 .

PHACOCHOERUS CUVIER

Phacochoerus F. CUVIER, 1817, in G. Cuvier's "Règne Animal," pp. 236-237. Genotype: *Aper aethiopicus* Pallas.

The wart hog occurs from the Cape to the Sudan and Cape Verde, in the savanna country and dry plains.

***Phacochoerus aethiopicus shortridgei* St. Leger**

Phacochoerus aethiopicus shortridgei ST. LEGER, 1932 (July), Ann. Mag. Nat. Hist., (10) X, p. 86. Type locality: Numkaub, Grootfontein District, South West Africa. The type specimen is in the British Museum.

Phacochoerus africanus. Statham, 1922.

Phacochoerus aethiopicus var. *sundevalli*. Monard, 1931.

The wart hog is reported from Cahama (Jentink, 1893); Calundungu, Rio Mbalé, and Caquindo (Monard, 1931); Statham (1922) states that it occurs throughout Angola. The American Museum Expeditions did not secure specimens.

HIPPOPOTAMIDAE

HIPPOPOTAMUS LINNAEUS

Hippopotamus LINNAEUS, 1758, "Systema Naturae," I, p. 74. Genotype: *Hippopotamus amphibius* Linnaeus.

***Hippopotamus amphibius capensis* Desmoulins**

Hippopotamus capensis DESMOULINS, 1825, "Dictionnaire Class. Hist. Nat.," VIII, p. 220. Type locality: Lower Berg River, Cape Colony.

Hippopotamus amphibius. Bocage, 1890.

Hippopotamus constrictus MILLER, 1910, Smithsonian Misc. Coll., LIV, No. 7, p. 1, Pls. I-IV. Type locality: Angola, Africa. The type specimen is in the United States National Museum.

The Vernay Angola Expedition collected a skull on the Cuanza River, near Dando, Bihé District. Monard (1931) records specimens from Rio Mbalé and Caquindo. The hippopotamus is found in all the larger rivers of Africa.

The skull examined agrees with Miller's description of *H. constrictus* in the narrow rostral constriction. Both specimens are immature and the rostrum increases in breadth with age; consequently this character is not a satisfactory one on which to base a species or subspecies.

MEASUREMENTS.—Skull: condylobasal length, 628; basal length, 591; palatal length, 436; greatest length nasals, 341; greatest breadth nasals, 108; least breadth nasals, 31.5; greatest breadth rostrum, 349; rostral constriction, 107; zygomatic breadth, 403; temporal constriction, 133; mastoid breadth, 281; orbit, width by height, 78×71 ; height occiput, basion toinion, 196; crown M^1 , length by breadth, 48.4×42.5 ; M^2 , length by breadth, 56.8×44.5 .

GIRAFFIDAE

GIRAFFA BRISSON

Giraffa BRISSON, 1762, "Règne Animal," p. 60. Genotype: *Giraffa giraffa* Brisson (= *Cervus camelopardalis* Linnaeus).

A race of the only recent species, *Giraffa camelopardalis angolensis*, is found in southern Angola.

Giraffa camelopardalis angolensis

Lydekker

Giraffa camelopardalis angolensis LYDEKKER, 1903 (Oct.), in Hutchinson's "Animal Life," II, p. 121. Type locality: Angola. The type specimen is in the Tring Museum.

No specimens were secured by the expeditions of the American Museum. Statham (1922) states that it is found in the south of Angola, in the savanna forest and desert scrub country, and Wilhelm (1935) records it east of the Cuito (Kwito) River in the south east. Giraffe occur throughout the plains and savanna country of Africa, from the Transvaal to the Sudan and Senegambia.

BOVIDAE

The following key is an attempt to separate the genera of antelopes and the buffalo of this group found in Angola.

- 1.—(a) Horns present in adults of both sexes. 2.
- (b) Horns present in males only. 8.

- 2.—(a) Size large (height at shoulder of adults more than 1000 mm.) 3.
- (b) Size smaller. 6.
- 3.—(a) Ox-like in form. Horns massive, nearly meeting on the forehead, not twisted or annulated. Preorbital, interdigital and metatarsal glands absent. Height at shoulder, 1000 to 1700 mm. Buffalo and Bush Cow. *Syncerus* (p. 162).
- (b) Horns twisted spirally, directed upward and backward. Skull without antorbital pits. Preorbital, interdigital and metatarsal glands absent. Height at shoulder as much as 1800 mm.; skull length about 490 mm. Eland. *Taurotragus* (p. 162).
- (c) Horns long, straight, or sabre-like; annulated. Interdigital glands present but no inguinal or preorbital glands. 4.
- (d) Horns relatively short, sigmoid or lyrate, annulated. Large preorbital and interdigital glands, but no inguinal glands. 5.
- 4.—(a) Horns nearly straight, projecting backward in same plane as profile of head. Height at shoulders about 1220 mm. Gemsbok. *Oryx* (p. 163).
- (b) Horns sabre-like, rising sharply from above the eyes. Neck horse-like, with a well-developed mane. Roan and Sable. *Hippotragus* (p. 159).
- 5.—(a) Horns sigmoid, strongly annulated, arising from a high bony pedicle. Tail moderate, tufted at end. Hartebeest. *Alcelaphus* (p. 153).
- (b) Horns lyrate, strongly annulated; skull without a bony pedicle. Tail moderate, tufted at end. Sassyby. *Damaliscus* (p. 153).
- (c) Horns nearly smooth; in adults directed laterally, curving upward. Tail long, horse-like. Brindled Gnu. *Gorgon* (p. 153).
- 6.—(a) A long glandular pouch lined with white hairs on the back, capable of being everted to form a crest. Preorbital and interdigital, but no inguinal glands. Horns lyrate. Only two lower premolars. Springbok. *Antidorcas* (p. 159).
- (b) No dorsal pouch. Horns situated behind the orbit, nearly straight, sloping backward in line with profile of skull. Interdigital gland tubular. Elongate area on muzzle for openings of preorbital gland. Forehead tufted. Frontals project angularly posteriorly. Lacrimal vacuities absent. 7.
- 7.—(a) Broad yellow stripe on back. Size larger (height at shoulder about 850 mm.; skull length more than 250 mm.). Yellow-backed Duiker. *Cephalophus* (p. 153).
- (b) Color uniform grayish brown. Size

- smaller (height at shoulder about 330 mm.; skull length about 115 mm.). Blue Duiker.....
*Philantomba* (p. 154).
- 8.—(a) Horns of males spirally twisted. Skull with lacrimal vacuities, but no antorbital pits. Usually a pattern of transverse stripes. Preorbital interdigital and metatarsal glands absent.....9.
 (b) Horns of males straight, curved, or lyrate; usually with annulations.10.
- 9.—(a) Size large (height at shoulder of adult males usually more than 1350 mm.). Color grayish. Horns long, usually more than 1000 mm. (measured in straight line). Koodoo.....
*Strepsiceros* (p. 161).
 (b) Size medium (height at shoulder of adult males about 1000 mm.). Color grayish brown. Horns shorter (500 mm. to 950 mm.). Feet with narrow elongate hoofs; back of pasterns naked. Sitatunga.....
*Limnotragus* (p. 161).
 (c) Size smaller (height at shoulder of adult males about 830 mm.). Color reddish brown with white markings. Horns usually short (270 to 500 mm.). Hoofs normal; back of pasterns, hairy. Bushbuck.....
*Tragelaphus* (p. 161).
- 10.—(a) Antorbital glands large, with a circular or semicircular opening. Skull with large antorbital fossae, and with lacrimal vacuities; frontals truncate posteriorly.....11.
 (b) Antorbital glands large; a narrowly elongate naked area on muzzle for openings. Skull with antorbital fossae; frontal bones project angularly posteriorly. Skull length about 185 mm. Bush Duiker.....
*Sylvicapra* (p. 154).
 (c) Antorbital glands absent. Skull without antorbital fossae; lacrimal vacuities present. Medial incisors expanded. Size larger (height at shoulder of adults more than 800 mm.).....14.
- 11.—(a) Muzzle hairy; elongated into a proboscis. A tuft of hair on the crown. Skull length about 116 mm.; nasals short, ending opposite anterior pre-molar. Dik-dik.....
*Rhynchotragus* (p. 156).
 (b) Muzzle naked, not proboscis-like. Crown of head normal.....12.
- 12.—(a) Pelage coarse, crinkled, like dry grass. Hoofs high, only the tips used in locomotion. Skull length 135 to 155 mm.; (greatest breadth about 60 per cent or more of basal length), with large antorbital fossae and narrow lacrimo-nasal vacuities. Klipspringer.....*Oreotragus* (p. 155).
 (b) Pelage finer. Hoofs normal, triangular or semi-cordate. Skull more elongate (greatest breadth less than 60 per cent of basal length).....13.
- 13.—(a) Size larger (height at shoulder about 620 mm.; skull length about 169 mm.). A bald spot below ear; "brushes" of hairs on pastern. Antorbital fossae large; lacrimal vacuities minute. Horns curved slightly forward at the tip, with basal parts annulated. Oribi.....
*Ourebia* (p. 156).
 (b) Size smaller (height at shoulders less than 600 mm.; skull length about 135 mm.). No bald spot below ear. Skull with frontal region roughened; antorbital fossae small but deep; lacrimal vacuities large. Horns almost smooth. Steenbok.....
*Raphicerus* (p. 156).
- 14.—(a) Skull without supraorbital pits, or lacrimal vacuities, but with a maxillo-premaxillary vacuity. No false hoofs; glandular tufts of hair on metatarsal region. Impala.....
*Aepyceros* (p. 158).
 (b) Skull with supraorbital pits; no maxillo-premaxillary vacuities. False hoofs well developed, metatarsal tufts not present.....15.
- 15.—(a) Slender, smaller (height at shoulder of adult males less than 1000 mm.). A naked spot below ear. Tail short, broad, white below. Skull with nasal processes of premaxillary not quite reaching nasals. Reedbuck.....
*Redunca* (p. 157).
 (b) Larger (height at shoulder of adult males usually 1000 mm. or more), stouter in build. No naked area below ear. Tail longer, slender, tufted. Skull with premaxillae in contact with nasals, supraorbital pits larger.....16.
- 16.—(a) Large (height at shoulder in adults about 1200 mm.). Pelage shaggy, grizzled; a mane on the neck. Horns (in males) strongly annulated, curving simply with convexity forward. Waterbuck...*Kobus* (p. 157).
 (b) Smaller. Color reddish or yellowish brown. Horns with tendency to a sigmoid curve.....17.
- 17.—(a) Front of forelegs blackish; white rings above hoofs. Horns long, sigmoid (500 to 850 mm.). Lechwe.....
*Onotragus* (p. 158).
 (b) Front of forelegs colored as the back, reddish brown; white ring above hoofs obsolete. Horns short (400 to 520 mm.). Kob.*Adenota* (p. 158).

Alcelaphinae

ALCELAPHUS BLAINVILLE

Alcelaphus BLAINVILLE, 1816 (May), Bull. Soc. Philomath., Paris, p. 75. Genotype: *Antilope bubalis* Pallas (= *A. buselaphus* Pallas, 1766), subsequently designated, Sclater and Thomas, 1894.

The Cape hartebeest is found from the Transvaal to Angola. Other species occur to Abyssinia and Algeria.

Alcelaphus caama evalensis (Monard)

Bubalis caama evalensis MONARD, 1933, Bull. Soc. Neuchâtel. Sci. Nat., LVII, pp. 64-66, Figs. 9-10. Type locality: Evale, Angola. The type specimen is in the Museum of Chaux-de-Fonts, Switzerland.

The Cape hartebeest is recorded from Angola by Sokolowsky (1903), quoting Baum's field notes to the effect that it occurs in the region between the Cunene and Cubango Rivers. Monard (1931) reports two skins from Evale and (1935) saw hartebeest at Kahonda, near Dongoena, Rua Cana Falls, Dombodola and Naulila. No specimens were secured by the expeditions of the American Museum in Angola.

DAMALISCUS SCLATER AND THOMAS

Damaliscus SCLATER AND THOMAS, 1894 "Book of Antelopes," I, pp. 3, 51-91, Figs. 7-12, Pls. VI-X. New name for *Damalis* Gray, 1846, preoccupied by *Damalis* H. Smith, 1827. Genotype: *Antilope pygarga* Pallas.

The sassaby or tssesabe is found in southern Angola, from here to Lake Tanganyika, Mozambique, southern Bechuanaland. Other species occur south of the Sahara from West Africa to Somaliland and Tanganyika Territory.

Damaliscus lunatus (Burchell)

Antilope lunata BURCHELL, 1824, "Travels," II, p. 334. Type locality: Makkwárin River, Bechuanaland. The type specimen is in the British Museum.

Damaliscus lunatus reclinus MATSCHIE, 1912, Deutsch. Jäger-Zeit., LIX, pp. 119-120. Type locality: Caprivi Peak, South West Africa. The type specimen is in the Berlin Museum.

D. lunatus is reported from Angola by Sokolowsky (1903); it is said to occur between the Cubango and Cuito Rivers, in the extreme southeastern part of the Colony.

Monard (1935) records a specimen from the region of Cafima.

GORGON GRAY

Gorgon GRAY, 1850, "Knowsley Menagerie," II, p. 20, Pl. XIX, fig 2. Genotype: *Antilope gorgon* H. Smith (= *Antilope taurina* Burchell, 1824).

Gorgon taurinus, the blue or brindled wildebeest, is found in southern Angola; it occurs from here to southern Bechuanaland, Mozambique, and north to Kenya.

Gorgon taurinus (Burchell)

Antilope taurina BURCHELL, 1824, "Travels," II, p. 278. Type locality: Khosi Fountain, southern Bechuanaland. The type specimen is in the British Museum.

Connochaetes taurinus matoosi BLAINE, 1925, Ann. Mag. Nat. Hist., (9) XV, p. 129. Type locality: Upper Cunene River, Angola. The type specimen is in the British Museum.

Connochaetes taurinus borlei MONARD, 1935, Bull. Soc. Neuchâtel. Sci. Nat., LVII, p. 64. Type locality: Rio Mbalé, Angola. The type specimen is in the Museum of Chaux-de-Fonts, Switzerland.

The Vernay Angola Expedition collected 5 specimens: Capelongo, 4; 65 km. SW. Capelongo, 1. Sokolowsky (1903) reports *G. taurinus* between Ediva and Chihinde, Cutuila, and on the Cubango River near Linghonung. Monard (1931) had specimens from Rio Mbalé, and Chimporo, in the Cubango region of Angola, and (1935) records them from the upper Cuvelai River, near the Osi River, Naulila, and Dombodola.

The specimens examined have more inflated, less angular auditory bullae than examples from Zululand, South Africa, but are otherwise similar.

MEASUREMENTS.—See table, p. 208.

Cephalophinae

Three genera of duikers, each with a single species, are found in Angola: *Cephalophus sylvicultrix*, *Philantomba monticola*, and *Sylvicapra grimmia*.

CEPHALOPHUS SMITH

Cephalophus H. SMITH, 1827, in Griffith: Cuvier's "Animal Kingdom," V, pp. 344-349. Named as a subgenus of *Antilope*. Genotype: *Antilope sylvicultrix* Afzelius, by subsequent designation (Sclater and Thomas, 1894).

Cephalophus sylvicultrix ruficrista
Bocage

Cephalophus ruficrista BOCAGE, 1878, Proc. Zool. Soc. London, p. 744. Type locality: Loanda, Angola.

Cephalophus sylvicultrix. Selater and Thomas, 1894, and authors.

The Angola Expeditions secured 6 specimens of the yellow-backed duiker; Chitau, 2 (a native skin and a fetus); Mombolo (Namba), 2 (one with skull); Mount Moco, 1; 3 mi. W. Quissango, Libolo, 1. Statham (1922) writes that this species has been taken near Bailundo, and it probably occurs in the forest of northern Angola. *C. sylvicultrix* is found from Liberia to Angola and western Uganda.

This race having been described by Bocage from a head only, it seems desirable to add to his description.

COLORATION.—Body coloration near Bone Brown, slightly paler on the under side, becoming almost black along the light dorsal band and on the thighs and hind legs. No bluish tinge on the body. Dorsal marking narrowly triangular, pale, near Pinkish Buff, appreciably paler than in specimens from eastern Congo, which have this region generally Isabella color or Cinnamon-Buff. Wide crescentic patch on rump, pale gray mixed with black. Tuft of hair between the horns near Hazel in color and contains few blackish hairs. In Afzelius' (1815) description of *C. sylvicultrix* the tuft of hair is described as blackish in front, dark reddish brown behind. In Congo specimens it is usually near Bay. Head, throat, and shoulders with hairs very short, the pale skin showing through.

The fetal specimen differs markedly in coloration from the adults. Upperparts grizzled Sayal Brown and blackish; underparts Sayal Brown. Back of neck, a mid-dorsal stripe to middle of back, an elongate triangle with base on the rump and joining middorsal stripe, all black. Hinder side of hind legs and thighs nearly black. Under the black hairs in the dorsal triangle are short cream-colored hairs, completely covered by the black. These short hairs become finer in texture and grayish on the rump, where the gray crescent is in adults. The hairs on the head, neck and shoulder are of the same length as on the rest of the

body. Cranially the specimens examined agree closely with the description and figure in Selater and Thomas' "Book of Antelopes" (I, p. 128, 1894), except for the angle of the horns, which are less in line with the dorsal profile.

PHILANTOMBA BLYTH

Philantomba BLYTH, 1840, in Cuvier's "Animal Kingdom," p. 140. Genotype: *Antilope (Cephalophus) philantomba* H. Smith, 1827, p. 349 (= *A. maxwelli* H. Smith, 1827, p. 267), absolute tautonymy.

Philantomba occurs from the Cape to Gambia and Uganda.

Philantomba caerula anchietae
(Bocage)

Cephalophus anchietae BOCAGE, 1878, Proc. Zool. Soc. London, p. 743. Type locality: Bibala, near Capangombe, Angola.

Cephalophus monticola. Bocage, 1890.

Cephalophus maxwelli. Bocage, 1902.

Cephalophus melanorheus. Bocage, 1902; Selater and Thomas, 1894.

Cephalophus melanorheus anchietae. Themido, 1931.

Cephalophus caerulus anchietae. G. M. Allen, 1939.

Two skins without skulls of the blue duiker were secured by the Vernay Angola Expedition at Mombolo (Namba). *P. c. anchietae* has been reported from Benguela and Loanda (Bocage, 1878); Hanha (Bocage, 1902); Quirimbo, 75 km. E. Porto Amboim (St. Leger, 1936). The species occurs probably throughout the mountainous area of western Angola.

The poorly preserved native skins permit of little discussion. Apparently *P. c. anchietae* combines characters of *caerula* and *melanorheus*, with blackish rump and reddish lower legs.

SYLVICAPRA OGILBY

Sylvicapra OGILBY, 1837 (June), Proc. Zool. Soc. London, 1836, p. 138. Genotype: *Antilope merrgens* Desmarest (= *Moschus grimmia* Linnaeus).

Sylvicapra grimmia, the single species, occurs from the Cape to Abyssinia and Gambia.

Sylvicapra grimmia splendidula
(Gray)

Plate IX

Grimmia splendidula GRAY, 1871 (June), Proc. Zool. Soc. London, p. 590. Type locality:

St. Paul de Loanda (probably interior Angola). The type specimen is in the British Museum.

Cephalophus grimmii. Bocage, 1878.

Grimmia mergens. Jentink, 1893.

Cephalophus leucoprosopus NEUMANN, 1899, Sitz.-ber. Ges. Naturf. Freunde, Berlin, pp. 18, 19. Type locality: Interior of Angola (probably). The type specimen was living in the Berlin Zoological Garden.

Cephalophus grimmii. Bocage, 1902.

Cephalophus (Sylvicapra) grimmii, var. *altifrons*. Monard, 1931.

Cephalophus grimmii splendidulus. Themido, 1931.

The Vernay Angola Expedition collected 27 specimens of the common duiker in Angola: Chitau, 16; 20 km. E. Dando, 2; 35 km. E. Dando, 1; Chipopia, 6; Capelongo, 2. *Sylvicapra* has been recorded from Capangombe (Bocage, 1878); Dombe (Serpa Pinto, *vide* Bocage, 1890); Cahama (Jentink, 1893); Cabanga (Sokolowsky, 1903); between Cuando and Luando Rivers (Blaine, 1922); Vila da Ponte (Monard, 1931); Morro das Cruzes, Loanda District, and Hanha, Benguela District (Themido, 1931); Cuvelai River (Monard, 1935).

The series of skins agrees fairly well with Neumann's (1899) description of *C. leucoprosopus*, but that name is apparently a synonym of *S. splendidulus* Gray (1871). Specimens from Chipopia and Capelongo are slightly paler in color and slightly grayer, with the black pedal markings averaging less distinct and smaller, than in Chitau specimens. However, the amount of individual variation is great, and it seems best at present to consider the southern specimens as indicating intergradation with a race in South West Africa.

SKULL.—Compared with an example of *S. grimmii* from George District, South Africa, skulls of Angola specimens are smaller, with rostrum more slender; frontal region less convex; maxillary above M¹ less swollen; auditory bullae more inflated. Horns curving slightly forward at the tips rather than nearly straight. Roughened areas on the frontals are vestiges of horns in the females.

MEASUREMENTS.—See table, p. 208.

FIELD NOTES.—Female duikers collected in June were carrying fetuses and young were secured in early August.

Oreotraginae

OREOTRAGUS A. SMITH

Oreotragus A. SMITH, 1834, S. Afric. Quart. Jour., II, p. 212. Named as a subgenus of *Antelope*. Genotype: *Oreotragus typicus* Smith (= *A. oreotragus* Zimmermann, 1783).

Characters of *Oreotragus* have been given in the key to the Bovidae.

Oreotragus oreotragus tyleri Hinton

Oreotragus oreotragus tyleri HINTON, 1921, Ann. Mag. Nat. Hist., (9) VIII, pp. 131–133. Type locality: Equimina, south of Benguela, Angola. The type specimen is in the British Museum.

Oreotragus oreotragus cunensis ZUKOWSKY, 1924, Arch. Naturg., Abt. A, Heft I, pp. 124–126. Type locality: Kambele Falls, north bank of Cunene River, Angola. The type specimen is in the collection of Herr Steinhart.

Oreotragus saltator. Seabra, 1908.

Oreotragus oreotragus acerosus. Themido, 1931.

The Vernay Angola Expedition collected 5 examples of the klipspringer: Hanha, 3; 101 km. E. Mossamedes, 1; 40 km. S. Capelongo, 1. The species is recorded from near Humpata (Sokolowsky, 1903); Mupopo on the Cului River, near Cassinga and Indungu, and at Bimbe (Monard, 1935).

The specimens of klipspringer examined show a large amount of individual variation cranially, making Zukowsky's races decidedly questionable. However, the nasals are definitely shorter than in specimens from Cape Province, the skulls are narrower in the orbital region, and the hamulae of the pterygoids are smaller. In color the skins differ appreciably from Cape Province specimens, lacking much of the buffy tinge of the latter, and paler. Our specimens, however, have blackish patches above the hoofs, a character the Angola race is supposed to lack.

MEASUREMENTS.—See table, p. 209.

FIELD NOTES.—A specimen examined, had eaten only leaves, there were no visible intestinal worms or parasites. A late fetus was found in one specimen, July 16.

Neotraginae

Two genera are found in Angola. Characters of *Ourebia* and *Raphicerus* are given in the key to the genera of the Bovidae.

OUREBIA LAURILLARD

Ourebia LAURILLARD, 1841, in D'Orbigny "Dictionnaire Univ. d'Hist. Nat.," I, p. 622. Named as a subgenus of *Antilope*. Genotype: *Antilope scoparia* Schreber, 1785 (= *A. ourebi* Zimmermann, 1783), by subsequent designation (Sclater and Thomas, 1896).

Two races of *O. ourebi* are found in Angola; the genus is found from Cape Province to Angola, Katanga, the Sudan, and Abyssinia.

- (a) Pelage curly. *O. o. rutila*.
- (b) Pelage straight, a black streak on upper side of muzzle. *O. o. leucopus*.

Ourebia ourebi rutila Blaine

Plate X, a

Ourebia rutilus BLAINE, 1922, Proc. Zool. Soc. London, I, pp. 325-326. Type locality: Country between the Cuanza and Luando rivers, Angola. The type specimen is in the British Museum.

Ourebia scoparia. Statham, 1922.

The American Museum has two specimens of oribi from Angola: Huambo, 1; without data, probably from the Cuanza region, 1 skull only. In addition to the localities given above, this oribi has been reported from Caconda (Themido, 1931).

The single skin agrees fairly well with Blaine's description (*loc. cit.*) but the feet are buffy, dilute Pinkish Buff. The color of the back is paler and duller, middorsally near Cinnamon, and the tail is longer. In the skull the nasals are longer than those recorded by Blaine.

MEASUREMENTS.—See table, p. 209.

Ourebia ourebi leucopus Monard

Ourebia leucopus MONARD, 1931 (1930), Bull. Soc. Neuchâtel. Sci. Nat., LIV, pp. 78-82. Type locality: Chimpore, Cubango region, Angola. The type specimen is in the Museum of Chaux-de-Fonts, Switzerland.

Ourebia scoparia leucopus Monard, 1935.

In addition to the type locality this oribi has been recorded from the Cubango River below the Cueio at Kavanga and Kalolo, and at Macuju Pan, by Sokolowsky (1903); between Caiundo and Chimpore, and Rio Mbalé (Monard, 1931); along the Cului River, near the Osi River, and along the Cunene River (Monard, 1935).

It is possible that *O. leucopus* represents seasonal (winter) variation of *O. o. rutila*, but the area inhabited by the former has many characteristic mammals which are

not found in the more northern part of Angola.

RAPHICERUS H. SMITH

Raphicerus H. SMITH, 1827, in Griffith: Cuvier's "Animal Kingdom," V, pp. 342-343. Named as a subgenus of *Antilope*. Genotype: *Antilope campestris* Thunberg, by subsequent designation (Sclater and Thomas, 1896).

Raphicerus occurs from the Cape of Good Hope to Angola and Northern Rhodesia. In East Africa it is found in Tanganyika and southern Kenya.

Raphicerus campestris kelleni (Jentink)

Plate X, b

Pediotragus kelleni JENTINK, 1899, Notes Leyden Mus., XXII, p. 41. Type locality: Cahama, Caculovar River, Angola. The type specimen is in the Rijksmuseum van Natuurlijke Historie, Leiden.

Nanotragus tragulus. Bocage, 1878.

Pediotragus tragulus. Jentink, 1887; Bocage, 1890.

Raphicerus campestris. Bocage, 1902.

Raphicerus campestris bourquii MONARD, 1931 (1930), Bull. Soc. Neuchâtel. Sci. Nat. LIV, pp. 73-102. Type locality: Calundungu, southern Angola. The type specimen is in the Museum of Chaux-de-Fonts, Switzerland.

The Vernay Angola Expedition secured 6 specimens: 101 km. E. Mossamedes, 4; Capelongo, 1; 40 km. S. Capelongo, 1. Other records of the steenbok are: Humbe (Bocage, 1878); Otjipopenima (Jentink, 1887); Gambos (Jentink, 1899); Huila (Bocage, 1902); between Cubango and Cuito Rivers (Sokolowsky, 1903); in the Cuanyama country (Monard, 1935).

The specimens examined agree closely with the original description of *kelleni* and differ from the southern race in having horns at about the same angle as in the oribi. Monard's type was said to have been a female with horns, but since it was secured from natives there is no certitude that the skull actually belonged with the skin.

MEASUREMENTS.—See table, p. 209.

Madoquinae**RHYNCHOTRAGUS NEUMANN**

Rhynchotragus NEUMANN, 1905, Sitz.-ber. Ges. Naturf. Freunde, Berlin, p. 88. Genotype: *Madoqua guentheri* Thomas.

Long-nosed dik-diks occur in Angola and South West Africa; related species are found in East Africa in Kenya, Uganda, and Abyssinia.

Rhynchotragus damarensis (Günther)

Plate XI, a

Neotragus damarensis GÜNTHER, 1880, Proc. Zool. Soc. London, p. 20. Type locality: Omaruru, Damaraland, South West Africa. The type specimen is in the British Museum.

Neotragus saltianus. Bocage, 1878.

Cephalophus hemprichinaus. Jentink, 1887.

Madoqua damarensis. Bocage, 1902.

Rhynchotragus damarensis variani, DRAKE-BROCKMAN, 1913, Ann. Mag. Nat. Hist., (8) XII, p. 481. Type locality: near Lobito, Angola. The type specimen is in the British Museum.

Three specimens of dik-dik were secured by the Vernay Angola Expedition at 101 km. E. Mossamedes. It has been previously recorded from Capangombe and Humbe (Bocage, 1878) and from Otji-pompenima (Jentink, 1887). *Rhynchotragus damarensis* is restricted to the southwestern corner of Angola and adjacent part of South West Africa, and is apparently local and rare even there.

The skulls agree closely with the figures of *R. damarensis* in Sclater and Thomas (1896). Their description of the coloration, however, is rather inadequate, and a short note is included here:

Upperparts grizzled blackish and near Cartridge Buff, this becoming nearly white on the rump and the back of the thighs. Dark color bands become near Cinnamon on the sides, neck and cheeks. Muzzle Cinnamon, with several flecks of white on each side. Forehead variegated black and Pinkish Buff; tuft on top of head Cinnamon or slightly darker, black tipped. A white circumocular ring. Preorbital gland area blackish. Inner side of ears white, external side Pinkish Buff. Under jaw, throat, midventral region, white, this extending down medial sides of limbs almost to the hocks. Sides of belly near Pinkish Buff. Feet near Pinkish Cinnamon.

MEASUREMENTS.—See table, p. 209.

Reduncinae

Four genera of this group are found in Angola: *Redunca*, *Kobus*, *Adenota*, and *Onotragus*. Characters distinguishing these genera are given in the key to the Bovidae.

REDUNCA H. SMITH

Redunca H. SMITH, 1827, in Griffith: Cuvier's "Animal Kingdom," V, p. 337. Genotype: *Antelope redunca* Pallas, by absolute tautonymy.

Redunca arundinum (Boddaert)

Plate XI, b

Antelope arundinum BODDAERT, 1785, "Elenchus Animalium," p. 141. Type locality: Cape of Good Hope.

Heleotragus reduncus. Bocage, 1878.

Eleotragus eleotragus. Jentink, 1887.

Eleotragus arundinaceus. Bocage, 1890.

Cervicapra arundinum. Sclater and Thomas, 1896; Bocage, 1902.

Redunca arundinum. Blaine, 1922.

Cervicapra fulvorufula. Wilhelm, 1933.

The collections of the American Museum contain 14 specimens of the reedbuck: Chitau, 7; Chissonque, 3; Mombola (Namba), 2; Upper Cubango R., 1 (frontlet and horns only); without data, 1. This species is found from Cape Province to Angola, Katanga, the Sudan, west to Senegambia.

The coloration of the skins agrees fairly closely with the figure in Sclater and Thomas (1896, Pl. XLII) of *C. arundinum*, but in some specimens the lower limbs are much paler, near Cartridge Buff, fore legs with the anterior stripe near Fuscous.

The horns show considerable individual variation, some being much more curved than others; some spreading as much as 310 mm., others converging distally to about 128 mm. Characterizations based on horns are not of much value in this species.

MEASUREMENTS.—See table, p. 210.

KOBUS A. SMITH

Kobus A. SMITH, 1840, "Illustrations of the Zoology of South Africa," Pl. xxviii, footnote in text. Genotype: *Antelope ellipsiprymnus* Ogilby.

Two species of waterbuck are reported from Angola: *Kobus* is found from Zululand to Angola, Katanga and the Sudan, west to Senegambia.

- (a) A white band on the rump.....
.....*K. ellipsiprymnus*.
- (b) No white band separated from perineal white area.....*K. defassa penricei*.

Kobus defassa penricei Rothschild

Cobus penricei ROTHSCILD, 1895, Nov. Zool., II, p. 32, Pl. iv, fig. 1. Type locality: near

Bongo, Kuvali River, about 100 miles SE. Benguela, Angola.

Kobus ellipsiprymnus. Jentink, 1887.

Cobus ellipsiprymnus. Bocage, 1890.

Kobus defassa penricei. Monard, 1931.

The American Museum has 6 specimens from Angola: Capelongo, 1 (horns only); 40 km. S. Capelongo, 2; 65 km. SW. Capelongo, 2; no data, 1. The waterbuck is reported from the following additional localities: Cunene River, probably near Humbe (Jentink, 1887); Quissana, between the Cunene and Cubango Rivers (Capello and Ivens, *vide* Bocage, 1890); Chitanda (Sokolowsky, 1903); the Loando, Cuanza, and Caporolo Rivers (Statham, 1922); Rio Mbalé and Caquindo (Monard, 1931).

The specimens of this race examined are not as blackish as represented on Plate xxxv of Slater and Thomas, 1896 ("Book of Antelopes," II), and as described by Rothschild (*loc. cit.*). The lower limbs in the males are between Bone Brown and Black.

MEASUREMENTS.—See table, p. 210.

Kobus ellipsiprymnus (Ogilby)

Antelope ellipsiprymnus OGILBY, 1833, Proc. Zool. Soc. London, pp. 47–49. Type locality: "West of Latakoo," Bechuanaland.

The only valid record of the common waterbuck in Angola is Balme, quoted in Shortridge (1934, p. 523), who states that he shot a specimen on the west bank of the Cuando River near the Caprivi border. Previous records of "*K. ellipsiprymnus*" are doubtless misidentifications of the other species, *K. d. penricei*.

ADENOTA GRAY

Adenota GRAY, 1850, Proc. Zool. Soc. London, p. 129. Genotype: *Antelope kob* Erxleben.

The puku, *Adenota vardoni*, has been reported from southern Angola: elsewhere it is known from the Zambezi to Katanga and from the Caprivi strip of South West Africa to Lake Tanganyika.

Adenota vardoni (Livingstone)

Antelope vardoni LIVINGSTONE, 1857, "Missionary Travels," p. 256. Type locality: near Libonta (about 15° S., 23° E.), Northern Rhodesia. There was no type specimen.

The puku is reported from Huila, Angola

(Bocage, 1902), on the basis of an adult skull secured by Anchieta. It probably does not occur near Huila, but the specimens may have come from the southeastern corner of Angola. Statham (1922) saw, in the country of the giant sable, a kob antelope unknown to him; it may have been the puku.

ONOTRAGUS GRAY

Onotragus GRAY, 1872, "Catalogue of the Ruminants," p. 17. Genotype: *Kobus leche* GRAY.

The lechwe is found in southeastern Angola: elsewhere it occurs in Northern Rhodesia, Ngamiland, and Katanga. The Nile lechwe is found in a restricted area in the Sudan.

Onotragus leche (Gray)

Kobus leche GRAY, 1850, "Knowsley's Menagerie," p. 23. Type locality: Zouga River, Ngamiland. The type specimen is in the British Museum.

Adenota amboellensis SOKOLOWSKY, 1903, "Kunene-Sambesi Expedition," p. 535. Type locality: "River regions of the Amboella country," Angola (16° to 18° S., 18° to 20° E.).

Kobus (Onotragus) lechee. Monard, 1931.

Kobus leche. Themido, 1931.

Onotragus leche notatus. Wilhelm, 1933.

Kobus (Onotragus) lechee amboellensis. Monard, 1935.

The lechwe is reported from the Cubango River, between the Cuito and Cuatiri Rivers, and on the Longa River (Sokolowsky, 1903); two days south of Caiundo on the Cubango (Monard, 1931), and Caconda (Themido, 1931). This last record seems improbable.

Aepycerotinae

AEPYCEROS SUNDEVALL

Aepyceros SUNDEVALL, 1847, Kongl. Vetensk. Akad. Handl., 1845, p. 271. Genotype: *Antelope melampus* Lichtenstein.

Two forms of impala occur in Angola:

- (a) Face uniformly reddish brown.....
.....*A. m. melampus*.
- (b) A blackish blaze on the face.....
.....*A. m. petersi*.

Aepyceros melampus melampus (Lichtenstein)

Antelope melampus LICHTENSTEIN, 1812, "Reise im südlichen Africa," II, p. 544. Type

locality: Klipfontein, Namaqualand, South Africa.

This impala occurs in the southeastern corner of Angola, in the lower Cubango, Cuando and Zambesi River valleys. The common impala is recorded from the Cubango River above Kawanga (Cabanga) and between the Cueio and Cuatiri branches (Sokolowsky, 1903), and Wilhelm (1933) states that it is common on both sides of the Cubango and Cuando Rivers.

Aepyceros melampus petersi

Bocage

Aepyceros petersi BOCAGE, 1878, Proc. Zool. Soc. London, p. 741. Type locality: Capangombe, Mossamedes District, Angola. The type specimen is in the Museu Bocage, Lisbon.

Aepyceros melampus. Jentink, 1887; Bocage, 1890.

Aepyceros melampus petersi. Themido, 1931.

The Vernay Angola Expedition secured 4 specimens of the black-faced impala in Angola, 65 km. SW. Capelongo. Other localities from which this antelope has been recorded are: Humbe (Bocage, 1878); Cunene River (Jentink, 1887); Caculovar River, Chitanda River and Ediva (Sokolowsky, 1903); Hanha, Benguela District (Themido, 1931). *A. petersi* occurs in the southwestern corner of Angola, chiefly between the Cunene River and the ocean.

The black facial marking, although present, is poorly developed in the specimens examined, but the blackish spot near the anterior canthus of the eye is well marked.

MEASUREMENTS.—See table, p. 210.

Antilopinae

A single genus of this group occurs in Angola, the springbok, *Antidorcas*.

ANTIDORCAS SUNDEVALL

Antidorcas SUNDEVALL, 1847, Kongl. Vetensk. Akad. Handl., 1845, p. 271. Genotype: *Antilope euchore* Forster (= *Antilope marsupialis* Zimmermann).

Characters of the springbok are given in the key to the genera of the Bovidae.

***Antidorcas marsupialis angolensis* Blaine**

Plate XII

Antidorcas angolensis BLAINE, 1922, Proc. Zool. Soc. London, pp. 335–336, Pls. v (fig. B).

VII, VIII. Type locality: Coastal region of Angola, between Benguela and Mossamedes. The type specimen is in the British Museum.

Gazella euchore. Bocage, 1878, 1890.

Antidorcas euchore. Bocage, 1902.

Antidorcas marsupialis centralis. Monard, 1931.

A series of 24 specimens was collected at Pico Azevedo, about 70 km. SE. Mossamedes. Unfortunately these specimens were all lost in transit. Springbok have been recorded from Huila (Bocage, 1878); Mossamedes to Rio Coroca (Sokolowsky, 1903); Desert of Mossamedes (Monard, 1931). All references indicate that the springbok is restricted in Angola to the southwestern region between the Cunene River and Benguela, and between the coastal mountains and the coast. Elsewhere it occurs from Cape Province and southern Transvaal through Bechuanaland and South West Africa.

The loss of the specimens does not permit us to substantiate Blaine's description of *A. angolensis*.

Hippotraginae

Pocock (1910, p. 907) used the term Oryginae for this group, and he appears to have been followed by most authors since then. However, the type genus (*Hippotragus*) of the subfamily was fixed by Selater and Thomas (1894, "Book of Antelopes," I, p. 2). With *Hippotragus* now established by fiat (Opinion 109, Committee on Nomenclature, Smiths. Miscell. Coll., LXXIII, no. 6), the subfamily name must become Hippotraginae again.

Two genera of this group are found in Angola: *Hippotragus* and *Oryx*. Characters distinguishing these are given in the key to the Bovidae.

HIPPOTRAGUS SUNDEVALL

Hippotragus SUNDEVALL, 1846, Kongl. Vetensk. Akad. Handl., 1844, p. 196. Genotype: *Antilope leucophaea* Pallas.

Two species occur in Angola, one of which has two races.

- 1.—(a) Roan-colored. Horns of male slightly longer than skull. Height at shoulder about 1400 mm. *H. e. cottoni*
- (b) Males blackish, females brown; horns

- longer than skull. Height at shoulder of males about 1360 mm.....2.
- 2.—(a) Pale preorbital marking extending to muzzle. Facial portion of skull shorter. Horn cores in males less nearly perpendicular and horns shorter (record 52 1/2 inches or 1332 mm.). Females blackish brown in color.....*H. niger niger*.
- (b) Pale preorbital markings small. Facial portion of skull elongate. Horn cores in males nearly perpendicular at origin, and horns long (record 64 3/4 inches or 1715 mm.). Females chestnut in color.....*H. niger varians*.

Hippotragus equinus cottoni Dollman and Burlace

Hippotragus e. cottoni DOLLMAN AND BURLACE, 1928, "Records of Big Game," 9th Ed., p. 265. Type locality: Cuanza River, Angola. The type specimen is in the Powell-Cotton Museum.

Aegoceros leucophaeus. Jentink, 1887; Bocage, 1890.

Hippotragus equinus. Bocage, 1902.

The Vernay Angola Expedition secured 14 specimens of the roan antelope in Angola: Chitau, 4; Capelongo, 3; Luvando, 3; Quipungo, 2; Chipopia, 2. It is reported from Mossamedes District (Jentink, 1887); Golungo Alto (Bocage, 1890); Chitanda River, above Goudkopje, Cuando River, Habunga River, and Cubango River above the entrance of the Cuatiri (Sokolowsky, 1903); and the Loando (Themido, 1931). The roan occurs probably throughout the interior of Angola, south of the Congo region. Elsewhere the roan is found from the Transvaal to the Sudan, west to the Cameroons and Sengal.

The original description of this subspecies is extremely abbreviated, merely stating that the coloration is more richly rufous. This is true of the specimens examined, and a few notes are here included.

COLORATION.—Hairs of back basally whitish gradually becoming darker toward the tips which are near Warm Sepia; general appearance near Sayal Brown. Sides slightly paler. Mane and ears tipped with black. Muzzle and lower jaw white, also preocular bar and insides of ears. Supra- and postocular spots near Cinnamon rather than whitish. Cheeks, over the eyes, and front of face below the eyes to about 50 mm. from the rhinarium, black-

ish. Tail blackish at base, ending in a black tuft.

MEASUREMENTS.—See table, p. 211.

Hippotragus niger niger (Harris)

Aigoceros niger HARRIS, 1838 (Jan.), Proc. Zool. Soc. London, p. 2. Type locality: Cashan Mountains, northwestern Transvaal. The type specimen is in the British Museum.

Hippotragus niger. Bocage, 1878, 1890, 1902.

Hippotragus niger kaufmannii. Wilhelm, 1933.

The typical sable antelope occurs in the southeastern corner of Angola, east of the Cubango River; beyond the border of Angola it is found from the Transvaal to Katanga and Kenya. The record of this species from Mossamedes (Bocage, 1878) was probably based on a specimen brought from some distance to the east, possibly the giant sable. Wilhelm (1933) states that the sable antelope is found in Angola east of the Kwito (Cuito) River, on the north bank of the Okavango (Cubango) River. His statement is the only definite indication that the common sable occurs in Angola.

Hippotragus niger varians Thomas

Plate XIII, a

Hippotragus niger varians THOMAS, 1916 (Feb.) Abstr. Proc. Zool. Soc. London, No. 151, p. 1. Type locality: Luando River, Angola. The type specimen is in the British Museum.

Hippotragus varians. Blaine, 1922.

The Vernay Angola Expedition secured 15 specimens of the giant sable: Chisouque, 6; without definite locality, 9. All records indicate that this race is restricted to the region between the Cuanza and Loando Rivers in central Angola, and separated completely from the typical form.

Blaine's description of the giant sable, 1922 (Proc. Zool. Soc. London, pp. 319-320), is quite complete and agrees with the specimens examined.

MEASUREMENTS.—See table, p. 211.

ORYX BLAINVILLE

Oryx BLAINVILLE, 1816, Bull. Soc. Philom., Paris, p. 75. Genotype: *Capra gazella* Linnaeus.

The gemsbok occurs from southern

Angola to southern Bechuanaland. Other species of the genus are found from Tanganyika to Arabia and Senegal.

Oryx gazella blainei Rothschild

Oryx gazella blainei ROTHSCHILD, 1921 (Aug.), Ann. Mag. Nat. Hist., (9) VIII, p. 209. Type locality: 'near Elephant Bay, Benguela District, Angola. The type specimen is in the British Museum.

Oryx gazella. Bocage, 1890, and authors.

The Phipps-Bradley Expedition secured heads of two specimens of the gemsbok in southwestern Angola. It has been recorded from as far north as 13°3' S., 17° 7' E., and south of Mossamedes (Capello and Ivens, 1882). Statham (1922) states that it occurs on the Cunene near the Chitanda junction, and Monard (1935) saw specimens between Naulila and Dom-bodola.

The gemsbok appears to be local and rather rare in Angola.

Tragelaphinae

Four genera belonging to this subfamily occur in Angola: *Tragelaphus*, *Limnotragus*, *Strepsiceros*, and *Taurotragus*. Characters differentiating these genera are given in the key to the Bovidae.

TRAGELAPHUS BLAINVILLE

Tragelaphus BLAINVILLE, 1816, Bull. Soc. Philom., p. 75. Genotype: *Antelope sylvaticus* Sparman, a race of *T. scriptus*.

Tragelaphus is found from south of the Sahara to Cape Province in forest and bush country.

Tragelaphus scriptus ornatus Pocock

[*Tragelaphus scriptus*] *ornatus* Pocock, 1900, Ann. Mag. Nat. Hist., (7) V, p. 94. Type locality: Linyante, Chobe River, Eastern Caprivi, South West Africa. The type specimen is in the British Museum.

Tragelaphus scriptus. Bocage, 1890, and authors.

Five specimens of bushbuck were secured by the Vernay Angola Expedition: Chitau, 4 (native skins only); Mombolo (Namba), 1 (skull only). This antelope has been recorded from Caconda (Bocage, 1890); near Humpata (Sokolowsky, 1903); Caporolo River (Statham, 1922); Hanha (Themido, 1931).

One specimen from Chitau shows a weak upper longitudinal stripe from the shoulder, the others agree closely with Pocock's original description.

The skull is injured and there are no measurements for the specimens.

LIMNOTRAGUS SCLATER AND POCKOCK

Limnotragus SCLATER AND POCKOCK, 1900 (see Pocock, 1918, p. 443), in Selater and Thomas, "Book of Antelopes," IV, pp. 149-150. Genotype: *Tragelaphus spekii* Selater (by original designation).

Limnotragus occurs locally, along the rivers, from Southern Rhodesia, Mozambique and Ngamiland, and from Uganda and the Sudan to Senegal.

Limnotragus spekii selousi (Rothschild)

Tragelaphus selousi ROTHSCHILD, 1898, Novit. Zool., V, p. 206. Type locality: Barotse country, Northern Rhodesia. The type specimen is in the Tring Museum.

Limnotragus baumii SOKOLOWSKY, 1903, in Baum's "Kunene-Sambesi Expedition," p. 533. Type locality: Cuito River below the Longa junction, southeastern Angola.

No specimens of the situtunga were collected by the expeditions of the American Museum in Angola. Records of this animal, in addition to the type locality of "*baumii*," are: Coque, Loando, and Luxcashi rivers, and near Chuza village on the Cuanza River (Statham, 1922), Utembo River, a tributary of the Luiana (Wilhelm, 1933).

STREPSICEROS SMITH

Strepsiceros H. SMITH, 1827, in Griffith: Cuvier's "Animal Kingdom," V, p. 365. Genotype: *Antelope strepsiceros* Pallas (absolute tautonymy).

The koodoo is found locally from Cape Province to Eritrea, the Sudan and Angola.

Strepsiceros strepsiceros zambesiensis Lorenz

Plate XIII, b

Strepsiceros strepsiceros zambesiensis LORENZ, 1894, Ann. Mus. Wien, IX, Notizen, p. 62. Type locality: Lechumo Forest NE. Mata-beleland (20° S., 28° E.).

Strepsiceros kudu. Bocage, 1878.

Strepsiceros strepsiceros. Jentink, 1887.

Strepsiceros capensis. Selater and Thomas, 1900.

Strepsiceros strepsiceros bea. Monard, 1931.

The Vernay Angola Expedition collected 3 specimens: Hanha, 1; 101 km. E. Mossamedes, 2. Other records of this antelope in Angola are: Capangombe (Bocage, 1878); Otjipompenima (Jentink, 1887); Rio Coroca, Quilengues, and Huila (Capello and Ivens, *vide* Bocage, 1890); Dombe (Serpo Pinto, *vide* Bocage, 1890); Caconda (Bocage, 1902); Cuito, Chitanda, Jonkoa, and Longa Rivers (Sokolowsky 1903); Rio Mbalé, Caquindo, and Cuelio (Monard, 1931); Benguela and Catumbela (Themido, 1931).

MEASUREMENTS.—See table, p. 211.

Taurotragus Wagner

Taurotragus Wagner, 1855, Schreber's "Säugethiere," Suppl., V, pp. 438-439. Genotype: *Antilope oryx* Pallas (by subsequent designation, Sclater and Thomas, 1900).

The eland occurs from Bechuanaland and the Sudan north of the Congo forest to Senegambia. It was formerly found as far south as the Cape.

Taurotragus oryx livingstonii (Sclater)

Oreas livingstonii SCLATER, 1864, Proc. Zool. Soc. London, p. 105. Type locality: Sesheke, 70 to 80 mi. W. Victoria Falls, Northern Rhodesia. The type specimen is in the British Museum.

Oreas canna. Bocage, 1878.

Taurotragus oryx. Bocage, 1902, and authors.

Three specimens of the eland, one a calf, were collected by the Vernay Angola Expedition at Capelongo. It has been recorded from: Quilengues, Huila, and Dombe (Capello and Ivens, and Serpo Pinto, *vide* Bocage, 1890); Loanda (Bocage, 1890), near Cassinga, source of Matungue River, Ediva, Chibia, Lasingua, and between Cubango and Cuito Rivers (Sokolowsky, 1903); Rio Mbalé, Caquindo, and Chimpopo (Monard, 1931).

The specimens examined, even the calf, do not show the stripes supposedly characteristic of the race to which they are here referred. The blackish marking inside the forelegs above the "knee" is well marked, however.

MEASUREMENTS.—See table, p. 211.

Bovinae

SYNCERUS HODGSON

Syncerus HODGSON, 1847 (Dec.), Jour. Asiatic Soc. Bengal, (N.S.) XVI, pt. II, No. 7, p. 709.

Genotype: *Bos brachyceros* Gray (a race of *S. caffer*).

Two races of *S. caffer* occur in Angola: the buffalo and bush cow were formerly found throughout Africa south of the Sahara.

- (a) Coloration blackish. Horns massive, little angular, directed laterally. *S. c. caffer*.
- (b) Coloration reddish brown. Horns flattened, angular, directed dorsally. *S. c. nanus*.

Syncerus caffer caffer (Sparrman)

Bos caffer SPARRMAN, 1779, K. Vetensk. Handl., Stockholm, XL, p. 79. Type locality: Little Sunday River, Eastern Cape Colony.

Bubalus caffer cunenensis ZUKOWSKY, 1910, Zool. Beob., LI, p. 267. Type locality: Bihé, Angola.

Bubalus caffer cubangensis Zukowsky, 1910, *idem*, p. 267.

The same animal was used as type for the two races; this specimen is in the Berlin Museum.

The American Museum has 4 fragmentary specimens of cape buffalo from the Cuanza River, Angola, near Chitau. The buffalo is reported from Caconda, countries of the Humbo and Ganguelas, Quilengues, and southern Mossamedes District (Bocage, 1890). Statham states that the buffalo are greatly reduced in numbers, and are found locally in Angola south of the Cuanza River.

Syncerus caffer nanus (Boddaert)

Bos nanus BODDAERT, 1775, "Elenchus Anim.," p. 152. Type locality: The Congo. The type specimen, a frontlet and horns of an old bull, is in the British Museum (Lydekker, 1898).

B[os] pegasus H. SMITH, 1828, Griffith: Cuvier's "Animal Kingdom," IV, p. 386. Type locality: Angola.

Bubalus brachyceros. Bocage, 1890.

Bubalus mayi MATSCHIE, 1906, Sitz.-ber. Ges. Naturf. Fr. Berlin, pp. 171-172, Fig. 6. Type locality: near Funda, 50 km. E. Loanda, Bengo River, Angola.

Bos caffer nanus. Statham, 1922.

The bush cow is said to occur in the northern part of Angola (Bocage, 1890). This region was not visited by the expeditions from the American Museum. Matschie's type and paratype of *B. mayi*, both females, were small, with horns that were almost parallel, the greatest spread in

the type being only 400 mm. Monard (1935) reports the bush cow common near Pango, 150 km. E. Loanda.

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TABLES OF MEASUREMENTS

Sex	Head and body	Tail	Hind foot	Ear	Skull	Greatest length	Basal length	Palatal length	Length nasals near mid-line	Zygomatic breadth	Interorbital breadth	Mastoid breadth	Temporal constriction	Upper tooth-row	Maxillary alveoli	Breadth M ¹	Breadth across M ¹ -M ¹
♂	210	21	34 (c.u.)		49.1	46.4	29.6	13.3	29.7	13.2	22.6	12.2	24.7	19.3	5.0	19.6	
♂	201	27	35 (c.u.)		47.2	44.3	27.5	12.1	29.6	13.2	22.4	12.4	24.1	18.4	5.1	19.4	
♂	Type B.M. 64.8.16.4 Benguela, Angola		27.5 (s.u.)	26	45.7	40.5	25.5	12.2	28.5	13.3	21.5	11.8	23.4	17.9	4.8	17.9	

Sex	Head and body	Tail	Hind foot (c.u.)	Skull length	Condylar-incisive length	Basal length	Palatal length	Breadth of rostrum behind I ¹	Maxillary breadth	Interorbital breadth	Mastoid breadth	Height, base of rostrum toinion	Upper tooth-row	P ⁴ -M ³	Breath M ¹	Length I ²
<i>Sylvisorex angolensis</i>																
♀	62	76	13.5 (s.u.)	17.1	14.5	7.0			5.5	3.8	7.8	4.3	6.9			
Type ¹ Mombola, Angola																
<i>Crocidura o. occidentalis</i>																
♀	100	70	17.5 (s.u.)	29.3	25.3	12.9			9.5		11.7		13.7			
Type ² Gaboon																
♂	118	93	22	30.0	26.1	13.0		3.6	8.8	5.6	12.0	7.1	13.0	7.1	2.9	2.2
A.M.N.H. 86835																
Lukolela, Congo																
<i>Crocidura o. anchietae</i>																
♀	112	62	17	3		12.9 ⁴	4.2		10.0	5.7			13.4	7.5	3.3	2.2
Cotype B.M. 89.5.1.2																
Caconda, Angola																
♀	107	63	17	30.0	26.0	13.0			9.8	5.7	12.1	6.7	13.2			
Type B.M. ⁴ Caconda, Angola																
(s.u.)																

¹ Roberts, 1929. ² Dollman, 1915a.

³ Injured. ⁴ Dollman, 1915b.

Dollman, 1915b.

Sex	Head and body	Tail	Hind foot (c.u.)	Skull Condylar length	Basal length	Palatal length	Breadth rostrum behind II	Maxillary breadth	Interorbital breadth	Maxillary breadth	Height, basion toinion	Upper tooth-row	P4-M3	Breadth M1	Length I ²
<i>Crocidura o. herero</i>															
♂	140	90	22	32.5	27.8	14.8	4.0	10.3	5.6	13.4	7.6	14.3	7.8	3.3	2.2
<i>Crocidura shortridgei</i>															
♂	82	58	15.3 ¹	20.9	17.7	8.4	2.1	6.1	4.1	9.3	5.1	8.7	4.8	1.9	1.3
<i>Crocidura luimbalensis</i>															
♂	103	45	15 ¹	²	21.4	10.4	3.0	8.1	4.7	10.7		10.4	5.9	2.4	2.0
<i>Crocidura neavei</i>															
♂	80	67	18	22.2	19.1	9.2	2.0	6.6	4.2	9.4	5.7	9.8	5.4	2.0	1.5
<i>Crocidura t. angolae</i>															
♀	80	60	16.4 ¹	20.7 ³	17.7	8.2	2.0	6.3	4.3	8.8 ³	4.9 ³	8.9	5.0	1.9	1.4
♂	93	51	16	24.0	20.7	10.0	2.4	7.2	4.3	9.7	6.0	10.4	5.6	2.0	1.7
♂	95	57	17	24.1	20.9	10.1	2.5	7.4	4.7	10.0	6.1	10.8	6.1	2.1	1.7
♂	90	43	15	24.0	20.2	9.9	2.3	7.0	4.2	9.5	5.9	10.1	5.3	2.0	1.6
♀	87	48	15	22.7	19.6	9.5	2.1	7.0	4.15	9.4	5.6	9.9	5.3	2.0	1.5
♀	92	54	16	23.3	20.1	9.7	2.2	7.2	4.6	9.8	6.0	10.3	5.8	2.1	1.6
♀	83	43	14	22.3	18.8	9.1	2.0	6.6	3.9	8.9	5.3	9.3	4.9	1.9	1.4
♀	87	30	13.8 ¹			9.3	2.4	7.0	3.8			9.8	5.4	2.2	1.6
<i>Crocidura ansorgei</i>															
♀	98	59	16.3 ¹	23.9	20.6	10.0	2.3	7.2	4.9	9.9	5.8	10.3	5.9	2.1	1.6

¹ Remeasured from dry skin.

² Injured.

³ Dollman, 1915a.

Sex	Head and body	Tail	Hind foot (c.u.)	Skull Condylo-inclive length	Basal length	Palatal length	Breadth rostrum behind I ¹	Maxillary breadth	Interorbital breadth	Alaroid breadth	Height, base toinion	Upper tooth-row	P ¹ -M ³	Breadth M ¹	Length I ²
<i>Crocidura erica</i> A.M.N.H. 85556	♂ 86	62	15 ¹	22.5	19.4	9.7	2.4	6.7	4.4	9.6	5.3	9.8	5.3	1.9	1.5
Hanha, Angola															
A.M.N.H. 85565	♂ 90	50	15.5 ¹	21.6	18.4	8.9	2.3	7.1	4.7	9.6	5.2	9.3	5.1	2.1	1.3
Hanha, Angola															
A.M.N.H. 85560	♀ 88	68	16		19.0	9.5	2.1	7.7	4.5	9.7	5.3	I ¹ [Worn]	5.3	1.9	1.3
Hanha, Angola															
A.M.N.H. 85564	♀ 84	63	14	21.3	18.6	9.0	2.3	6.7	4.3	9.5	5.1	I ¹ [Worn]	5.1	1.9	1.3
Hanha, Angola															
Type B.M. 4.4.9.29	♂ 96	54	15.5 ¹	23.3	19.7	9.9	2.6	7.1	4.7	10.0	5.2	10.4	5.7	2.3	1.6
Pungo Andongo															
<i>Crocidura hirta</i> B.M. 5.5.9.11	♂ 90	44	15	23.7 ²	20.0 ²	10.1	2.8	7.6	4.3	10.0 ²	5.5 ²	10.3	5.8	2.5	1.6
Angola															
Cotype Berlin Mus. ³	♂ 85	55	15							10.0					
Tette, Mozambique															
Topotype ²	♀ 87	48	15	21.7	18.1	8.8		6.7	4.5	9.6	5.3	9.3			
Tette, Mozambique															
<i>Crocidura deserti</i> A.M.N.H. 85567	♂ 95	42	15	⁴								10.4	5.9	2.4	1.9
Capelongo, Angola															
Type B.M. 4.10.1.62	♂ 92	46	15.5 ¹	24.5	20.9	9.9	2.8	7.9	4.6	10.6	5.9	10.3	5.8	2.4	1.7
Molopo, Bechuanaland															
<i>Crocidura cuanensis</i> Type A.M.N.H. 85558	♂ 82	35	12 ¹	20.8	17.7	8.4	2.3	7.3	4.2	9.4	4.9	9.0	5.1	2.2	1.5
Chitau, Angola															
Topotype A.M.N.H. 87061	♂ 81	29	12	20.5	17.7	8.2	2.2	7.0	4.1	9.1	4.9	8.7	4.8	2.1	1.5
Chitau, Angola															
<i>Crocidura chitauensis</i> Type A.M.N.H. 85566	♀ 75 ⁵	30 ⁵	11.7 ¹	20.0	17.0	7.7	2.1	7.2	4.0	8.9	4.9	8.8	5.0	2.2	1.5
Chitau, Angola															

¹ Remasured from dry skin. ² Dollman, 1915b. ³ Peters, 1852. ⁴ Injured.

	Sex	Head and body	Tail	Hind foot (c.u.)	Skull Condylo-inclive length	Basal length	Palatal length	Breadth rostrum behind I ¹	Maxillary breadth	Interorbital breadth	Maxstoid breadth	Height, basion toinion	Upper tooth-row	P4-M3	Breadth M1	Length I ²
<i>Crocidura bicolor bicolor</i>																
A.M.N.H. 81461	♀	63	40	11 ¹	17.0	14.6	6.5	1.6	5.1	3.4	7.3	3.9	7.0	4.1	1.5	1.0
Chitau, Angola																
A.M.N.H. 88120	♀	61	40	10.5 ¹	17.3	14.7	7.0	1.6	5.0	3.3			7.5	4.1	1.4	1.1
Chitau, Angola																
A.M.N.H. 85561	♀			10.5 ¹	²		6.4	1.7	5.1	3.4			6.9	3.8	1.8	1.1
Capelongo, Angola																
A.M.N.H. 88604	♀	54	30	10	16.5	14.0	6.5	1.6	5.0	3.4	7.2	4.1	7.1	4.0	1.5	1.0
Chitau, Angola																
A.M.N.H. 88602	♂	62	38	10.5	17.7	15.0	7.0	1.8	5.3	3.7	7.9	4.1	7.5	4.2	1.6	1.1
Chitau, Angola																
A.M.N.H. 88603	♂	59	39	10.8	17.1	14.5	6.6	1.7	5.2	3.5	7.6	4.1	7.3	3.9	1.4	1.1
Chitau, Angola																
A.M.N.H. 88605	?	60	34	10	16.6	13.9	6.5	1.7	5.1	3.4	7.4	3.9	7.1	3.9	1.5	1.1
Chitau, Angola																
B.M. 97.8.6.4.	?				17.0	14.4	6.8	1.8	5.2	3.5	7.5	3.7	7.1	3.9	1.6	1.1
Angola																
<i>Crocidura nigricans</i>																
Type ³	♀	70	52	12												
Quindumbo																

¹ Remeasured from dry skin.

² Injured.

³ Bocage, 1889b.

	Sex	Head and body	Tail	Hind foot	Skull condylo-incisive length	Basal length	Palatal length	Length nasals, near mid-line	Zygomatic breadth	Interorbital breadth	Maxilloid breadth toinion	Height, maxillary alveoli	P2-M2	Outside breadth M1-M1
<i>Nasilio b. brachyura</i>														
Average 5	♂	119.9	90	30.2	31.7	29.4	19.8	12.6	19.0	6.0	13.7	9.7	13.5	8.3
Chitau, Angola														
Maximum	♂	125	94	30.5	32.7	30.2	20.2	13.0	19.6	6.3	14.0	9.8	14.0	8.6
Minimum	♂	113	87	29.5	31.1	28.9	19.0	12.0	18.4	5.7	13.4	9.4	13.1	7.9
Chitau, Angola														
Maximum	♀	125	83.3	29.4	32.3	30.2	19.8	12.9	19.0	5.8	13.8	9.5	14.1	8.7
Minimum	♀	131	92	30.5	33.3	31.4	20.0	13.2	19.3	6.1	14.2	9.9	14.4	8.9
Chitau, Angola														
Maximum	♀	122	80	29.0	31.7	29.5	19.7	12.6	18.6	5.7	13.5	9.2	13.8	8.5
Minimum	♀													
Chitau, Angola														
<i>Nasilio b. schinzi</i>														
Average 6	♂	116.5	106.5	31	32.5	30.4	20.0	12.6	18.8	6.1	13.7	9.8	13.9	8.3
Humpata, Angola														
Maximum	♂	125	124	31	33.7	31.6	20.4	13.5	19.6	6.4	14.7	10.1	14.0	8.5
Minimum	♂	103	100	31	30.7	29.0	19.5	12.1	18.5	5.7	13.1	9.5	13.7	8.0
Humpata, Angola														
Maximum	♀	121.4	107.2	31.2	33.2	31.0	20.5	13.0	18.9	6.2	13.7	9.6	14.1	8.5
Minimum	♀	133	118	33	33.8	31.6	20.8	13.6	19.4	6.4	14.3	9.9	14.4	8.9
Humpata, Angola														
Maximum	♀	111	99	30	32.4	30.3	19.6	11.9	18.3	6.1	13.3	9.5	13.8	8.3
Minimum	♀													
Humpata, Angola														

	Sex	Head and body	Tail	Hind foot	Skull condylo-inclive length	Basal length	Palatal length	Length nasals, near mid-line	Zygomatic breadth	Interorbital breadth	Maxsoid breadth	Height, basion toinion	Maxillary alveoli	P2-M2	Outside breadth M1-M1
<i>Elephantulus i. alexandri</i>															
Average 10	♂	118	115	32.8	32.3	30.2	19.0	13.5	19.7	6.3	14.6	9.9	13.7	8.2	11.4
Hanba, Angola															
Maximum	♂	121	127	33.5	33.7	31.2	19.6	14.3	20.4	6.7	15.2	10.2	14.1	8.6	11.7
Hanba, Angola															
Minimum	♂	114	107	32	31.3	29.1	18.1	12.8	19.2	6.0	14.0	9.6	13.0	7.8	11.0
Hanba, Angola															
Average 10	♀	122	119	33.2	32.8	30.6	19.2	13.9	20.0	6.2	14.7	9.9	13.7	8.2	11.4
Hanba, Angola															
Maximum	♀	135	124	35	33.8	31.6	19.6	14.1	20.6	6.5	15.2	10.4	14.1	8.5	11.6
Hanba, Angola															
Minimum	♀	112	110	31	32.1	30.1	18.5	13.2	19.5	5.9	14.1	9.6	13.4	8.0	11.3
Hanba, Angola															
<i>Elephantulus i. mossamedensis</i>															
Type A.M.N.H. 85664	♂	112	123	34	31.4	29.6	18.5	12.5	20.1	7.0	15.0	9.7	13.0	7.7	11.4
101 km. E. Mossamedes															
Paratype A.M.N.H. 85661	♂	110	115	34	32.9	31.7	1	14.2	1	6.1	14.7	9.8	13.6	7.9	11.4
101 km. E. Mossamedes															

¹ Injured.

	<i>Pterotes anchistele</i> Lisbon Mus. Type ♀ ¹	<i>Carnegie Mus.</i> 6971 ♂ Chitau, Angola	<i>Bpionops f. franqueti</i> Paris Mus. Type ♂ Gaboon	A.M.N.H. 86767 ♀ Mistandunga, Congo	A.M.N.H. 86765 ♂ Lukalela, Congo	<i>Bpionops dossoni</i> Chitau, Angola	A.M.N.H. 88068 ♂ Chitau, Angola	A.M.N.H. 88087 ♂ Chitau, Angola	A.M.N.H. 88073 ♀ Chitau, Angola	A.M.N.H. 88083 ♀ Chitau, Angola	A.M.N.H. 88085 ♀ Chitau, Angola	<i>Bpomophorus w. haldemanni</i> A.M.N.H. 85519 ♂ Chitau, Angola	<i>Bpomophorus angolensis</i> B.M. 64.8.16.11 Type ♂ Benguela, Angola	Maximum ¹ 3 ♂	Minimum ¹ 3 ♂	<i>Micropteropuspallius</i> B.M. 4.4.9.9 ♂ Canhoca, Angola	B.M. 4.4.9.10 ♂ Canhoca, Angola	Maximum ¹ 8 ads.	Minimum ¹ 8 ads.
External measurements:																			
Head and body		87	141	151.5	173	169	156	144	145	137	131	6	105	103		15	15	3	0
Tail																		17.5	16
Hind foot (c.u.)																			
Tibia		17		25.5		34.9	34.1	34.0	30.2	32.5	30.0	33.5			36	15	15	15	13.5
Ear	53	47.2	97.5	98.0	95.8	86.3	86.3	81.5	83.1	83.0	82.6	24		91	87.5	49.5	49.5	53	50
Forearm	23.5	24.8	51.8	53.4	52.6	46.2	42.2	43.7	42.2	42.3	40.4	40.8		44.5	41	24.4	24.9	26.5	23.5
Digit II, metacarpal	36	34.9	68.1	70.3	68.6	64.5	63.0	63.0	60.2	60.3	59.7	56.5		64.5	62	36.5	36.4	38.5	34
Digit III, metacarpal	27.5	25.3	44.2	45.6	41.2	42.5	39.9	41.3	40.2	38.8	38.5	36.6		41.5	40	21.7	23.3	24	22
1st phalanx	35	30.7	61.7	62.2	58.6	58.3	55.0	63.5	57.3	59.9	58.0	45.5		56	54.5	31.4	32.5	33	30
2nd phalanx	37 ²	34.9	65.0	66.3	64.8	57.5	54.7	55.2	52.4	52.5	52.4	54.0		61	59.5	34.8	36.4	36	33.5
Digit IV, metacarpal	36.5	34.4	67.8	65.3	65.4	61.3	60.4	61.1	58.4	57.5	58.3	52.9		60	58	34.1	35.3	37	33.5
Digit V, metacarpal																			
Skull:																			
Greatest length	29.7		51.0		54.8	54.2	52.9	47.7	47.3	46.5	43.3	54.0		61.5	58.5	29.7	29.0	29.8	29
Basal length	26.2 ³		48.1		51.6	50.1	48.5	43.7	43.6	43.3	40.1	50.4				26.2	25.7		
Palatal bridge	14.5	12.2	24.7		27.5	26.2	25.5	22.5	22.8	21.6	21.9	27.1		34.5		13.0	13.1	14.0	13.2
Zygomatic breadth			28.7		26.3	27.1	25.7	24.0	25.5	24.7	24.6	26.0		27.8		18.3	17.6	18.8	18.2
Interorbital breadth	5.2	4.9	8.1		7.0	7.0	6.9	7.0	7.1	7.3	7.6	7.8		9		5.7	5.4	5.8	5
Temporal constriction	8.5	8.1	9.8		10.5	10.7	9.9	9.9	10.2	10.0	10.3	10.8		10.2		8.7	8.5	8.8	8.2
Mastoid breadth	11.2 ³	10.7	19.3		18.8	18.4	17.8	16.6	17.0	17.2	17.0	17.5				12.4	12.4		
Front of orbit to prosthion	11.3 ³		21.0		26.0	25.0	24.4	21.0	20.7	20.9	16.8	25.0				10.2	9.7		
Height of occiput	5.8 ³	5.5	9.5		9.0	9.0	8.6	8.4	8.7	8.3	8.2	9.3				6.6	7.0		
Outside breadth across tooth-rows, M ¹ -M ¹	9.2	7.9	15.6		14.6	14.8	14.6	13.5		13.0	13.4	13.9		16.5	15.8	9.9	8.9	10.0	9.2
Maxillary alveoli	7.6 ³	8.0	16.0		15.2	15.6	14.5	13.6		12.5	14.0	18.2				8.9			
Crowns P ¹ -M ¹	3.5 ³		7.3		6.4	6.0	6.3	5.3		5.6	6.9	15.1							

¹ From Andersen, K., 1912. ² Corrected measurement, see table, p. 485, Andersen, K., 1912. ³ Calculated from figure 28, p. 484, Andersen, 1912.

[illegible]

External measurements:														
Head and body	50	48	59	31	16	60	61	40 ³	44	39	44	42	46	45
Tail	40	44	31	40	15	40	61	40	44	35	42	39	33	37
Hind foot (c.u.)										6				
Tibia	17.5	16.3	16	15	15.5		28.8		11.4	12.2	12.3	12.4	11.8	11.9
Ear	13	14	15	14	14		19.6	12	12.5	8	10 ⁴	9	10 ⁴	10
Forearm	33	40.3	36.1	37.0	52		54		32.9	31.6	33.1	32.9	31.4	31.6
Digit II, metacarpal							51			27.4	29.1	29.1	28.2	29.0
Digit III, metacarpal	34	34.9	35.0	36.2			51	31.5	32.4	29.0	31.3	30.0	28.9	29.8
1st phalanx	15	16.2	15.5	15.1			22	10.7	9.9	10.5	12.1	11.5	10.3	11.4
2nd phalanx	11	11.8	11.5	11.3			18.6	9.7	10.2	9.5	10.4	9.9	9.3	9.7
Digit IV, metacarpal	32	32.8	33.5	34.5			48.7		32.9	29.0	31.2	30.2	28.8	29.6
Digit V, metacarpal	33	34.2	33.5	33.3			49.8		31.2	29.0	30.9	29.6	29.0	28.9
Skull:														
Greatest length		15.5	²				29.2	13.2 ⁴		²	12.1	11.8	11.8	11.9
Basilar length		12.5	12.3				16.1	10.5		9.0	9.7	9.5	9.3	9.8
Palatal bridge		6.4	6.1				8.2	4.7		4.0	4.5	4.3	4.0	4.3
Zygomatic breadth		9.4					13.3	7.9			7.8			7.7
Interorbital breadth														
Temporal constriction		3.6	3.7				5.3	3.2		3.6	3.6	3.7	3.5	3.4
Mastoid breadth		7.9	7.8				10.2	7.0		6.9	7.1	6.9	6.8	7.0
Height of occiput		5.5	5.7				7.2	4.7		4.2	4.4	4.5	4.5	4.4
Outside breadth across														
tooth-row, M ² -M ³		5.5	5.7				8.2	5.5		4.8	5.0	5.2	4.8	5.1
Maxillary alveoli		5.8	5.7				7.3	4.6		3.9	4.3	4.2	4.0	4.2
Crowns P ¹ -M ³		4.1	4.0				5.7	3.7		2.9	3.2	3.1	3.0	3.2

¹ Peters, 1870a. ² Injured. ³ Thomas, 1912. ⁴ Personally taken. ⁵ Measured from dry skin.

	<i>Bp. bicolor</i> Type 1	<i>Bp. tenuipinnis</i> Type Berlin Mus. 2	A.M.N.H. 48983 ♀ Ngayu, Congo	<i>Bp. pusillus</i> Type 2 Boma, Congo	<i>Bp. minutus</i> Type Leiden Mus. "a" Cape of Good Hope	<i>Laephotis angolensis</i> Type 5 15 km. W. Dala, Angola	A.M.N.H. 87244 ♂ 35 km. E. Dando, Angola	<i>Scotellus s. fitzsimonsi</i> Topology A.M.N.H. 83632 ♂ Tsoisorogo, Kalihari Desert	<i>Scotophilus n. herero</i> Type B.M. 7.1.1.449 ♀ Elephant's Vley, S. W. Africa	<i>Scotophilus v. damarensis</i> Type B.M. 7.1.1.463 ♂ Elephant's Vley, S. W. Africa
External measurements:										
Head and body	43	46	44	31		50	45.5	44	73 ⁶	66 ⁶
Tail	26	30	29	22		38	36	30	53 ⁶	47 ⁶
Hind foot (c.u.)	7	6	8	4.5 ⁴		6	7	7		
Tibia	11		10.2	10.5		14	11.3	10.8	22	17.3
Ear	12	11.5	12	7		18	15	10	16 ⁶	12 ⁶
Forearm	30	29	29.3	26	31.5	35	33	29.9	58.6	47.7
Digit II, metacarpal			26.8		26		30.3	26.4		
Digit III, metacarpal		28.5	27.6		27.6	34	32.0	27.4	54.5	45.1
1st phalanx		10.3	9.9		10.5		10.5	11.8	18.7	15.5
2nd phalanx		8.3	8.3		10.0		9.0	8.8	15.0	12.4
Digit IV, metacarpal			27.2		28.3	34	31.0	7.4	54.5	44.1
Digit V, metacarpal			26.1			34	31.2	6.5	50.5	41.9
Skull:										
Greatest length			12.2	10.5	13.1		13.7	12.0	20.1	17.3 ⁷
Basilar length			9.9	9			11.3	10.1		
Palatal bridge			4.1	4			5.0	3.9	8.0	6.5
Zygomatic breadth			8.1	7			7.5	8.1		12.6
Interorbital breadth							4.2			
Temporal constriction			3.4	3.2	3.5		3.4	3.5	4.9	4.5
Mastoid breadth			7.2	6.5			7.4	7.2	11.7	11.0
Height of occiput			4.3	4.1			4.6	4.6		
Outside breadth across tooth-rows, M ² -M ³			5.2	4.0	5.5		5.3	5.0	9.5	8.2
Maxillary alveoli			4.0				4.4	4.3	7.0	6.3
Crowns P ⁴ -M ³			3.3		3.8		3.7	3.4	5.7	5.1

¹ Bocage, 1889a. ² Peters, 1872. ³ Noack, 1889. ⁴ S.u. ⁵ Monard, 1935. ⁶ Measured from dry skin. ⁷ Thomas, 1906, p. 175.

<i>Minellius m. bernardi</i> Type 1 Villa da Ponte, Angola									
A.M.N.H. 85328 ♂									
Chitau, Angola									
A.M.N.H. 88093 ♂									
Chitau, Angola									
A.M.N.H. 88113 ♂									
Chitau, Angola									
A.M.N.H. 88098 ♀									
Chitau, Angola									
<i>Scolococys albivittata</i> ? ¹									
Cunene River									
<i>Glauconycteris variegata</i>									
Cotype B.M. 7.1.1437									
"Otioto" Damara-land, S. W. Africa									
<i>Miniopterus schreibersi</i>									
B.M. 4.4.9.26 ♀									
Golungo Alto, Angola									
B.M. 4.4.9.25									
Golungo Alto, Angola									
<i>Kerivoula argentata</i>									
Type B.M. 7.1.1.540 ♀									
Otioto, S. W. Africa									
Cotype Paris Mus. A. 467									
Egypt									
Lisbon Mus. ³									
<i>Tadarida anchistae</i> (?)									
Cotype B.M. 4.1.4.2									
Quibula, Angola									
Cotype of <i>N. anchistae</i>									
Lisbon Mus.									
Quibula, Angola									
<i>Tadarida bocageti</i>									
Type Lisbon Mus.									
Galanga, Angola									
B.M. 23.5.9.28 ♂									
Lousvale, Orange R., S. W. Africa									
<i>Tadarida amsorgei</i>									
Type B.M. 10.4.8.4 ♂									
Malange, Angola									

External measurements:

Head and body	48	57	50	52	52	56	58	60	75	70	70	64	32	70
Tail	29	30	29	32	31	37	47	44.5	40	40	40	30	32	32
Hind foot (c.u.)	7	8	8 ²	8 ²	8 ²			10.5	7 ⁶			7 ⁶		
Tibia	10	9.8	9.6	9.9	9.4		16.6	16.0	13	13			13.2	13.2
Ear (from notch)	9	11 ²	11.4 ²	11 ²	11 ²	13	45.3	43.2	18.1	19	19	15	18.0 ²	18.0 ²
Forearm	31	30.9	31.0	31.0	29.3	38.5			48.4	51	51	45	46	46
Digit II, metacarpal	27	30.3	30.3	30.2	27.4	34			47.1	50	50	43	46.4	46.4
Digit III, metacarpal	30	30.3	30.7	30.3	28.1	36	38.3	37.7	49.1	20	20	18	19.2	19.2
1st phalanx	8	8.8	8.9	9.5	8.2	13.5	10.8	10.6	18.8	24	24	22(?)	18.6	18.6
2nd phalanx	7	7.5	7.4	7.6	6.8	10.5	27.9	27.4	15.3	46	46	41	44.8	44.8
Digit IV, metacarpal	29	30.1	30.1	29.2	27.0	35	37.4	36.4	47.4	27	27	26	28.6	28.6
Digit V, metacarpal	24	26.7	26.8	25.4	25.4	35	34.7	33.9	31.1					
Skull:														
Greatest length	14.5	14.7	14.1	14.3	13.6		3	3	20.4	21.1	21.1		17.9	19.1
Basilar length		11.9	11.7	11.8	11.0				16.6	17.8	17.8		14.8	15.4
Palatal bridge		5.1	5.1	4.9	4.6		5.4	5.5		7.4	7.4		5.9	5.9
Zygomatic breadth		11.4	10.6	10.5	10.5		9.4		12.0	13.0	13.0		11.1	11.5
Lacrimal breadth	7.8	8.1	8.0	7.7	7.6									
Temporal constriction	5	4.9	5.0	4.9	4.8		4.9	3.7	4.6	4.9	4.9		4.4	4.3
Mastoid breadth	8	9.7	9.6	9.3	9.2		9.4		11.7	12.1	12.1		10.5	10.7
Front of orbit to prosthion		4.2	4.2	4.1	3.8									
Height of occiput	4.5	4.7	4.7	4.5	4.5		6.5		6.5	6.9	6.9		5.7	7.0
Outside breadth across tooth-rows, M ² -M ³	7.3	7.5	7.5	7.0	7.0		7.2	6.0	9.0	9.1	9.1		7.6	8.8
Maxillary alveoli		5.4	4.9	4.9	4.6		5.0	5.6	7.5	8.1	8.1		6.8	7.1
Crowns P ⁴ -M ³		4.5	4.2	4.2	3.9		4.3	4.2	5.9	6.1	6.1		5.2	5.4

¹ Monard, 1933, 1935. ² Measured from dry skin. ³ Broken. ⁴ Tomes, 1861, pp. 32-33. ⁵ Seabra, 1900b. ⁶ Probably s.u.

	Sex	Head and body	Tail	Hind foot	Ear	Skull Greatest length	Basilar length	Palatilar length	Length nasals	Zygomatic breadth	Interorbital breadth	Mastoid breadth	Breadth rostrum behind Cr	Height, bulbæ to bregma	Diameter of orbit	Maxillary alveoli	Maxillary breadth outside M ¹ -M ²
<i>Galago s. moholi</i>																	
Average 10	♂ ♂	164	236	65		42.4	30.2	14.0	13.0	29.1	4.5	22.9	8.6	20.0	15.0	14.9	14.6
Chitau, Angola																	
Maximum	♂	173	250	68		43.3	31.0	14.6	13.7	30.2	5.2	24.1	9.1	21.3	15.4	15.2	15.0
Minimum	♂	151	217	63		41.0	29.1	13.1	12.3	28.0	4.0	21.2	8.3	18.9	14.4	14.7	14.1
Average 10	♀	158	229	62		41.6	29.0	13.7	12.9	28.0	4.6	22.7	8.2	20.2	14.7	14.9	14.4
Chitau, Angola																	
Maximum	♀	163	248	65		43.7	30.7	14.4	14.0	29.3	4.8	24.2	8.5	21.5	15.1	15.3	15.2
Minimum	♀	150	205	60		40.3	28.0	13.3	11.3	26.9	4.2	21.1	7.8	19.3	14.2	14.3	13.8
<i>Otolemur c. monteviri</i>																	
Average 4	♂ ♂	335	458	99	65.7	76.7	59.9	28.6	24.4	50.6	9.7	35.7	17.5	30.5	20.1	28.2	24.8
Maximum	♂	373	473	103	68	79.0	62.4	29.5	26.2	52.8	10.4	36.7	18.8	32.1	20.5	28.8	26.0
Minimum	♂	319	439	94	64	73.8	56.2	27.1	21.3	47.5	9.9	34.0	16.4	30.3	19.3	27.6	23.9
Average 4	♀	315	421	92	62.8	71.7	55.9	27.4	21.5	45.7	8.6	33.8	15.7	29.1	19.3	26.7	24.3
Chitau and Chissonque, Angola																	
Maximum	♀	336	426	95	67	73.6	57.7	28.6	22.5	48.3	9.2	34.2	16.3	29.6	20.2	27.0	24.7
Minimum	♀	297	415	89	60	68.8	52.9	20.2	20.3	42.2	8.0	33.3	14.7	28.5	18.8	26.5	24.0

	Sex	Head and body	Tail	Hind foot	Skull Greatest length	Basilar length	Palatilar length	Breadth behind rostrum	Zygomatic breadth	Temporal constriction	Mastoid breadth	Breadth braincase	Height, basion to bregma	Front of orbit to prosthion	Maxillary alveoli	Maxillary breadth M2-M3
<i>Cercopithecus a. cynosuros</i>																
A.M.N.H. 80787	♂	470	570	140	108.8	74.2	37.5	27.0	73.0	45.0	Circ. 59.0	57.3	50.2	36.3	33.5	33.6
Capelongo, Angola																
A.M.N.H. 80789	♀	412	493	123	93.6	60.5	31.0	23.5	60.5	41.9	52.0	52.9	45.6	27.6	28.7	31.0
Chitau, Angola																
<i>Cercopithecus m. mitis</i>																
Leiden Mus. 2572	♀	Circ.	Circ.			Circ.	Circ.									
Benguela (?), Angola	ad.	520	740	121	100.9	68.7	34.5	26.1	65.9	40.4	57.0	56.4	45.2	33.9	32.6	32.0
Leiden Mus. 2600	♀				100.9	69.2	34.4	25.8	64.2	41.1	55.6	56.4	46.7	33.1	31.7	32.1
Angola	ad.					Circ.	Circ.									
Leiden Mus. 2564	♀				99.4	68.9	33.1	26.1	68.4	40.8	59.1	57.5	48.3	34.0	32.0	32.9
Angola	ad.				109.3	83.4	39.4	29.8	74.2	48.1	60.1	59.4	51.2	40.1	37.1	34.3
Leiden Mus. 2585	♂					Circ.	Circ.									
Angola	ad.				102.7	72.6	34.3	29.2	69.4	44.1	58.0		47.8	32.7		34.9
Type of <i>C. pluto</i>																
B.M. 50.7.9.2	♂															
Angola	im.															
<i>Cercopithecus t. ansorgei</i>																
A.M.N.H. 80779	♂	290	505	108	74.1	45.0	20.4	21.6	51.1	38.3	48.6	48.6	39.1	18.2	23.8	26.0
Hanba, Angola	y.ad.															
Leiden Museum	♂					Circ.	Circ.									
Benguela, Angola	ad.				77.8	48.8	21.1	22.0	55.2	39.8	51.3	49.6	40.5	19.4	22.0	26.1
Type B.M. 4.4.9.1	♂					20.2	20.2	21.0						16.8	22.4	25.5
Canhoca, Angola																
Leiden Museum						Circ.	Circ.									
Benguela, Angola	♀				72.7	43.3	19.3	20.6	50.2	37.1	48.2	47.1	38.3	18.0	20.3	25.1
<i>Cercocebus aterrimus</i>																
A.M.N.H. 55013	♂				126	89.2	40.6	37.6	83.7	48.0	65.2	63.4	56.8	48.1	41.0	38.5
Luluabourg, Belgian Congo																

	Sex	Head and body	Tail	Hind foot	Skull Greatest length	Basilar length	Palatilar length	Breadth rostrum behind canine	Zygomatic breadth	Temporal constriction	Mastoid breadth	Breadth braincase	Height, basion toinion	Front of orbit to prosthion	Maxillary alveoli	Maxillary breadth M2-M2
<i>Papio kindae</i>																
A.M.N.H. 80796	♂	530	415	190	136.4	82.0	45.7	35.0	80.5	56.9	72.6	72.3	65.5	55.5	1	43.4
Mombolo, Angola	juv.															
Type Congo Mus. 3495	♀				132.3	86.3	49.0	32.6	81.1	50.8	64.6		59.9	53.4	42.5	43.3
Katanga, Congo	ad.															
Congo Mus. 10794	♂				160.5	107.8	65.0	41.8	97.0	55.3	73.6		72.0	74.3	50.1	48.8
Sandoa, Katanga, Congo	ad.															
<i>Papio comatus</i>																
A.M.N.H. 80773	♂	587	600	210	200.0	140.3	89.8	53.8	118.6	54.6	95.3	81.2	69.0	109.4	65.2	56.8
Hanha, Angola																
A.M.N.H. 80775	♂	660	500	220	197.0	138.4	88.3	53.6	115.3	54.1	89.8	78.3	67.0	110.7	71.0	54.5
Hanha, Angola																
A.M.N.H. 80774	♂				206.5	144.5	90.7	52.5	116.3	52.2	86.6	80.6	69.5	115.2	69.0	57.9
Hanha, Angola																
A.M.N.H. 80771	♂	2	500	210	197.0	136.5	84.6	46.9	111.7	54.6	88.2	84.4	69.5	103.2	67.7	54.2
Hanha, Angola																
A.M.N.H. 80772	♂	2	590	2	190.0	132.2	78.9	47.4	104.0	54.8	85.9	78.9	67.9	94.3	1	53.7
Hanha, Angola	juv.															

1 M³ not erupted. 2 Measurements questionable.

	Sex	Head and body	Tail	Hind foot	Ear (notch)	Skull Greatest length	Basilar length	Diastema	Length nasals	Zygomatic breadth	Rostral breadth	Mastoid breadth	Height, basion toinion	Length bullae	Maxillary alveoli	Breadth M ¹
<i>Geosciurus princeps</i>																
A.M.N.H. 86479	♂	257	241	74	13	60.4	46.2	13.5	21.2	35.6	12.4	26.0	17.5	14.7	12.1	4.0
101 km. E. Mossamedes																
C. M. 6848	♂			70 ¹		57.5	43.6	13.3	19.4	33.9	11.7	25.5	17.3	14.2	10.7	4.0
Mucungu, Angola																
<i>Funisciurus c. congicus</i>																
Average 4	♂ ♂	174	143	35.3				8.4	10.6	22.2		17.0		8.5	7.3	2.1
Northern Angola																
Maximum	♂	175	158	36.0		39.1	29.7	8.7	10.8	22.8		17.4	11.6	8.7	7.6	2.3
Minimum	♂	170	135	35.0		38.8	29.6	8.2	10.4	21.2		16.4	11.1	8.4	7.0	1.8
Average 8	♀	167	148	36			29.7 ²	8.7	13.2	22.6		17.0	11.2 ²	8.6 ²	7.1	2.4
Northern Angola																
Maximum	♀	184	156	38		39.8	30.3	9.2	15.8	23.3		17.4	11.6	9.4	7.3	2.5
Minimum	♀	157	140	35		38.7	29.1	8.2	10.2	21.9		16.8	11.1	8.2	6.7	2.1
<i>Funisciurus c. flavinus</i>																
Average 9	♂ ♂	168	141	40.5		39.6	30.0	8.2	11.0	22.4		17.2	11.4	9.1	7.4	2.3
Southern Angola																
Maximum	♂	175	159	42		42.5	31.4	9.0	12.2	23.5		18.1	11.9	9.4	8.1	2.6
Minimum	♂	160	108	38		37.2	28.8	7.7	10.2	20.8		16.4	10.6	7.0	7.0	2.1
Average 34	♀	165	151	41.3		39.7	30.4	8.1	11.3	22.8		17.2	11.3	9.1	7.6	2.1
Southern Angola																
Maximum	♀	172	161	44		40.5	31.3	8.6	12.1	23.2		17.6	11.7	9.5	8.0	2.4
Minimum	♀	152	119	39		38.5	29.8	7.7	10.4	22.0		17.1	10.9	8.5	7.2	2.0
<i>Funisciurus n. penbertoni</i>																
Type B.M. 5.10.1.3	♀					40.8	30.7	10.1	11.4	21.9		17.3	12.2	9.1	5.9 ³	
Dondo, Angola																
im.																

¹ Remasured from dry skin. ² Average of 3 specimens. ³ P⁴ to M³.

Sex	Head and body	Tail	Hind foot	Ear (notch)	Skull Greatest length	Basilar length	Diastema	Length nasals	Zygomatic breadth	Rostral breadth	Mastoid breadth	Height, basion toinion	Length bullae	Maxillary alveoli	Breadth M ¹
<i>Paraxerus c. phalaena</i>															
♀	176	158	44		41.5	31.9	8.1	11.8	24.0		17.8	12.1	9.3	8.6	2.3
♀	176	149	44		42.0	32.2	8.3	12.9	25.5		19.0	11.8	10.0	8.9	2.6
♂	187	157	43		42.4	33.6	8.5	12.0	25.0		18.4	11.5	9.9	8.9	2.6
♂	168	167	43												
♂	198	154	42												
<i>Helosciurus g. loandicus</i>															
♂	210	228	52		48.6	37.3	9.9	15.1	28.5		20.9	13.2	10.9	9.2	2.6
♂	220	249	55		49.6	38.3	10.2	15.6	29.6		21.4	13.7	11.4	9.6	2.7
♂	191	196	50		47.5	36.4	9.6	14.2	27.2		20.2	12.7	10.4	8.8	2.4
♀	207	242	52.9		48.2	36.9	9.9	15	28.3		20.4	13.1	10.6	9.5	2.6
♀	224	263	53		49.7	38.3	10.2	15.3	29.3		19.9	13.7	11.3	9.7	2.7
♀	195	226	51		46.5	35.7	9.5	14.3	27.8		21.1	12.5	10.1	9.3	2.5
♀	200	245	47		47.5	37.3	10.2	14.4	27.3	9.7	20.2	12.6	10.6	9.2	
♀	218	225	53	19	52.0	40.1	11.8	17.7	29.0	10.2	21.6	14.1	10.5	9.5	
<i>Helosciurus g. brauni</i>															
Type B.M. 35.1.6.87															
Fazenda Congulu, Angola															
<i>Protoxerus s. loandae</i>															
♂	285	380	66	21	67.6	52.3	17.7	19.9	36.4		27.6	17.2	13.2	12.0	
♀					67.1	51.6	17.2	20.2	38.2		28.5	17.5	13.1	12.0	
♀					65.0	51.0	17.2	19.0	37.4		27.5	17.5	12.7	11.8	
♀					63.8	49.1	16.2	19.0	36.8		27.6	17.1	12.3	11.8	

	Sex	Head and body	Tail	Hind foot	Ear	Skull Greatest length	Basilar length	Diastema	Length nasals	Zygomatic breadth	Interorbital breadth	Mastoid breadth	Height, basion toinion	Length bullae	Maxillary alveoli	Breadth M ¹	Width palate inside M ¹ -M ¹
<i>Anomalurus j. jordanii</i>																	
Type B.M. 35.1.6.80	♀	345	290	66		60.5	48.2	13.2	10.3 ¹	40.1	16.5	26.6	14.7	13.3	13.4		2.9
Congulu, Angola																	
B.M. 35.1.6.82	♀					61.5	49.2	12.8	10.6 ¹	40.1	16.4	27.2	15.2	13.4	14.0		2.3
Quirimbo, Angola																	
<i>Pedetes cafer angolae</i>																	
A.M.N.H. 87991	♀	391	420	155	79	85.3	64.2	19.8	32.4	55.7	37.1		26.6	13.9	19.8	4.0	
Humpata, Angola																	
C.M. 6876	♀	370	440	145	75	84.1	63.4	21.0	31.8	57.5	35.0	35.5	25.0	14.6	19.4	4.0	
Humbe, Angola																	
C.M. 6875	♂	380	450	155	70	88.3	65.8	21.1	35.4	55.1	35.7	34.1	25.3	14.9	20.3	3.8	
Humbe, Angola																	
C.M. 6878	♂	390	420	155	80	84.6	62.6	20.7	33.3	53.1	34.7		24.0	14.2	18.9	3.6	
Humbe, Angola																	
Type B.M. 19.12.19.1						92.0	67.7	22.8	35.6	55.6	37.6	35.6	26.8		20.0	3.9	
Cholende, Bihé, Angola																	
B.M. 25.5.16.5						91.6	67.2	22.0	33.8	59.3	34.7	34.1	26.7		20.6	4.4	
Capango, Angola																	
B.M. 25.5.16.6						92.5	66.9	22.1	37.2	56.0	33.5	37.1	26.2		18.4	4.2	
Capango, Angola																	

¹ Near mid-line.

	Sex	Head and body	Tail	Hind foot	Bar	Skull Greatest length	Basilar length	Diastema	Length nasals	Zygomatic breadth	Interorbital breadth	Mastoid breadth	Height, basion toinion	Inclive foramina	Maxillary alveoli	Width palate inside M1-M1
<i>Claviglis angolensis</i>																
Average 6	♂ ♂	108	68	19.5		29.6	22.8	6.6	11.6	16.6	4.4	13.5	6.8	3.7	3.6	3.8
Chitau, Angola																
Maximum	♂	118	77	20		30.5	23.6	6.8	12.1	18.1	4.6	14.0	7.0	4.0	3.8	4.3
Minimum	♂	100	60	19		28.5	22.1	6.3	10.9	15.9	4.3	13.3	6.6	3.5	3.5	3.6
Average 7	♀	103	70	19.2		29.0	22.5	6.4	11.3	16.3	4.3	13.6	6.9	3.5	3.6	3.7
Chitau, Angola																
Maximum	♀	105	77	20		30.1	23.6	6.8	11.8	17.3	4.5	13.8	6.7	3.8	3.6	3.9
Minimum	♀	97	60	18		28.3	22.0	6.3	10.8	15.7	4.2	13.2	7.1	3.3	3.5	3.6
Type B.M. 92.1.9.9	♀	96	74	18.4		30.0	23.1	6.9	11.6	16.6	4.4	13.8	6.9	3.5	3.6	
Caconda, Angola																
<i>Claviglis parvulus</i>																
No. 853 ¹		112		19		30		7	12	16		13			4	
Cubango Mission, Angola																
No. 856 ¹		110		19		28		6	11	15		13			4	
Cubango Mission, Angola																
No. 803 ¹		110		19		29		6	11						4	
Cubango Mission, Angola																
<i>Claviglis ansorgei ansorgei</i>																
Type B.M. 9.10.1.60	♀	90		17		26.4	20.3	5.8	10.4	14.2	4.0	12.1	6.6		3.1	
Tala Kilau (Donguena), Angola							Circ.									
A.M.N.H. 87719	♂	84	45	15		24.3	18.6	4.9	9.6	14.1	4.0	12.0	6.0	2.6	3.2	3.1
Humpata, Angola										Circ.						

¹ Monard, 1935, p. 85.

	Sex	Head and body	Tail	Hind foot	Ear	Skull Greatest length	Basilar length	Diastema	Length nasals	Zygomatic breadth	Interorbital breadth	Mastoid breadth	Height, basion toinion	Incisive foramina	Maxillary alveoli	Width palate inside M ¹ -M ¹
<i>Clavigitis ansorgei cuanzensis</i>																
Average 5	♂ ♂	84	65.9	15.4		25.0	18.9	5.3	9.3	14.0	4.1	11.9	6.2	3.1	2.9	3.5
Chitau, Angola																
Maximum	♂	88	73	16		25.3	19.2	5.5	9.7	14.3	4.2	12.2	6.6	3.2	2.9	3.6
Minimum	♂	77	61	14		24.3	18.5	5.1	9.0	13.8	4.0	11.6	6.0	3.0	2.8	3.3
Average 6	♀	85	62.2	15.7		24.3	18.5	5.2	9.2	13.6	4.0	11.7	6.2	3.0	2.8	3.5
Chitau, Angola																
Maximum	♀	95	73	16		24.5	18.6	5.3	9.3	13.9	4.2	12.1	6.6	3.2	2.9	3.7
Minimum	♀	77	47	15		23.1	18.3	5.1	9.0	13.4	3.8	11.5	5.7	2.9	2.7	3.3
<i>Clavigitis kelleni</i>																
Type Leiden Mus. "a"	♀	64	66	15.4	10	23.2	17.5	4.9	8.7	12.3	3.8	10.8	6.5		3.4	2.7
Mossamedes dist., Angola												Circ.				
<i>Clavigitis monardi</i>																
Type B.M. 35.3.20.1 ¹	♂	160		22 ²		36.6				27.5	6.0	16.3			4.4	
Dala, Chiumbe R., Angola																
No. 444 ³	♀	132	90	21		33		7.3	13 ⁴	19.2	5	15.7		4	4	
Upper Chiumbe R., Angola															Circ.	
No. 460 ³		150	90	22		34		8.5	13 ⁴	20	5.1	15.7		4	4	
Upper Chiumbe R., Angola																
No. 472 ³		145	90	22		34.4		9	13 ⁴	20	5	15.5		4.2	4.2	
Upper Chiumbe R., Angola															Circ.	
No. 488 ³		130		21		32		7.8	12 ⁴	19.4	5	15.7		4.1	4.2	
Upper Chiumbe R., Angola															Circ.	

¹ St. Leger's (1935) measurements. ² Remasured from dry skin. ³ Monard's (1935) measurements. ⁴ At suture.

	Sex	Head and body	Tail	Hind foot	Ear	Skull Greatest length	Basilar length	Diastema	Length nasals	Zygomatic breadth	Interorbital breadth	Mastoid breadth	Height, base toinion	Length bullae	Length incisive foramina	Maxillary alveoli	Breadth M ¹	Width palate, M ¹ -M ¹
<i>Cricetomys g. ansorgei</i> A.M.N.H. 81956 Chitau, Angola	♂	356 ¹	392	72 ²		76.3 Circ.	63.4	23.5	33.0	35.1	10.9	26.2	17.2		7.5	12.3	3.8	6.6
A.M.N.H. 87801 Humpata, Angola	♂	397	395	73		75.8 Circ.	63.5	23.3	32.2	34.0	11.3	27.3	18.2		8.6	13.4	3.7	6.8
Average 4	♀	348.7	413	71.2	42.3	73.0	61.0	22.2	29.9	34.2	10.8	25.4	17.1		7.2	12.3	3.6	6.6
Angola Maximum	♀	375	445	73	45	76.0	62.9	23.1	30.5	35.7	11.7	25.8	17.6		8.5	12.6	3.7	7.2
Angola Minimum	♀	338	390	69	40	71.1	59.6	21.7	29.1	32.5	10.1	25.0	16.6		6.5	12.2	3.5	6.2
Angola Type B.M. 4.4.9.91 Pungo Angondo, Angola	♂	400	469	78	47	80.5	73.5	24.6	35.1	37.4	12.0	28.1		8.6	13.2	4.0	7.1	
<i>Lophuromys sikapusi</i> A.M.N.H. 81589	♂	134	87	25		31.3	25.6	8.3		15.4	6.9	13.0		6.2	7.1	5.2	1.9	4.1
Chitau, Angola																		
A.M.N.H. 85741	♂	110	60	24 ²		31.1	24.4	7.8	12.7	14.7	6.7	12.7		5.9	6.7	5.2	1.9	3.8
Chitau, Angola																		
A.M.N.H. 85742	♀	129	76	24.5		31.2	24.8	8.0	12.7	15.5	6.9	13.1		6.0	6.7	5.4	1.9	3.7
Chitau, Angola																		
A.M.N.H. 86677	♀		72	23	11													
Chitau, Angola																		
<i>Mus musculus</i> A.M.N.H. 85875	♂	84	84	17		21.0	16.5	5.2	7.9	10.9	3.5	9.1	5.9		4.9	3.5	1.1	2.1
Lobito, Angola																		
A.M.N.H. 85878	♀	85	80	18		20.0	15.1	4.7	7.2	10.6	3.5	9.0	5.6		4.2	3.7	1.1	2.0
Lobito, Angola																		
<i>Leggada triton</i> A.M.N.H. 81950	♂	70	47	16 ²		22.2	17.6	6.0	8.5	10.5	3.8	9.5		4.1	4.7	3.9	1.3	2.5
Chitau, Angola																		
A.M.N.H. 81903	♂	58	50	16			16.0	5.3		10.0	3.9	9.0		3.7	4.8	3.7	1.3	2.4
Chitau, Angola																		
A.M.N.H. 86652						21.7	17.0	5.7	8.5	10.2	3.8	9.3		4.1	5.1	3.9	1.3	2.6
Chitau, Angola																		

¹ Measurement doubtful. ² Remasured from dry skin.

	Sex	Head and body	Tail	Hind foot	Ear	Skull Greatest length	Basilar length	Diastema	Length nasals	Zygomatic breadth	Interorbital breadth	Mastoid breadth	Height, basion toinion	Length bulia	Length incisive foramina	Maxillary alveoli	Breadth M ¹	Width palate, inside M ¹ -M ¹
<i>Leggada callevaerti</i>																		
A.M.N.H. 86671	♀	89	46	16.5	14	24.6	20.7	7.5	9.1	11.4	4.0	9.8		5.1		3.6	1.4	2.5
Chitau, Angola																		
A.M.N.H. 86666	♂	84	44	16.5	11.5	23.4	19.5	6.9	8.6	10.7	3.8	9.7		4.9		3.5	1.4	2.6
Chitau, Angola																		
Type B.M. 25.4.2.1	♀	43	17 ¹			25.0	20.9	6.7	9.0	12.0	4.1	10.1			6.1	3.9		
Luluabourg, Congo																		
<i>Leggada deserti</i>																		
A.M.N.H. 85736	♂	56	45	12		²		4.3			3.1				3.6	3.2	1.1	1.8
Capelongo, Angola																		
A.M.N.H. 86979	♀	49	37	12.5		15.7	11.4	3.5	5.5	8.2	3.2	7.5	5.3		3.1	3.2	1.1	1.7
Capelongo, Angola																		
A.M.N.H. 86980	yg.	51	35	13		17.0	11.3	3.5	4.6	8.2	3.0	7.4			3.0	3.0	1.1	1.7
Capelongo, Angola	yg.																	
<i>Leggada b. sybilla</i>																		
A.M.N.H. 81905	♂					18.5	13.6	4.5	7.0	9.6	3.3	8.5	5.0		4.0	3.6	1.2	2.0
Chitau, Angola																		
A.M.N.H. 85860	♂	62	38	13		18.7	14.6	5.2	7.9	9.6	3.3	8.3	4.7		4.6	3.5	1.1	1.8
Chitau, Angola																		
A.M.N.H. 86687	♂	57	43	13.5		18.4	13.9	4.3	6.9	9.2	3.3	8.4	4.7		3.8	3.4	1.2	2.1
Chitau, Angola																		
A.M.N.H. 85865	♀	65	49	14		²		4.6		10.1	3.3	8.4			4.6	3.3	1.1	2.1
Chitau, Angola																		
A.M.N.H. 86959	♀	57	42	13		17.7	13.2	4.4	6.6	9.3	3.3	8.4	4.9		4.1	3.5	1.2	2.0
Chitau, Angola																		
A.M.N.H. 86960	♀	60	31	14		19.3	16.0	5.5	8.0	9.5	3.2	8.6	4.8		4.4	3.7	1.3	2.0
Chitau, Angola																		

¹ Remasured from dry skin.

² Injured.

<i>Mastomys coucha</i>													
Average	9												
Chitau, Angola		133	119	24.5	31.5	26.3	8.6	12.8	15.5	4.2	12.5	8.0	7.6
Maximum		150	126	25	33.3	27.8	9.4	13.8	16.2	4.5	13.1	8.6	8.3
Chitau, Angola													5.4
Minimum		113	104	23	29.5	23.8	7.8	11.6	14.5	4.1	11.9	7.7	7.1
Chitau, Angola													5.1
A.M.N.H. 81917													5.6
Chitau, Angola	♀	117	112	23	31.8	25.6	8.5	13.3	15.3	4.0	12.5	7.6	7.0
A.M.N.H. 81923													5.3
Chitau, Angola	♀	120	105	23	30.2	25.0	7.9	12.6	14.0	4.0	11.5		6.9
<i>Myomys angolensis</i>													
A.M.N.H. 81937													
Chitau, Angola	♂	109	124	24	31.1	25.0	8.0	12.6	14.8	4.5	12.1	7.6	7.2
A.M.N.H. 87921													5.5
Humpata, Angola	♂	125	125	24	25.0		8.4	12.5	15.5	4.8	12.1	7.6	7.4
A.M.N.H. 87924													5.2
Humpata, Angola	♂	122	124	24	30.7	24.8	8.2	12.5	15.1	4.5	12.3	7.6	7.3
A.M.N.H. 81920													5.5
Chitau, Angola	♀	127	128	24	32.0	25.6	8.7	13.0	15.5	4.6	12.6	7.7	7.2
A.M.N.H. 87865													5.4
Humpata, Angola	♀	115	103	24	30.5	23.7	8.0	12.3	15.4	4.6	12.3	7.6	7.0
A.M.N.H. 87878													5.4
Humpata, Angola	♀	125	125	25	31.0	24.7	8.0	12.5	15.3	4.6	11.9	7.5	6.8
<i>Zelotomys s. kувелатensis</i>													
A.M.N.H. 85936													
Chitau, Angola	♀	127	90	23	15	30.0	25.3	8.5	11.5	17.0	4.4	13.0	5.4
A.M.N.H. 87947													7.6
Humpata, Angola	♀	138	90	25	31.5	27.3	9.3	12.5	18.3	5.4	13.7		5.5
<i>Aethomys a. avunculus</i>													
Average	6												
Caporolo, Angola	♂	118	171	28	32.0	24.1	7.8	13.6 ¹	14.7	4.5	12.4		5.2
Maximum		120	183	29	33.3	24.8	8.1	14.3 ¹	15.2	4.6	13.0		7.4
Caporolo, Angola	♂												5.4
Minimum		112	163	27	31.4	23.1	7.3	12.9 ¹	14.4	4.4	12.0		7.5
Caporolo, Angola													5.0
A.M.N.H. 85779													7.1
Caporolo, Angola	♀	120	146	29	32.0	24.2	7.9	13.5 ¹	15.0	4.3	12.4		4.8
A.M.N.H. 86868 (alc.)													7.5
Caporolo, Angola	♀	133	164	28	19								5.4
													1.8
													2.5

¹ Near mid-line.

	Sex	Head and body	Tail	Hind foot	Ear	Skull Greatest length	Basilar length	Diastema	Length nasals	Zygomatic breadth	Interorbital breadth	Mastoid breadth	Height, basion toinion	Length bulla	Length incisive foramina	Maxillary alveoli	Breadth M ¹	Width palate inside M ¹ -M ¹
<i>Aethomys a. phippesi</i>																		
Average 5	♂	133	164	28		33.5	25.2	8.4	14.2	15.8	4.7	13.1		5.3	7.6	5.5	1.8	2.8
Humpata, Angola																		
Maximum	♂	143	172	31		34.0	26.3	8.6	14.3	16.6	5.1	13.6		5.6	8.0	6.0	1.9	3.0
Humpata, Angola																		
Minimum	♂	129	156	27		32.6	24.4	8.0	13.6	15.4	4.4	12.9		5.1	7.3	5.1	1.7	2.6
Humpata, Angola																		
Type A.M.N.H. 87855	♂	131	156	28		32.6	24.9	8.0	13.6	15.8	4.4	13.5		5.1	7.6	5.8	1.9	2.9
Humpata, Angola																		
Average 6	♀	130	171	28		33.8	25.5	8.5	14.3	15.6	4.8	13.1		5.2	7.6	5.5	1.9	2.6
Humpata, Angola																		
Maximum	♀	140	188	29		34.5	26.2	8.7	14.8	15.7	5.0	13.4		5.5	8.0	5.7	2.0	2.8
Humpata, Angola																		
Minimum	♀	124	159	26		33.0	24.8	8.2	13.8	15.4	4.6	12.9		5.0	7.4	5.3	1.8	2.5
Humpata, Angola																		
<i>Aethomys e. imago</i>																		
A.M.N.H. 87961	♂	141	162	29		36.2	27.4	9.0	15.4	17.5	5.4	13.4		6.3	7.9	5.8	1.9	2.7
Mulondo, Angola																		
A.M.N.H. 87968	♂	140	149	30		36.2	28.0	9.0	15.4	17.4	5.1	14.1		6.9	7.7	6.2	2.0	2.7
Mulondo, Angola										Circ.								
A.M.N.H. 87820	♀	136	155	29		33.6	25.8	8.1	13.5	17.6	5.2	13.7		6.8	7.0	6.3	1.9	2.6
Mulondo, Angola																		
A.M.N.H. 87974	♀	140	107	28		34.1	26.6	8.3	13.5	17.6	5.3	14.1		6.4	7.2	5.9	1.9	2.8
Mulondo, Angola																		
Type B.M. 26.12.7.220	♂					35.9	28	9.2	15.8	17.5	4.9	13.6		6.5	8.1	6.0	2.1	3.0
Stanpriet, S. W. Africa							Circ.											
<i>Aethomys bocagei</i>																		
A.M.N.H. 85726	♀	167	197	36	25	41.2	32.4	11.2	18.0	18.9	6.0	15.8		6.6	9.1	6.8	2.2	3.5
Hanha, Angola																		
A.M.N.H. 85729	♀	169	195	35	26	41.5	32.4	10.6	18.0	18.6	5.8	15.2		6.6	9.3		2.2	
Hanha, Angola																		
A.M.N.H. 85730	♂	151	184	35.5	26	40.2	31.3	10.0	17.3	19.4	5.9	15.3		7.0	8.3	7.0	2.3	3.4
Hanha, Angola																		
Type B.M. 4.4.9.62	♂	191	189	35	28	40.9	32.0	10.5	16.0	19.3	5.3	15.0		6.9	8.9	6.7	2.1	3.0
Pungo Andongo, Angola							Circ.											

	Sex	Head and body	Tail	Hind foot	Ear	Skull (reatest length	Basilar length	Diastema	Length nasals	Zygomatic breadth	Interorbital breadth	Mastoid breadth	Height, basion toinion	Length bulla	Length incisive foramina	Maxillary alveoli	Breadth M ¹	Width palate, inside M-M ¹
<i>Aethomys thomasi</i>																		
Average 10	♂	149	121	27		36.8	29.9	10.0	15.4 ²	18.9	5.7	14.8		7.0	9.0	6.9	2.1	3.4
Chitau, Angola																		
Maximum	♂	158	146	28		38.8	31.4	10.7	16.4 ²	19.7	6.0	15.5		7.4	9.4	7.4	2.2	3.6
Chitau, Angola																		
Minimum	♂	141	108	26		35.2	28.5	9.3	14.7 ²	18.2	5.5	14.2		6.6	8.8	6.8	2.0	3.2
Chitau, Angola																		
Average 5	♀	148	123	26.5		36.0	29.4	9.9	14.4 ²	18.3	5.4	14.4		6.9	9.0	6.9	2.2	3.1
Chitau, Angola																		
Maximum	♀	151	145	28.5		36.9	30.0	10.3	15.3 ²	19.1	5.7	15.0		7.3	9.3	7.2	2.4	3.4
Chitau, Angola																		
Minimum	♀	142	114	26		35.0	28.3	9.3	13.8 ²	17.6	5.3	13.4		6.6	8.7	6.7	2.0	2.8
Chitau, Angola																		
<i>Aethomys vernayi</i>																		
A.M.N.H. 85735	♂	169	117	27 ¹	21	35.4	29.4	9.7	13.6 ²	18.8	5.4	15.3		7.7	8.3	6.8	2.4	3.2
20 km. E. Dando, Angola																		
A.M.N.H. 85949	♀			27.5 ¹		33.7	28.5	9.4	13.2 ²	17.5	5.3	14.7		7.4	8.1	7.0	2.4	
20 km. E. Dando, Angola																		
<i>Rattus norvegicus</i>																		
A.M.N.H. 85697	♂	255	235	44	22	53.2	43.6	14.7	22.2	26.3	7.8	19.5		8.2	9.1	7.7	2.1	4.7
Lobito, Angola																		
<i>Rattus rattus</i>																		
A.M.N.H. 81647	♂	145	175	35		38.4	31.0	10.2	14.0	18.2	5.9	15.4		7.1	7.2	6.5	2.0	3.5
Chitau, Angola																		
A.M.N.H. 85666	♀	147	185	32	21	37.5	29.7	9.9	13.5	17.3	6.0	14.5		6.9	6.4	6.3	2.0	3.5
Chitau, Angola																		
<i>Oenomys h. anchietae</i>																		
A.M.N.H. 81587	♂	160	192	33		37.8	29.8	9.9	15.4	17.4	5.2	13.5		6.0		8.0	2.5	2.4
Chitau, Angola																		
A.M.N.H. 86725	♂	176.5	206.5	37	21	39.6	31.3	10.3	15.8	19.2	5.9	14.3		6.4	7.8	7.6	2.4	2.4
Namba, Angola																		
A.M.N.H. 81588	♀	161	177	34		36.7	29.7	9.5	14.0	17.7	5.3	13.6		5.6		7.9	2.3	2.2
Chitau, Angola																		
A.M.N.H. 85086	♀	170	190	32.5 ¹	17.5 ¹													
Luimbale, Angola																		

¹ Remeasured from dry skin.

² Near mid-line.

	Sex	Head and body	Tail	Hind foot	Bar	Skull Greatest length	Basilar length	Diastema	Length nasals	Zygomatic breadth	Interorbital breadth	Mastoid breadth	Height, basion toinion	Length bulla	Length incisive foramina	Maxillary alveoli	Breadth M ¹	Width palate, M ¹ -M ¹
<i>Thallomys n. nitela</i>																		
A.M.N.H. 85948	♂	162		26.5 ¹	22	33.6	27.0	9.2	12.8	16.6	4.8	13.9		7.6		5.5	1.8	2.5
Hanha, Angola																		
A.M.N.H. 86968	♀	136	151	25	19													
Hanha, Angola																		
Type B.M. 9.10.1.49	♂	160	191	30	22			11.0	15.4						8.8	5.9	1.8	
Bombone, Angola																		
B. M. 9.10.1.50	♂	150	150	28.5	20	32.5	26.1	8.6	12.5	16.1	4.6	13.9			7.5	5.7	1.8	2.2
Bombone, Angola																		
B.M. 9.10.1.51	♀	150	152	29	21	34.1	27.1	9.1	12.9	16.9	5.2	14.4			7.4	5.8	1.8	
Bombone, Angola																		
<i>Thallomys d. herero</i>																		
Type B.M. 25.12.4.153	♀	143	186	26	21.5	33.1	28.5	8.2	13.4	15.9	4.6	13.0		8.2	6.8	5.7	1.7	
Ondongwa, Ovamboland, S. W. Africa																		
No. 1237 ²						34		9	13	17	4.7	14.4			7.9	5.5		
Mupanda, Angola																		
No. 1357 ²						35		9	13	17	5	15			8	6		
Mupa, Angola																		
<i>Gramomys s. angolensis</i>																		
A.M.N.H. 81946	♂	110	180	26	15.5 ¹	29.7	22.2	7.0	10.7	14.9	4.6	12.3		5.2	6.5	5.0	1.5	2.2
Chitau, Angola																		
Type A.M.N.H. 81947	♂	109	166	23.5 ¹	15.5 ¹	29.0	21.6	7.0	10.6	14.6	4.5	11.6		5.0	6.2	4.7	1.8	2.6
Chitau, Angola																		
<i>Hylomyscus carillus</i>																		
A.M.N.H. 85733	♀	88 ¹	130	19	19	25.4	19.9	7.0	9.2		4.7	11.1		4.5	5.0	4.2	1.2	3.1
Chitau, Angola																		
A.M.N.H. 85895	♀	87 ¹	118	19.5	17	25.6	20.0	7.1	8.9	12.7	4.8	11.3		4.4	5.5	4.4	1.3	2.8
Chitau, Angola																		
A.M.N.H. 85845	♀	97	139	19	19	26.4	21.0	7.6	8.6	12.8	4.6	11.1		4.5	5.4	4.3	1.2	2.8
Hanha, Angola																		
Type B.M. 4.4.9.74	♀	96	146	19		26.0	21.6	6.6	9.3	12.3	4.6	10.3		4.3	4.8	4.3	1.2	2.4
Pungo Andongo, Angola																		

¹ Remasured from dry skin.

² Monard, 1935, p. 127.

	Sex	Head and body	Tail	Hind foot	Ear	Skull Greatest length	Basilar length	Diastema	Length nasals	Zygomatic breadth	Interorbital breadth	Mastoid breadth	Height, basion toinion	Length bullae	Length incisive foramina	Maxillary alveoli	Breadth M1	Width palate, M1-M1
<i>Dasymys n. nudipes</i>																		
A.M.N.H. 81602	♂	184	173	40		41.4	36.3	13.4	16.5	20.6	4.4	16.1		6.0	9.8	8.2	2.8	2.4
Chitau, Angola																		
A.M.N.H. 87740	♂	179	169	41		40.4	34.4	12.3	16.2	20.3	4.7	16.0		6.6	9.4	8.0	2.7	2.6
Humpata, Angola																		
A.M.N.H. 87744	♂	182	163	41		39.3	33.6	11.4	15.7	20.3	4.6	16.1		6.3	9.1	8.6	2.9	2.8
Humpata, Angola																		
A.M.N.H. 81604	♀	168	166	40		39.2	33.5	11.5	14.9	20.3	4.6	15.4		6.2	8.3	8.8	3.0	2.2
Chitau, Angola																		
A.M.N.H. 87735	♀	186	183	43		40.6	34.6	11.6	16.4	20.4	4.5	15.8		6.6	9.4	8.9	2.9	2.4
Humpata, Angola																		
A.M.N.H. 87741	♀	183	170	41		39.8	33.7	11.6	14.9	20.8	4.8	16.3		6.5	9.1	8.6	2.8	2.4
Humpata, Angola																		
<i>Pelomys frater</i>																		
Average 7	♂ ♂	148.5	138	32		35.1	28.9	9.2	13.5	17.3	5.1	13.8	9.1		6.3	7.1	2.2	2.1
Chitau, Angola																		
Maximum	♂	173	148	33		36.5	30.0	9.8	14.4	18.0	5.4	14.2	9.5		6.6	7.4	2.3	2.4
Chitau, Angola																		
Minimum	♂	137	123	31		33.6	28.4	8.5	12.9	16.7	4.8	13.0	8.7		5.9	7.1	2.0	1.8
Chitau, Angola																		
Average 5	♀ ♀	155	138	33		35.1	28.8	9.0	13.5	17.2	4.9	13.4	9.0		6.4	7.0	2.2	2.0
Chitau, Angola																		
Maximum	♀	173	149	34		35.8	29.2	9.5	13.9	17.8	4.9	14.3	9.7		6.9	7.2	2.3	2.2
Chitau, Angola																		
Minimum	♀	133	130	32		33.4	28.2	8.8	13.1	16.6	4.8	13.0	8.7		6.1	6.9	2.1	1.6
Chitau, Angola																		
<i>Pelomys campanae</i>																		
A.M.N.H. No. 85954	♂	139	145	31		33.6	26.4	7.9	13.3	15.9	5.3	12.9	8.5		6.2	6.2	1.9	2.4
Hanba, Angola																		
A.M.N.H. No. 85952	♂	150	149	32		36.5	28.6	9.0	13.9	16.4	5.1	13.7	9.0		6.9	6.5	1.9	2.6
Hanba, Angola																		
A.M.N.H. No. 85958	♀	143	152	32		33.5	26.4	7.9	12.8	16.1	5.4	13.2	8.5		6.0	6.1	1.8	2.5
Hanba, Angola																		
A.M.N.H. No. 85959	♀	132	136	32		34.0	27.2	8.4	13.0	15.8	4.9	13.3	8.4		6.1	6.3	1.9	2.5
Hanba, Angola																		

	Sex	Head and body	Tail	Hind foot	Ear	Skull	Greatest length	Basilar length	Diastema	Length nasal	Zygomatic breadth	Interorbital breadth	Mastoid breadth	Height, basion toinion	Length bulla	Length incisive foramina	Maxillary alveoli	Breadth M ¹	Width palate inside M ¹ -M ¹
<i>Lemniscomys t. griselda</i>																			
	♂	130	130	29		32.6	25.9	7.8	12.4	15.3	4.7	12.9				6.2	6.3	2.0	2.3
	♂	138	149	30		34.7	27.0	8.6	13.7	16.3	5.4	13.3				6.6	6.6	2.0	2.5
	♂	119	118	28		31.0	24.2	7.4	11.6	14.5	4.7	12.4				6.0	6.0	1.9	2.1
	♀	134	138	28		32.7	26.5	7.9	12.1	15.6	4.5	13.0				6.2	6.5	2.0	2.4
	♀	116	135	29		31.2	24.2	7.4	12.1	14.9	4.7	12.0				5.8	6.1	2.0	2.2
<i>Lemniscomys striatus</i>																			
	♀	135	130	27		28.6	23.9	6.8	11.2		4.9	11.3		7.4		5.8	5.5	1.7	1.9
<i>Rhabdomys p. angolae</i>																			
	♂	113	86	21		27.1	22.5	7.2	10.1	13.5	4.1	11.2			5.6	5.5	5.2	1.5	2.1
	♂	112	90	22		27.6	22.7	7.3	10.3	13.3	4.3	11.5			6.1	6.2	5.1	1.5	2.1
	♂	126	104	23		28.8	24.1	7.9	10.8	14.7	4.3	11.7			6.0	6.3	5.5	1.5	2.5
	♀	117	89	22		27.6	22.8	7.2	9.9	13.9	4.5	11.2			5.8	6.0	5.5	1.5	2.1
	♀	126	100	24		28.1	24.0	7.6	10.5	14.2	4.2	11.4			6.0	6.2	5.5	1.6	2.2
	♀	109	85	21		26.1	21.5	7.0	9.1	13.5	4.1	11.0			5.5	5.4	5.1	1.5	2.0
<i>Rhabdomys bechuanae</i>																			
	♀	122	133	26				7.5	11.4	14.2	4.5				6.6	6.6	5.3	1.7	2.3

<i>Dendromus m. vernayi</i> ¹																	
Type A.M.N.H. 85909	♀	77	86	20		22.1	17.2	5.7	8.0	11.8	3.0	9.2	5.6	4.3	3.7	1.1	2.6
Chitau, Angola																	
A.M.N.H. 81909	♀	63	84	20		1	16.1	5.2	7.6	11.1	2.9	9.0		4.1	3.5	1.1	2.7
Chitau, Angola																	
A.M.N.H. 81911	♂	65	80	20		21.4	16.0	5.0	7.8	10.7	2.9	9.1	5.3	4.0	3.4	1.1	2.5
Chitau, Angola																	
A.M.N.H. 85914	♂	66	82	20		1		5.1	7.7		3.0			4.1	3.4	1.1	2.4
Chitau, Angola																	
<i>Dendromus ansorgei</i>																	
A.M.N.H. 88334	♂	67	74	17		20.2	14.9	4.6	7.6	10.4	3.7	8.5	5.3	3.7	3.3	1.0	2.4
Chitau, Angola																	
A.M.N.H. 81914				17		20.4	14.6	4.9	8.0	10.3	2.7	8.5	5.5	3.8	3.3	0.9	2.4
Chitau, Angola																	
A.M.N.H. 88331	♀	67	79	16		1		4.6	7.6		2.7			3.7	3.1	0.9	2.4
Chitau, Angola																	
<i>Dendromus n. angolensis</i>																	
A.M.N.H. 85898	♀	75	87	19		22.0	16.9	5.6	8.0	11.1	3.1	10.2	5.7	4.4	3.3	1.0	2.8
Chitau, Angola																	
A.M.N.H. 86682	♀	70	83	18		21.7	15.8	5.1	8.1	10.6	2.8	9.1	5.2	4.3	3.5	1.0	2.9
Chitau, Angola																	
A.M.N.H. 86699	♀	78	83	17		21.3	16.0	5.1	8.2	10.6	2.8	8.6	5.2	4.5	3.4	1.0	2.8
Chitau, Angola																	
Average 7	♂♂	72.4	86.4	18.0		22.2	16.3	5.4	8.2	11.1	3.0	9.3	7.5	4.4	3.3	1.0	2.8
Chitau, Angola																	
Maximum	♂	81	93	18.5		23.1	16.9	5.5	8.8	11.4	3.1	9.9	5.7	4.6	3.6	1.0	2.9
Chitau, Angola																	
Minimum	♂	65	77	17		21.5	15.7	5.0	8.2	10.8	3.0	9.0	5.1	4.2	3.2	1.0	2.7
Chitau, Angola																	
<i>Dendromus leucostomus</i> ²																	
Maximum of 10 specimens		69	80	18	15												
Minimum of 10 specimens		47	57	16.5	14												
Skull						19.3		5	10	10	3						
<i>Petromyscus shortridgei</i>																	
A.M.N.H. 81915	♂	76	96	18		25.5	20.1	7.1			4.1	10.8		5.1	3.9	1.2	2.6
Caporolo, Angola																	
Type B.M. 25.12.4.147	♂	85	90	16.5	14.5	25.4	19.4	6.8	10.2	12.3	4.1	11.3	6.4	5.0	3.8		
Ovamboland, S. W. Africa							Circ.										

¹ Skull injured. ² Monard, 1935, pp. 104-106.

Sex	Head and body	Tail	Hind foot	Ear	Skull Greatest length	Basilar length	Diastema	Length nasals	Zygomatic breadth	Interorbital breadth	Mastoid breadth	Height, basion toinion	Length bullae	Length incisive foramina	Maxillary alveoli	Breadth M ¹	Width palate, M ¹ -M ¹
<i>Steatomys bocagei</i>																	
♂	119.1	59.7	19.1		28.8	23.6	7.8	12.1	13.7	4.2	12.2	7.2	6.1	6.1	4.7	1.5	3.5
Average 8																	
♂	124	72	20		29.8	24.4	8.1	13.0	13.8	4.3	12.8	7.5	6.5	6.5	5.0	1.6	4.0
Maximum																	
♂	109	52	18		27.5	22.6	7.2	11.5	13.3	4.1	12.2	7.0	5.6	5.6	4.3	1.4	3.4
Minimum																	
♀	110	61	18		28.5	23.2	7.6	12.6	14.4	4.2	12.5	7.2	6.0	6.0	4.6	1.5	3.4
A.M.N.H. 88345																	
♀	122	63	19		28.7	23.6	7.6	12.7	14.3	4.1	12.8	7.1	6.0	6.0	4.3	1.6	3.5
A.M.N.H. 88346																	
♀	109	64	18		27.5	22.7	7.4	11.5	13.4	4.2	12.6	7.3	5.8	5.8	4.7	1.5	4.0
A.M.N.H. 88348																	
♀	97	57	18.2		26.7	21.5	7.2	11.0	13.7	4.2	12.0	6.9	5.5	5.5	4.8		
Type B.M. 92.1.9.14																	
Caconda, Angola																	
<i>Steatomys m. minus</i>																	
♂	85	33	13 ¹		20.9	16.5	5.3	8.2	11.5	4.0	10.5	5.6	4.4	4.4	3.5		
Type B.M. 5.5.9.56																	
Quilengues, Angola																	
<i>Steatomys m. leucorhynchus</i>																	
♂	85	45	16	13 ²			6.1	9.0		4.0			4.8	4.8	4.3	1.5	2.9
A.M.N.H. 85816																	
Capelongo, Angola																	
♂	85	45	17	14	23.5	20.5	6.4	9.3	12.1	3.9	11.1		4.5	4.5	4.1	1.4	2.9
Type A.M.N.H. 85846																	
Capelongo, Angola																	
♂	89	41	17	14													
A.M.N.H. 86976																	
Capelongo, Angola																	
<i>Steatomys a. angolensis</i>																	
♀	91	59	18	16	25.2	19.5	6.1	9.9	12.0	3.8	11.2		5.3	5.3	4.0	1.3	3.1
Type A.M.N.H. 88367																	
Chitau, Angola																	
<i>Steatomys a. bradleyi</i>																	
♂	92	55	17	16.5	26.3	20.2	6.6	10.8			11.6		5.4	5.4	4.2	1.3	
Type A.M.N.H. 87873																	
Humpata, Angola																	
<i>Steatomys s. umbratus</i>																	
♂	73	50	15.5		22.0	17.0	5.9	8.9	12.1	3.9	10.6	6.2	4.7	4.7	3.9		
Type B.M. 25.12.4.133																	
Cunene Falls, S. W. Africa																	

¹ S.u. ² Skull injured.

<i>Malacothrix l. egeria</i> Type B.M. 25.12.4.146 Ondongwa, Ovamboland, S. W. Africa														
♂	80	36	19	19	25.0	20.3	6.9	9.9	14.3	3.0	10.3	6.6	5.2	4.2
						Circ.								
Mupanda, Angola ¹														
	93	40	18		25.0		8.0	13.5		11			4.0	
<i>Saccostomus anderssoni</i> A.M.N.H. 87944														
♂	116	43	18		32.9	26.9	10.2	13.9	15.4	4.8	12.8		6.3	Circ.
Mulondo, Angola														
♂	122	38	19		32.3	26.6	9.9	14.2	15.4	4.6	13.1		6.6	4.8 1.5 3.2
A.M.N.H. 87945														
Mulondo, Angola														
♀	118	50	19	15 ²	3		9.3	13.5		4.7			6.4	5.0 1.5
A.M.N.H. 85800														
Capelongo, Angola														
A.M.N.H. 85799														
Hanha, Angola														
Type B.M. 69.8.11.4														
S. W. Africa														
<i>Gerbillus s. leucanthus</i> A.M.N.H. 86046														
	100	110	25	10	3		7.0	12.3	14.8	5.9			5.0	4.2 1.4 3.0
Pico Azevedo, Angola														
Type B.M. 25.12.4.114														
♂	102	114	26		29.1	22.4	7.4	11.4	15.6	6.0	12.4		9.2 5.1	4.3 1.5 3.3
Ondongwa, Ovamboland, S. W. Africa														
<i>Gerbiliscus bohmi</i> ⁴														
♂	130	150	40		39		10.5	15	22	7			9	6.8 2.3 4.5. Circ. Circ.
Type Qua Mpala, Marungu, Congo														
<i>Tatera valida</i> Average 5														
♂	157	148	36		42.8	33.7	11.8	18.0	21.4	6.9	16.1	10.5	10.7 8.1	7.4 2.6 3.6
Chitau, Angola														
♂	164	158	37		44.9	35.0	12.4	19.0	22.1	7.2	16.3	10.8	11.0 8.4	7.7 2.7 4.1
Maximum														
Chitau, Angola														
♂	141	130	35		41.1	33.0	11.2	17.3	20.6	6.6	16.0	10.4	11.5 7.6	7.0 2.5 3.3
Minimum														
Chitau, Angola														
♀	159	154	36		42.2	33.2	11.4	17.3	21.9	6.8	15.9	10.5	11.8 7.9	7.2 2.6 3.6
Average 7														
Chitau, Angola														
♀	169	171	38		43.4	34.3	12.0	17.7	23.0	7.6	16.6	11.0	11.2 8.3	7.7 3.0 4.2
Maximum														
Chitau, Angola														
♀	152	135	35		40.1	31.7	10.6	16.3	20.6	6.3	15.5	10.2	10.4 7.0	6.8 2.3 3.0
Minimum														
Chitau, Angola														

¹ Monard, 1935, p. 118.

² From notch.

³ Skull injured.

⁴ Noack, 1887, pp. 244-245.

Sex	Head and body	Tail	Hind foot	Ear	Skull Greatest length	Basilar length	Diastema	Length nasals	Zygomatic breadth	Interorbital breadth	Mastoid breadth	Height, basion toinion	Length bullae	Length incisive foramina	Maxillary alveoli	Breadth M ¹	Width palate, inside M-M ¹
<i>Tatera humpatensis</i>																	
♀	147	170	38		38.4	30.2	10.7	15.5	20.7	6.8	14.9	9.7	10.0	7.3	6.5	2.4	3.8
Type A.M.N.H. 87952																	
Humpata, Angola																	
♀	141	171	38		38.5	30.6	10.7	16.2	20.0	6.3	14.8	10.0	10.1	8.0	6.5	2.3	3.8
A.M.N.H. 87951																	
♂	139	187	40 ¹		39.1	31.4	11.3	16.5	19.4	7.1	15.1	9.8	10.3	9.1	6.6	2.5	4.2
Humpata, Angola																	
♂	158	175	38		38.6	30.8	10.8	15.8	20.0	6.8	15.5	10.3	10.3	7.8	6.4	2.3	3.8
A.M.N.H. 87953																	
Humpata, Angola																	
<i>Tatera s. angolae</i>																	
♂	139	143	33		38.1	29.4	10.1	17.2	19.6	6.0	15.1		10.9	7.1	6.1	2.1	3.7
A.M.N.H. 85753																	
♂	142	147	33 ¹		38.4	29.5	9.8	16.4	19.7	6.4	15.6		11.2	7.1	6.7	2.5	3.8
Hanha, Angola																	
♂		172	32 ¹		38.4	29.3	9.8	18.0	19.6	6.2	15.7		11.3	7.2	6.0	2.2	3.6
A.M.N.H. 85758																	
♀	126	170	33		37.2	29.0	9.8	15.6	18.8	5.9	15.0		11.4	7.3	6.3	2.4	3.4
Hanha, Angola																	
♀	127	142	31		37.0	28.9	9.7	16.2	19.3	6.2	14.9		11.3	7.3	6.2	2.1	3.5
Catumbela, Angola																	
♂	144	137	30		35 ²	26.4	8.6		19 ²	6.1	14.4		10.3	5.9	6.3	2.3	3.0
A.M.N.H. 85749																	
Lobito, Angola																	
Type B.M. 5.5.9.34																	
Quilengues, Angola																	
♀	135	158	34.5	22.5	36.5	29.1	9.2	15.4	19.9	5.9	15.5		11.3	7.3	6.7	2.6	3.3
<i>Tatera joanae</i>																	
Type B.M. 25.12.4.103																	
Ukuambi, Ovamboland.																	
S. W. Africa																	

¹ Measurement doubtful.

² Wroughton, 1906, pp. 488-489, skull was incomplete, 1937.

<i>Otomys a. anchietae</i>																		
Average	5	♂ ♂	213	119	41	49.7	41.0	11.8	20.8	25.6	5.2	18.2	11.5	8.0	11.9	3.3	1.7	
Chitau, Angola																		
Maximum		♂	217	127	41	51.6	40.8	12.1	22.9	27.8	5.3	19.3	11.9	8.9	12.5	3.4	2.4	
Chitau, Angola																		
Minimum		♂	209	115	40	28.7	43.0	11.3	19.6	24.5	5.0	17.5	11.2	7.0	11.2	3.2	1.5	
Chitau, Angola																		
Average	6	♀ ♀	197	111	36.8	46.1	37.6	10.5	18.6	23.9	5.0	17.2	11.0	7.4	11.6	3.1	1.7	
Chitau, Angola																		
Maximum		♀	209	121	37.5	47.7	39.6	11.0	20.0	24.7	5.4	17.6	11.3	8.4	12.5	2.2	2.2	
Chitau, Angola																		
Minimum		♀	187	87	36	45.6	36.6	9.7	18.0	23.3	4.7	17.1	10.7	7.3	11.1	1.5	1.5	
Chitau, Angola																		
<i>Otomys cuanensis</i>																		
Type A.M.N.H.	85841	♂	178	109	33	22	43.5	34.6	9.6	19.0	20.9	4.6	15.7	8.1	7.7	9.7	2.5	1.6
Chitau, Angola																		
A.M.N.H.	85836	♂	184	100	31 ¹	22	40.4	32.5	9.5	18.4	19.5	4.5	14.5	7.2	7.2	9.4	2.4	1.4
Chitau, Angola																		
A.M.N.H.	85829	♂	179	105	32	22	41.8	33.4	9.5	18.8	²	4.4	15.5	7.5	7.4	8.9	2.	1.7
Chitau, Angola																		
A.M.N.H.	86510						²	34.0	9.8	19.0	19.8	4.6	16.0	8.0	6.7	9.8	2.5	1.7
Chitau, Angola																		
A.M.N.H.	85087	♂	186	80	25 ³	20												
Cassonque, Angola																		
<i>Otomys irroratus maximus</i>																		
A.M.N.H.	87722	♂	200	113	33		43.9	36.4	11.0	19.5	22.4	4.5	16.1	7.7	8.2	10.5	2.7	1.3
Humpata, Angola																		
A.M.N.H.	87727	♂	199	120	35		44.7	37.5	10.9	20.5	23.0	4.4	16.4	8.7	8.0	11.1	2.6	1.7
Humpata, Angola																		
A.M.N.H.	87733	♂	209	119	34		44.7	36.8	10.4	20.4	22.9	4.3	16.4	8.2	8.0	10.9	2.6	1.6
Humpata, Angola																		
A.M.N.H.	87726	♀	196	102	33		43.1	35.6	10.4	19.5	21.7	4.4	16.3	8.9	7.6	11.0	2.6	1.8
Humpata, Angola																		
A.M.N.H.	87732	♀	190	101	33		41.5	34.5	10.0	17.9	21.1	4.5	15.6	7.7	7.8	10.2	2.6	1.6
Humpata, Angola																		

¹ Measurement doubtful. ² Injured. ³ S.u.

	Sex	Head and body	Tail	Hind foot	Skull Greatest length	Basilar length	Diastema	Length nasals	Zygomatic breadth	Temporal constriction	Mastoid breadth	Postorbital breadth (processes)	Height, basion toinion	Maxillary alveoli
<i>Cryptomys mechowii</i>														
Average 6	♂	243	28	44	57.3	49.7	19.9	23.3	43.7	11.1	28.4	18.2	16.7	10.2
Angola														
Maximum	♂	253	38	45	58.5	51.5	20.9	26.0	44.3	12.3	29.4	20.3	17.8	11.6
Minimum	♂	234	20	42	56.6	49.0	18.6	21.9	41.8	10.3	27.0	17.0	15.5	9.6
Average 6	♀	227	35	43	54.2	46.4	18.9	22.9	39.8	11.5	26.4	16.5	15.6	9.5
Angola														
Maximum	♀	234	46	44	55.1	47.2	19.7	25.0	41.9	12.2	27.0	17.4	16.2	10.5
Minimum	♀	218	31	42	52.8	45.6	18.1	21.3	38.0	10.8	25.0	15.9	14.9	8.7
Type Berlin Mus.	♂	270	30	40 ¹	55.4	47.1	17.5	22.8		11.5	26.9	17.4	16.9	10.9
Malange, Angola														
Maximum in Berlin Mus.					62.7	54.6	22.7	29.2	51.7	11.9	30.8	21.8	19.8	11.2
Concordia, Angola														
<i>"Cryptomys ansorgei"</i>														
Type B.M. 5.5.9.74	♂	260	24	40 ¹	57.8	48.8	21.4	23.4	43.4	11.3	27.5	20.4	18.2	9.9
Kukena R., Bihé, Angola														
<i>"Cryptomys blainei"</i>														
Type B.M. 20.4.27.1	♂			51	63.3	54.9	21.9		48.1		30.1		18.4	12.3
Chisongwe, Central Angola														
<i>Cryptomys bocagei</i>														
Average 10	♂	139.7	17.4	23	35.9	30.2	12.2	13.8	25.4	7.7	18.0	11.2	10.7	6.1
Chitau, Angola														
Maximum	♂	152	20	25	39.2	32.8	13.7	16.0	27.4	8.1	19.1	12.6	11.8	6.7
Minimum	♂	122	15	22	33.9	28.4	11.0	12.9	24.0	7.1	16.9	10.2	9.8	5.6
Average 5	♀	133	18	22.7	33.7	28.1	11.3	12.4	23.8	7.6	17.2	10.5	10.2	5.9
Chitau, Angola														
Maximum	♀	134	22	24	35.0	29.3	11.7	13.0	24.7	7.9	18.0	11.5	10.5	6.3
Minimum	♀	132	16	22	32.6	27.1	10.6	11.7	22.2	7.3	16.5	9.7	9.9	5.5
Type B.M. 97.8.6.22	♂	150	15	25	38.8	32.3	13.3	15.0	30.1	8.7	19.5	14.6	11.7	6.2
Hanba, ² Angola														

¹ S.u. ² Probably 13° S. 14°40' E.

	Sex	Head and body	Tail	Hind foot	Ear (from crown)	Skull Greatest length	Basilar length	Diastema	Length nasals	Zygomatic breadth	Temporal constriction	Mastoid breadth	Width nasals	Incisive foramina	Length bulba	Maxillary alveoli	Width palate inside M1-M4
<i>Lepus s. angolensis</i>																	
Average	♂ ♂	437	76.6	108.2	104	87.3	66.2	23.9	37.5	41.9	13.1	29.5	20.2	21.2	11.1	16.4	11.5
Angola																	
Maximum	♂	457	94	116	112	88.4	66.4	25.1	39.8	43.6	14.0	29.8	22.0	22.2	11.6	17.3	12.6
Minimum	♂	412	54	104	97	85.1	64.8	22.7	35.3	39.9	12.7	29.1	17.3	20.2	12.5	15.5	10.3
Average	♀	436	88	108	99	87.1	66.9	23.7	38.9	42.9	12.9	29.2	19.1	21.5	11.2	16.8	11.4
Angola																	
Maximum	♀	470	98	111	110	90.1	69.8	25.2	40.2	46.7	13.5	29.5	20.8	23.1	11.8	17.3	11.8
Minimum	♀	429	75	102	90	85.3	65.0	22.3	34.6	41	12.0	28.7	17.6	20.6	10.5	16.2	10.7
<i>Lepus c. salae</i>																	
A.M.N.H. 80829	♂	420	75	110 ¹	120 ¹	84.7	63.4	21.8	36.2	40.0		27.5	18.6	21.4	13.3	15.3	
Pico Azevedo, Angola						90.4	69.9	24.1	37.5	41.2		28.8	20.7	23.3	13.8	15.5	
A.M.N.H. 80830	♂																
Pico Azevedo, Angola																	
A.M.N.H. 80831	♂	425	55	105 ¹	125 ¹	84.7	64.9	23.4	35.3	39.2		28.3	19.3	22.3	14.1	15.6	
101 km. E. Mossamedes																	
A.M.N.H. 80832	♀	435	100 ²	107 ¹	125 ¹	³			34.7				17.6			14.3	
101 km. E. Mossamedes																	
C.M. 6841	?					84.1	64.4	22.5	36.2	39.1		28.4	17.6	21.5	14.0	14.6	
Mucungu, Angola																	

¹ Remeasured. ² Questionable. ³ Injured.

Sex	Head and body	Tail	Hind foot	Ear	Skull Greatest length	Basilar length	Palatal length	Length nasals	Zygomatic breadth	Interorbital breadth	Mastoid breadth	Breadth rostrum behind canine	Temporal constriction	Height basion toinion	Maxillary alveoli
<i>Genetta g. pulchra</i> A.M.N.H. 80740	♂	455	90	55	87.4	79.6	39.6	17.9	42.3	12.7	27.0	12.7	14.8	20.0	34.7
101 km. E. Mossamedes A.M.N.H. 80741	♂	535	465	55	95.9	87.2	43.4	20.6	47.7	14.4	30.3	14.0	15.2	23.1	37.2
Capelongo, Angola A.M.N.H. 80742	♂	480	485	56	1		42.0	20.5	44.0	14.2		13.3	14.9	21.8	36.2
Capelongo, Angola															
<i>Genetta angolensis</i> A.M.N.H. 80749	♂	465	430	47	89.4	81.9	39.5	16.9	43.3	12.6	27.2	14.4	13.4	20.8	33.4
Chissouque, Angola A.M.N.H. 80869	♂	478	400	54	92.4	83.5	41.0	19.8	44.3	13.5	27.8	13.7	15.4	22.3	35.3
Chitau, Angola A.M.N.H. 80746	♀	440	380	58	1										
Chitau, Angola A.M.N.H. 80748	♀	455	390	51	87.7	79.7	37.8	17.0	45.2	13.7	27.5	14.5	16.4	20.8	32.8
Chissouque, Angola															
<i>Galerella bocagei</i> A.M.N.H. 81484	♂	292	241	55	61.3	55.1	29.9	9.6	29.8	11.8	23.1	11.1	11.6	18.1	20.9
Chitau, Angola A.M.N.H. 81490	♂	307	265	56	62.2	56.1	29.7	9.9	30.7	11.1	23.5	10.7	11.2	18.1	20.8
Chitau, Angola A.M.N.H. 81485	♂	276	222	50	60.0	53.4	27.5	9.0	30.3	11.1	22.0	11.2	12.9	16.8	19.9
Chitau, Angola A.M.N.H. 81489	♀	270	226	51	58.2	52.3	28.0	Fused	27.9	10.5	21.0	9.7	9.9	15.9	20.0
Type B.M. 5.5.9.13 Caconda, Angola	♀	265	235	25	1		29.3		27.2	10.4		10.6	11.9		20.5
<i>Galerella cauxi kaokoensis</i> A.M.N.H. 87692	♂	307	267	67	61.5	55.9	31.3	13.1	32.4	12.7	24.1	12.0	12.5	18.1	21.2
Mulondo, Angola <i>Atlar paludinosus</i> ² Eyambo, Angola	♀	570	380	106 s.u.	113	107 ³	61 ⁴		62	21	40		15		

¹ Skull broken. ² Measurements from Monard, 1915. ³ Basal length. ⁴ Palatal length.

	Sex	Head and body	Tail	Hind foot	Ear	Skull Greatest length	Basilar length	Palatal length	Length nasals	Zygomatic breadth	Interorbital breadth	Mastoid breadth	Breadth rostrum behind canine	Temporal constriction	Height, basion toinion	Maxillary alveoli
<i>Ichneumia albicauda loudce</i> Type B.M. 4.4.9.37	♀	620	506	135		1		60.5	25.4	52.3	22.9		22.9	24.5		40.6
Pungo Andongo, Angola																
<i>Paracynictis edouisi</i> A.M.N.H. 87690	♂	427	295	108		80.7	73.3	42.0	16.9 ³	41.2	17.5	30.7	16.0	18.0	21.3	29.0
Humpata, Angola																
A.M.N.H. 87691	♀	399	301	102		78.5	70.9	40.7	16.6 ³	40.6	15.4	28.8	14.3	18.8	21.5	29.4
Humpata, Angola																
A.M.N.H. 88130	♂	426	283	105		81.7	73.9	43.1	16.0 ³	44.4	17.1	31.1	16.5	16.8	21.9	31.3
Chitau, Angola																
Type B.M. 97.1.4.6						81.6	74.2	43.1	15.9 ³	42.6	17.3	30.0	15.9	16.8	20.3	30.2
Matabeleland, S. Rhodesia																
<i>Cynictis p. cinderella</i> ⁴ Mus. Chaux-de-Fonds 1267	♂					65		30 ²		37	14.5	26		16		
Mupanda, Angola																
Mus. Chaux-de-Fonds 1314	♂					63		30 ²		37	14	25.5		13		
Mupanda, Angola																
Mus. Chaux-de-Fonds 1315	♂					63		30 ²		37	14	27		15.5		
Mupanda, Angola																
Type B.M. 25.12.4.40 ⁵	♂	325	233	67		64				36		28				
Ondongwa, Ovamboland, S. W. Africa																
<i>Mungos m. grisonax</i> A.M.N.H. 86492	♂	300	220	66		64.9	59.4	33.1	11.6	33.0	11.7	26.1	12.7	15.3	19.4	22.9
20 km. E. Dando, Angola																
C.M. 7002	♀	395	225	66		72.0	67.6	37.4	15.2	37.2	13.3	28.7	14.4	15.1	24.9	23.8
Gauca R., E. of Dando																
C.M. 7006	♀					71.2	66.1	37.8	15.2	39.6	15.2	28.8	14.6	13.7	19.7	24.1
Gauca, Angola																
C.M. 7005	♀					74.8	69.4	39.7	15.0	39.2	14.2	30.0	15.0	14.2	20.9	25.3
Gauca, Angola																
Type B.M. 25.12.4.44	♂					74.0	66.3	37.0 ²		40.4	14.5	28.4	14.9	14.7	19.7	24.8
Ekandua, S. W. Africa																
<i>Mungos ansorgei</i> B.M. 10.4.8.7	♀	320	212	66.5	24	63.2	57.0	31.0 ²		33.0	13.0	26.3	12.3	11.4	17.3	20.7
Dala Tando, Angola																

¹ Skull broken. ² Palatal length. ³ Near mid-line. ⁴ Measurements from Monard, 1935, p. 222. ⁵ Measurements from Thomas, 1927, p. 375.

	Sex	Head and body	Tail	Hind foot	Ear	Skull Greatest length	Basilar length	Palatilar length	Length nasals	Zygomatic breadth	Interorbital breadth	Mastoid breadth	Breadth rostrum behind canine	Temporal constriction	Height, basion toinion	Maxillary alveoli	Length
<i>Helogale p. brunetta</i>																	
	♂	219	149	46		50.2	44.7	23.7	8.3	27.2	9.6	21.9	10.2	10.3	15.1	17.0	12.5
A.M.N.H. 81486 Chitau, Angola																	
	♂	240	150	48		51.1	46.3	23.6	10.7	29.4	10.6	22.6	10.3	9.8	15.0	16.8	12.0
A.M.N.H. 86494 Chitau, Angola																	
	old																
	♂	239	174	51		51.2	46.6	24.6	7.7	29.8	10.6	22.1	10.3	8.7	14.5	17.3	12.0
A.M.N.H. 87694 Mulando, Angola																	
	♂	229	152	49		50.1	44.9	23.2	Fused	29.8	11.1	23.3	10.7	8.9	15.8	16.5	11.5
A.M.N.H. 87696 Mulando, Angola																	
	♀	222	152	46		50.5	45.0	23.6	8.5	29.7	10.7	23.0	10.5	9.5	16.0	16.4	12.2
A.M.N.H. 81487 Chitau, Angola																	
	♀	229	165	48		48.9	44.0	22.7	Fused	27.1	10.9	22.1	10.4	9.6	13.8	16.1	11.6
A.M.N.H. 87695 Mulando, Angola																	
	♂	235	190	48.5		50.5	46.2	23.2		31.0	10.8	23.8	11.2	9.4	14.6	17.2	13.6
Type B.M. 25.12.4.38 Cunene Falls, S. W. Africa																	
<i>Proteles c. harrisoni</i>																	
					134	127		65.5	38.2	77.3	27.0	51.0	36.2	31.6	32.5	40.4	
A.M.N.H. 88383 Angola																	
<i>Crocuta crocuta</i>																	
	?					1		122.3	46.1	173.0	59.2		63.4	51.1		101.3	
A.M.N.H. 80621 Chitau, Angola																	
<i>Felis leo bleyenberghi</i>																	
	♂	1995	940			340	282	146.8	84.0	215	68.7	131.4	97.9	60.4		108.0	
A.M.N.H. 80609 Capelongo, Angola																	
	♂					332		141.5	78.0	238	74.1	132.0	99.2	70.3		103.0	
Type Congo Mus. 1220 Katanga, Belgian Congo																	
						362	299	158	94.1	252	79.1	143.5	106.3	67.9	100.2	117.9	
Berlin Mus. Loanda, Angola																	
						366	300	160	88.7	231	73.5	139.3	102.9	72.0	97.0	127.5	
Berlin Mus. 30 km. W. Cassinga, Angola																	

i Skull broken.

	Sex	Head and body	Tail	Hind foot	Ear	Skull Greatest length	Basilar length	Palatal length	Length nasals	Zygomatic breadth	Interorbital breadth	Mastoid breadth	Breadth behind canine	Temporal constriction	Height, base toinion	Maxillary alveoli
<i>Felis p. shortridgei</i> A.M.N.H. 80610 Chitau, Angola	Old					1		Circ. 95.0	52.3	148.3	38.7		61.0	37.4		72.4
Berlin Mus. 41784 Concordia, Angola	?					202	167	84.1	43.9	127.6	33.9	79.8	50.0	38.6	56.7	64.7
<i>Felis s. lönnbergi</i> A.M.N.H. 88382 Quissongo, Angola	?					112.6	102.7	44.0	28.6	81.3	23.0	49.3	30.9	31.1	33.8	36.8
B.M. 8.9.15.1 Angola	?					1		45.5	29.8	88.0	25.6	52.6	35.0	30.4		39.0
<i>Acinonyx j. jubatus</i> A.M.N.H. 80620 Chitau, Angola	?					1		Circ. 155	73.9	45.4	137.4	41.8	57.5	58.4		61.1
<i>Lutra maculicollis</i> ² Cubango R., Angola	750 430					110 96	100 ³ 88 ³	45 ⁴ 42 ⁴		61 52		53 50		14 15		
<i>Aonyx capensis</i> Leiden Mus. spec. d. Mossamedes, Angola						130	115.5	59.4		90.6	27.4	89.6	32.5	26.4	47.1	39.7
Type, <i>A. c. angolae</i> B.M. 98.3.201 Caporolo R., Angola	♀					138.8	124.0	62.0	25.6	91.1	27.1	92.2	32.3	25.7	48.1	41.9
<i>Mellivora capensis verna</i> ² Cuvelai R., Angola	♂					140	132 ³	62 ⁴		84		63		35		
Cubango, Angola	♀							55 ⁴		74				36		

¹ Skull broken. ² Measurements from Monard, 1935. ³ Basal length. ⁴ Palatal length.

	Sex	Head and body	Tail	Hind foot	Ear	Skull Greatest length	Basilar length	Palatilar length	Length nasals	Zygomatic breadth	Interorbital breadth	Maxilloid breadth	Breadth behind canine	Temporal constriction	Height, basion toinion	Maxillary alveoli
<i>Ictonyx s. shortridgei</i>																
A.M.N.H. 80664	♂	390	310	75	32	74.0	64.4	31.9		49.0	20.6	41.1	17.8	1	24.3	22.1
Chinango, Angola																
A.M.N.H. 80666	♂	363	260	69	31	69.6	61.8	31.5		45.0	18.2	36.9	16.0	18.2	21.6	20.5
Chitau, Angola																
<i>Poecilogale albinucha</i>																
A.M.N.H. 86491	♂	302	1	39	17	50.4	45.5	21.2		27.3	12.5	23.5	11.8	10.8	14.8	13.7
Chitau, Angola																
A.M.N.H. 86490	♀	265	165	34	18	45.4	42.4	20.2		25.1	10.5	21.5	10.5	1	13.5	13.1
Capelongo, Angola																
C.M. 6966	?	315	185	40	19	55.3	50.8	24.0		1	13.1	27.8	13.1	9.3	16.8	15.4
30 km. E. Dando, Angola																
<i>Lycan pictus</i> ²																
Angola						212	186 ³	100 ⁴		130		73		41		82
<i>Canis mesomelas arenarum</i>																
A.M.N.H. 80652	♂	690	310	159	110	160.7	145.6	78.7	56.8	86.4	29.5	52.8	26.4 ⁵	35.1	37.4	71.0
Pico Azevedo, Angola																
A.M.N.H. 80653	?					158	142.1	75.0	58.1	83.2	29.1	51.3	26.1 ⁵	33.1	36.0	70.3
Capelongo, Angola																
<i>Canis a. adustus</i>																
A.M.N.H. 80661	?					173.5	154.5	83.1	70.0	80.6	28.3	53.5	26.4 ⁵	29.7	37.0	72.3
Chitau, Angola																
A.M.N.H. 80662	?	1175	395	175	90											
Namba, Angola																
A.M.N.H. 80924	?					170	154.3	83.2	63.1	85.6	30.1	57.0	25.8 ⁵	33.5	40.4	73.6
No data, Angola																

¹ Injured. ² Measurements from Monard, 1935. ³ Basal length. ⁴ Palatal length. ⁵ Behind P¹.

	Sex	Head and body	Hind foot	Ear	Skull Greatest length	Basilar length	Diastema	Length nasals	Zygomatic breadth	Interorbital breadth	Mastoid breadth	Height, basion toinion	Width between squamosals	Maxillary alveoli	Breadth M ¹	Width palate, M ¹ -M ¹
<i>Proavia c. welwitschii</i>																
A.M.N.H. 80604 ¹	?	380	62	24	77.6	64.3	8.7	18.7	41.1		32.7		11.1		6.6	11.4
Pico Azevedo, Angola																
A.M.N.H. 80606 ¹	♂	410	63	24			6.2	17.0	39.7						5.7	11.7
101 km. E. Mossamedes																
A.M.N.H. 80600 ²	♀				75.9	65.0	10.3	19.0	42.7	18.0	29.8	27.1	9.3		6.2	10.9
Hanha, Angola																
A.M.N.H. 80605 ³	♂	460	63	25	76.7	66.7	8.2	18.4	45.1	17.3	28.6	27.3	7.3		6.3	11.0
101 km. E. Mossamedes																
Leiden Mus. ³	♂				76.4	65.5	8.7	16.9	45.0	18.2	31.8	27.7	11.4	32±	6.5	12.7
Angola																
B.M. 88.12.6.2 ³	♀				76.5		8.2	16.1	45.0	17.4	30.9		8.3	32.5±	6.5	12.3
Capangombe, Angola																
<i>Heterohyrax syriacus bocagei</i>																
A.M.N.H. 88025 ⁴	♂	245	40		54.3	43.7		9.8	28.7	11.3	23.9	19.6	13.4			
Humpata, Angola																
A.M.N.H. 88026 ⁵	♂	242	40		52.2	43.7		9.2	30.1	11.4	25.7	20.0	12.7			
Humpata, Angola																
A.M.N.H. 85066 ⁵	♀	290	50	25				13.4	31.5	12.4	26.3		13.9		5.1	8.6
Lumbale, Angola																
B.M. 4.4.9.144 ⁵	♀				72.4	64.1	10.2	14.4	40.2	15.2	29.1	22.8	14.2		5.8	12.8
Pungo Andongo, Angola																
B.M. 88.12.6.1 ⁵	♂						10.0	15.3	42.7	18.8	31.8				6.0	13.0
Huila, Angola																
Type B.M. 1515a ⁶	♂				78.3	68.5	12.2		45±	17.2	32.6			30±	5.4	13.4
Angola																
A.M.N.H. 88027 ⁶	♂				89.7	76.5	14.5	27.1	50.5	22.7	33.7	28.5	12.3		6.2	13.5
Humpata, Angola																
A.M.N.H. 88028 ⁷	?				86.5	74.4	12.3	21.5	45.7		33.5	25.5	10.5		6.2	13.8
Humpata, Angola																
A.M.N.H. 80601 ⁸	♀	485	64	32	85.6	75.7	11.8	23.2	49.8	20.3	34.6	24.3	12.7	31.5	5.9	13.5
Lubango, Angola																

¹ Stage IV, Thomas, 1892, Proc. Zool. Soc. London, p. 53. ² Stage V. ³ Stage VI. ⁴ Stage I. ⁵ Stage III. ⁶ Stage VI. ⁷ Stage VII. ⁸ Stage VIII, early.

	Sex	Head and body	Tail	Hind foot	Ear	Skull Greatest length	Basal length	Palatal length	Length nasals	Zygomatic breadth	Temporal constriction	Mastoid breadth	Height, basion to lamdoidal suture	Length bulba	Maxillary alveoli	Breadth M1	Width palate inside M2-M3
<i>Gorgon taurinus</i>																	
A.M.N.H. 80490	♂					459	419	242	192	169	137	163	118	40	108.4	15.6	55.5
Capelongo, Angola																	
A.M.N.H. 80491	♂					483	430	250	220	180	143	168	114	36	119.4	17.5	60.0
Capelongo, Angola																	
A.M.N.H. 80492	♂					466	420	244	214	170	131	169	110	43	106.5	14.5	55.5
Capelongo, Angola																	
A.M.N.H. 80493	♂	2058	417	485	220												
Capelongo, Angola																	

	Sex	Head and body	Tail	Hind foot	Ear	Skull Greatest length	Basal length	Palatal length	Greatest length nasals	Zygomatic breadth	Interorbital breadth	Mastoid breadth	Breadth rostrum (premaxillary)	Height, basal suture to bregma	Maxillary alveoli	Width palate inside M1-M2
<i>Sylvicapra g. splendidula</i>																
A.M.N.H. 80561	♂	897	115		120	180	157	92.3	66.5	74.3	42.8	54.1	23.1	49.5	54.9	28.3
Chitau, Angola																
A.M.N.H. 80564	♂		152		113	182	159	90.0	65.4	77.7	48.0	57.7	23.1	49.0	51.7	28.7
Chitau, Angola																
A.M.N.H. 80584	♂	912	148	303	116	183	158	90.8	70.0		44.3	57.0	27.9	49.0	56.1	
Chipopia, Angola																
A.M.N.H. 80559	♀					191	165.5	94	71.6	75.6	40.5	53.7	24.0	48.0	54.4	29.2
Chitau, Angola																
A.M.N.H. 80565	♀	930	137	302	109	193	167	95.2		77.2	42.3	60.4	25.3	47.0	49.3	29.3
Chitau, Angola																
A.M.N.H. 80578	♀	985	135	280		188	166	94.3	69.9	79.5	42.3	59.5	23.6	50.0	51.2	28.4
Chipopia, Angola																
A.M.N.H. 80582	♀	1054	120	295	129	192.5	166.5	96.0	70.9	79.6	43.8	62.0	25.0	49.5	54.5	29.8
Chipopia, Angola																

	Sex	Head and body	Tail	Hind foot	Ear	Skull Greatest length	Basal length	Palatal length	Greatest length nasals	Zygomatic breadth	Temporal constriction	Maxilloid breadth	Breadth rostrum (premaxillary)	Height, basion to lamibdoidal suture	Maxillary alveoli	Width palate inside M1-M1
<i>Oreotragus o. taylori</i> A.M.N.H. 80553	♂		90	220	87	140.3	119.2	68.0	38.4	79.0	88.9	48.2	20.4	39.4	47.5	27.0
101 km. E. Mossamedes A.M.N.H. 80550	♂	779	76	225	95	136.4	116.4	67.1	36.4	77.0	81.7	47.8	17.9	39.6	50.0	23.7
Hanha, Angola A.M.N.H. 80551	♀	835	85	240	92	151.1	134.1	77.7	33.0	77.4	79.9	50.0	19.9	39.4	51.2	27.2
Hanha, Angola <i>Ourebia o. rutila</i> A.M.N.H. 80545	♂	1075	105	320	122											
Huambo, Angola A.M.N.H. 90163	♂					168.5	148.3	91.5	71.2	75.4	43.3	44.9	21.0	42.0	51.2	25.1
Angola <i>Raphicerus campestris kelleni</i> A.M.N.H. 80540	♂	745	55	255	115	152.0	119.6	65.6	40.8	64.3	43.3	44.8	17.3	36.1	42.7	20.3
101 km. E. Mossamedes A.M.N.H. 80543	♂					136.4	120.3	68.1	45.0	66.3	47.3	44.2	18.5	37.4	46.0	22.4
40 km. S. Capelongo A.M.N.H. 80539	♀	750	50	260	115	147.3	132.1	76.6	50.4	65.1	44.0	43.6	16.1	36.1	52.0	22.2
101 km. E. Mossamedes <i>Rhynchotragus damarensis</i> A.M.N.H. 80587	♀	594	46	207	81	115.9	100.6	55.7	19.6	57.2	43.2	36.6	11.3 ¹	34.4	38.3	18.5
101 km. E. Mossamedes																

¹ In front of premolars.

	Sex	Head and body	Tail	Hind foot	Ear	Skull Greatest length	Basal length	Palatal length	Length nasals	Zygomatic breadth	Temporal constriction	Maxilloid breadth	Breadth rostrum (premaxillary)	Height, basion to lamibdoideal suture	Maxillary alveoli	Breadth M ¹	Width palate, inside M ¹ -M ¹
<i>Redunca arundinum</i>																	
A.M.N.H. 80499	♂					288	262	164	97.8	115.6	66.6	99.1	36.0 ¹	64.4	68.1		39.1
Chitau, Angola																	
A.M.N.H. 80505	♂	1204	179	421		292	271	170	94.5	113.5	67.9	95.0	33.0 ¹	67.7	72.0		37.0
Chitau, Angola																	
A.M.N.H. 80507	♂					287	262	160	97.7	114.2	68.6	94.2	33.8 ¹	65.4	66.0		34.0
Chitau, Angola																	
A.M.N.H. 80506	♀	1231	260	433		263	232	150	89.1	102.0	60.6	75.2	28.1 ¹	57.0	65.5		33.2
Chitau, Angola																	
A.M.N.H. 80509	?	1090	230	447	182	282	250	160	105.6	108.5	59.0	82.5	30.5 ¹	62.5	69.5		37.3
Namba, Angola																	
<i>Kobus d. penricei</i>																	
A.M.N.H. 80487	♂	2005	420	520	230	395	366	218	155	162	98.0	139	64.1	100.6	100.5	17.9	55.3
40 km. S. Capelongo																	
<i>Aepyceros m. petersi</i>																	
A.M.N.H. 80498	♂	1200	270			270	251	143	85	111.9	72.7	90.6	43.4	67.0	82.3	12.0	36.0
65 km. S. W. Capelongo																	
A.M.N.H. 80496	♀	1120	270			261	234	135	85	96.5	66.0	75.7	41.8	61.0	78.5	11.4	37.6
65 km. S. W. Capelongo																	

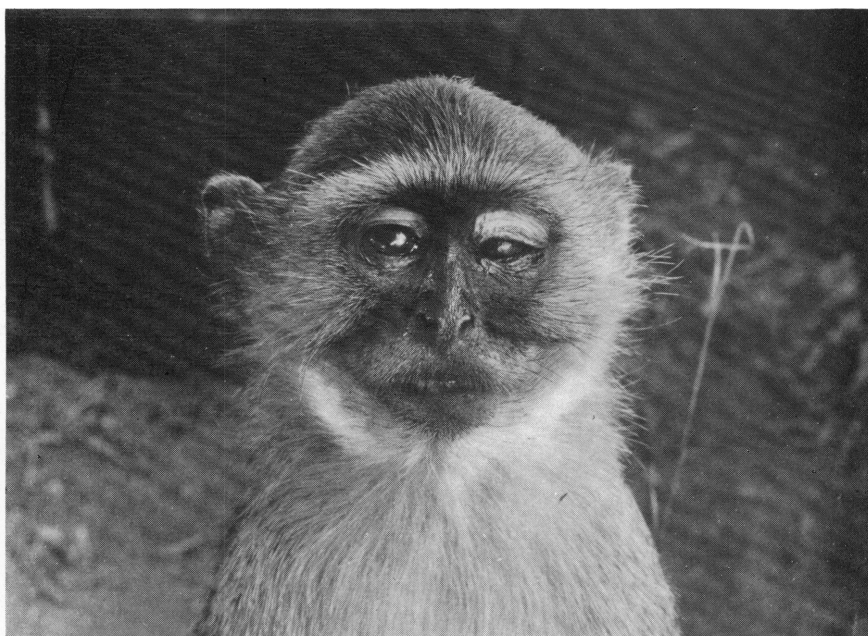
¹ At anterior end.

	Sex	Head and body	Tail	Hind foot	Ear	Skull Greatest length	Basal length	Palatal length	Zygomatic length	Temporal constriction	Maxilloid breadth	Breadth rostrum (premaxillary)	Height, basion to lamdoidal suture	Maxillary alveoli	Breadth M ¹	Width palate inside M ¹ -M ¹	
<i>Hippotragus e. coltoni</i>																	
A.M.N.H. 80468	♂	2080	600	525	365	466	422	266	184	194	106	115	70.4	106.0	124.7	23.2	65.7
Quipungo, Angola																	
A.M.N.H. 80470	♂	2190 ¹	600 ¹	547 ¹	352 ¹	463	430	266	186	184	101	137	73.3	102.1	119.2	21.9	62.4
Luvando, Angola																	
A.M.N.H. 80466	♀					441	397	257	183	183.5	96.0	128	67	92.5	117.3	20.7	64.8
Chipopia, Angola																	
A.M.N.H. 80469	♀	2000	750	520	380	445	410	257	170	169.5	80.5	128.5	65	99.8	132.3	22.9	64.0
Luvando, Angola																	
<i>Hippotragus n. variiani</i>																	
A.M.N.H. 80460	♂	1867	443	540	266												
Chissonque, Angola																	
A.M.N.H. 80461	♂	1936	534	534	248	449	401	253	173	159.5	95.0	129.5	70.6	104.3	111.6	22.4	57.1
Chissonque, Angola																	
A.M.N.H. 80454	♂					468		254	186	120.5	90.5	71.0			117.3	20.2	62.3
Angola																	
A.M.N.H. 80458	♀	1914	494	506	280	437		253	163	134.0	88.5	118.5	79.2		125.4	21.1	54.4
Chissonque, Angola																	
A.M.N.H. 80459	♀	1850	481	519	280	433.5	390	254	169	154.0	86.0	117.3	59.0		115.4	19.4	58.2
Chissonque, Angola																	
<i>Strepsiceros s. zambesienis</i>																	
A.M.N.H. 80482	♂					432	395	215		179	114	163.5	77	118.0	121.7	19.6	65.5
Hanha, Angola																	
A.M.N.H. 80484	♂	1938	900		260	417	387	204		164	113	162	65	101.0	119.4	19.2	62.0
101 km. E. Mossamedes																	
<i>Taurotragus o. livingstoni</i>																	
A.M.N.H. 80481	♂					497	455	229	192	207	129	219	88.8	115.8	149.6	22.3	88.7
5 km. S. W. Capelongo, Angola																	

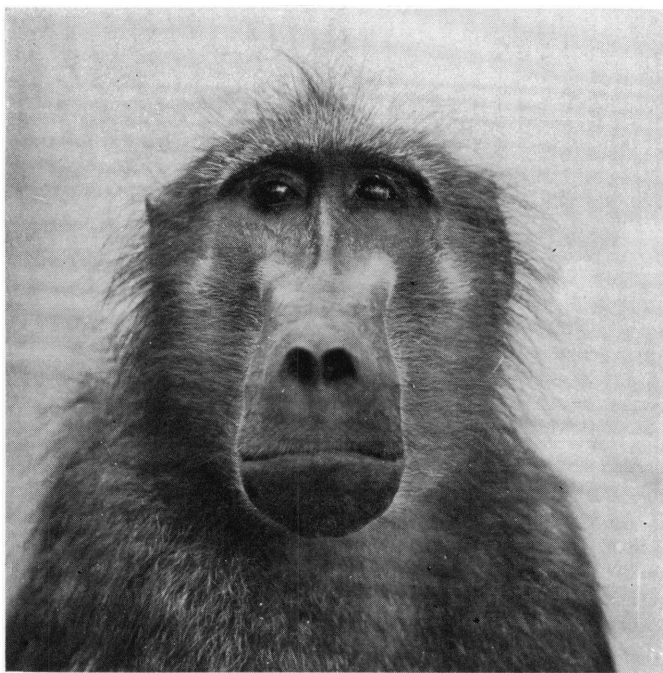
¹ These measurements are questionable of this specimen.



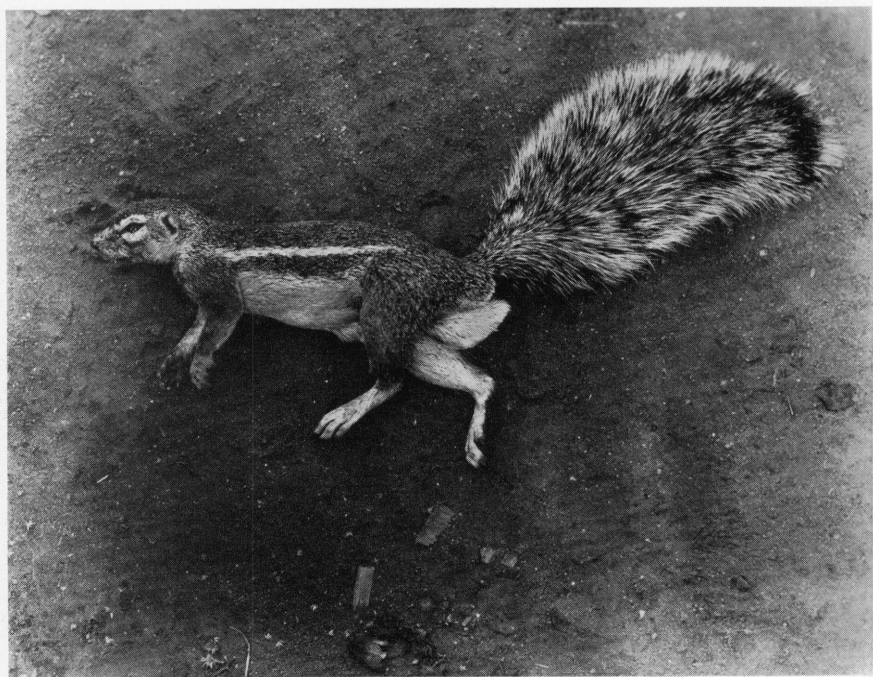
Galago senegalensis moholi, living, Chitau, Angola.
Photograph by H. Lang.



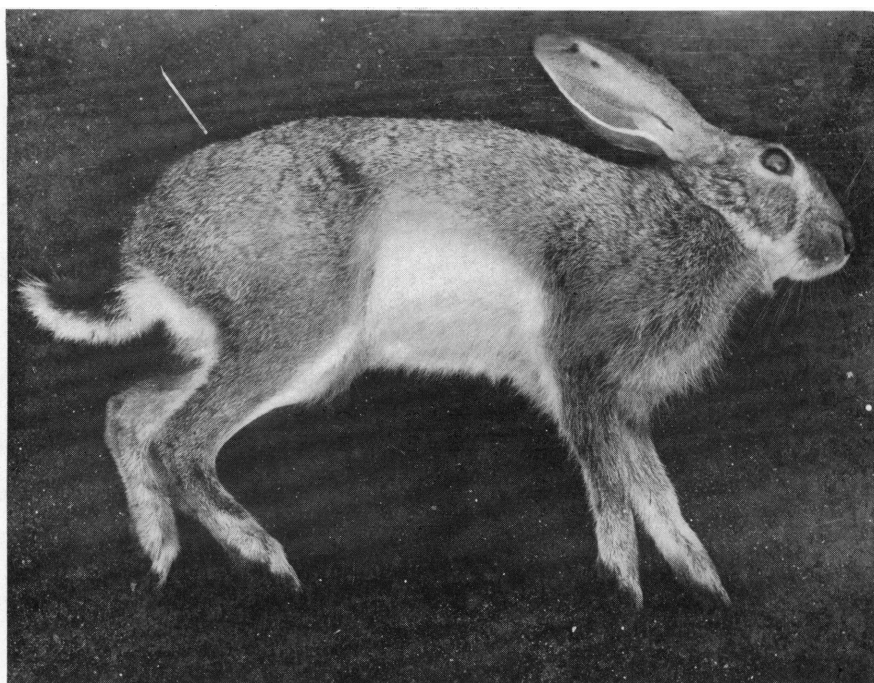
Two views of *Cercopithecus aethiops cynosuroides*, Chipopia, Angola.
Photographs by R. Boulton.



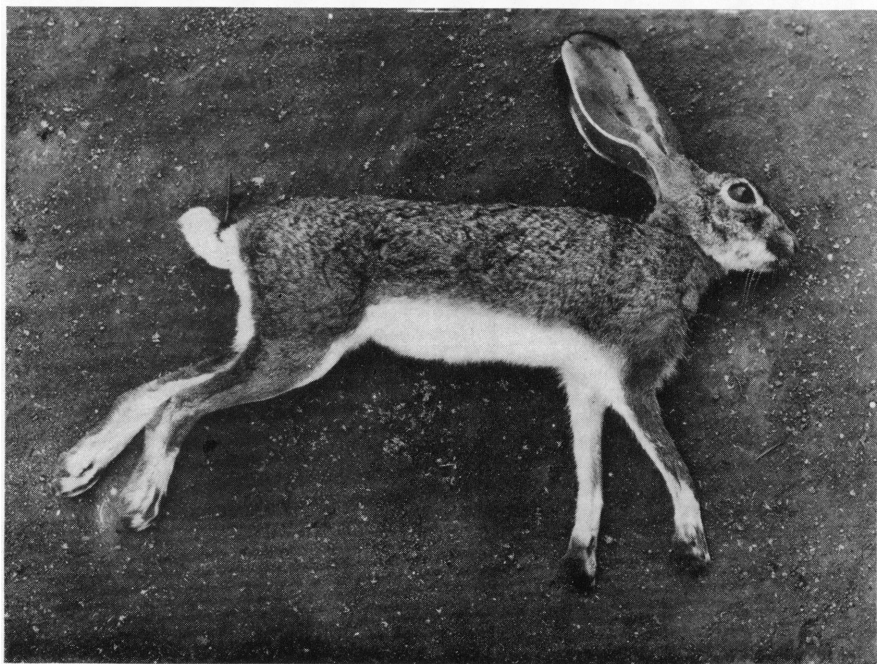
Two views of *Papio comatus*, Hanha, Angola.
Photographs by H. Lang.



Two views of *Geosciurus princeps*, 101 km. east of Mossamedes, Angola.
Photographs by H. Lang.



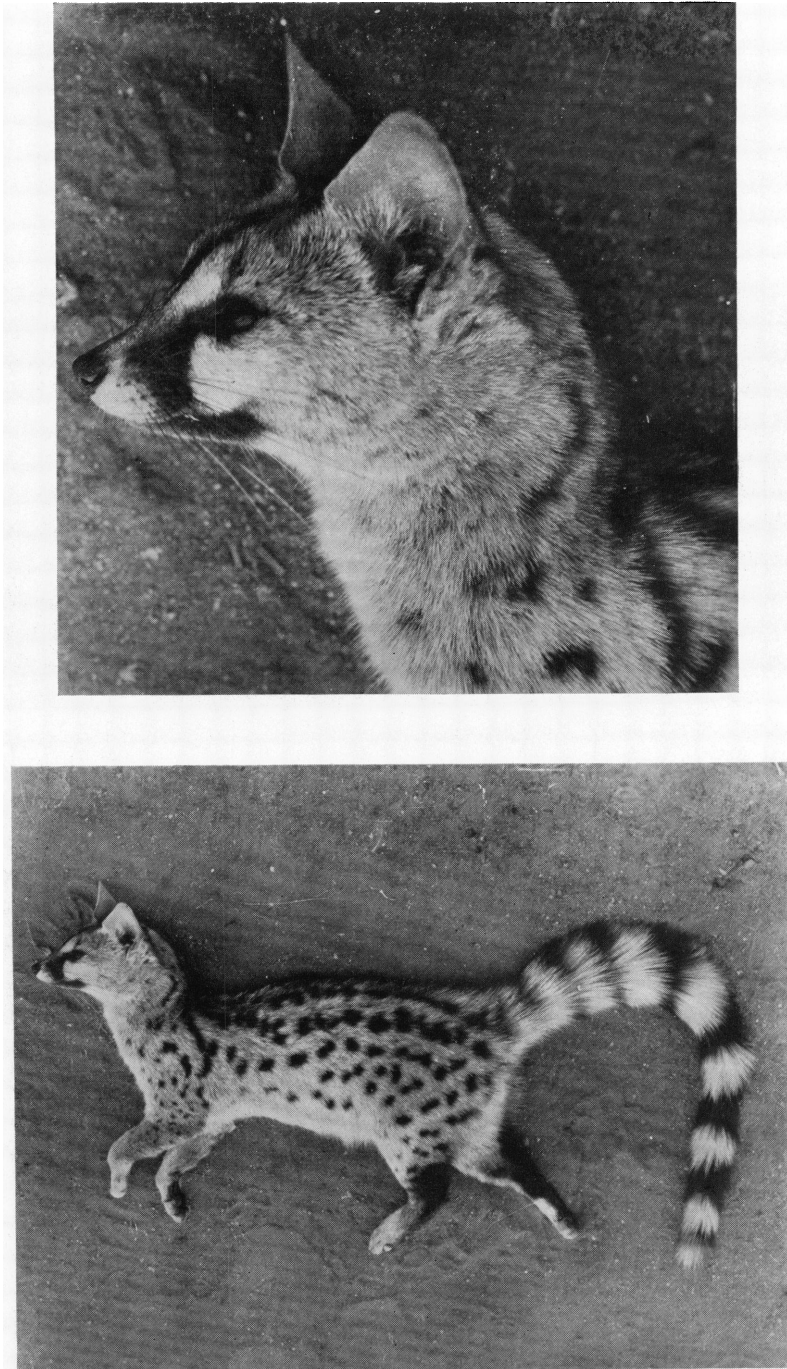
a



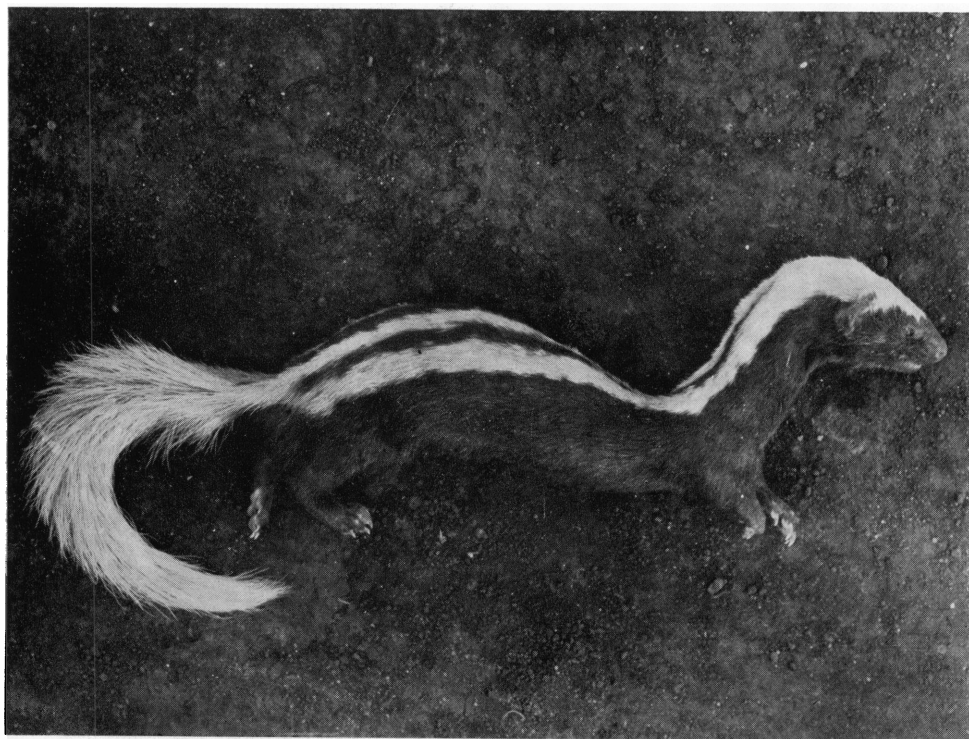
b

- a. *Lepus saxatilis angolensis*, Capelongo, Angola.
b. *Lepus capensis salae*, 101 km. east of Mossamedes, Angola.

Photographs by H. Lang.



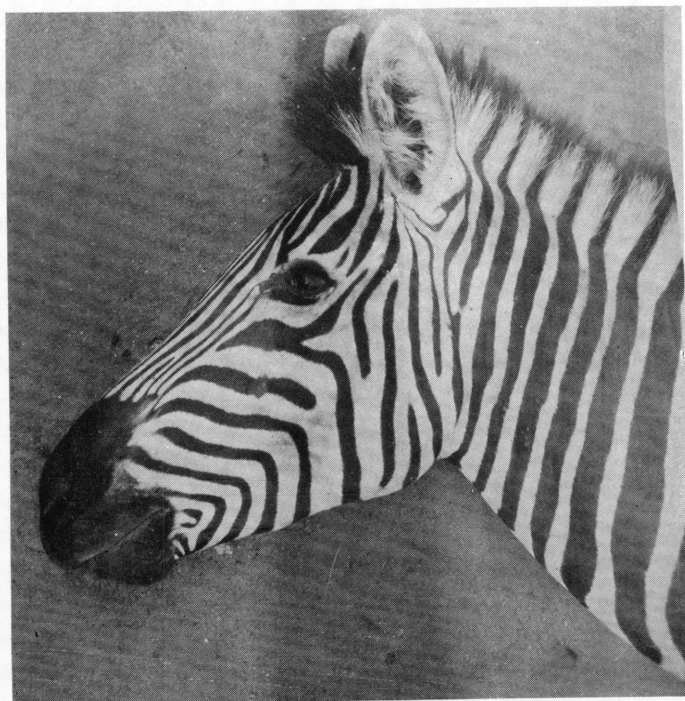
Two views of *Genetta genetta pulchra*, 101 km. east of Mossamedes, Angola.
Photographs by H. Lang.



Poecilogale albinucha, Capelongo, Angola.
Photograph by H. Lang.

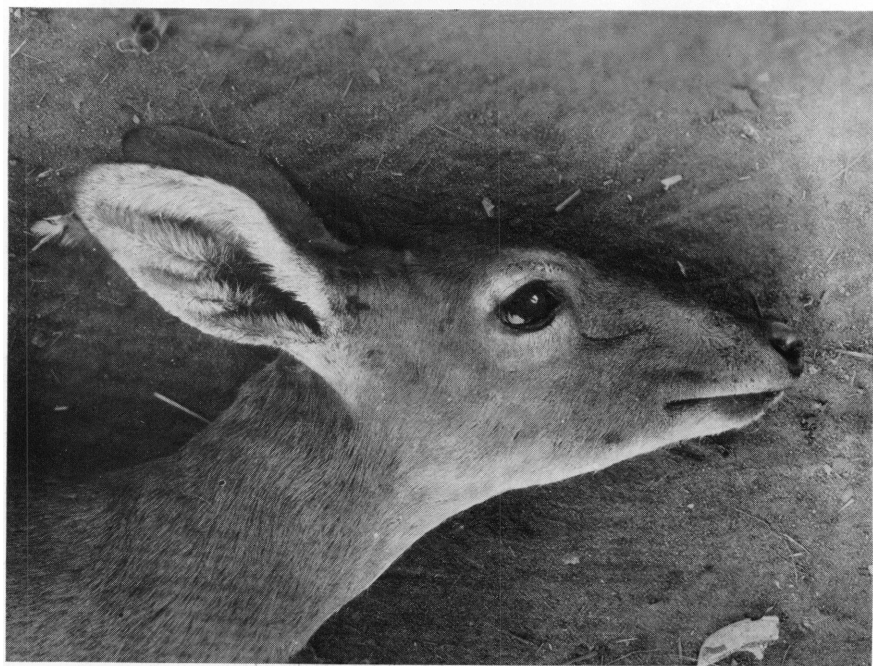


a

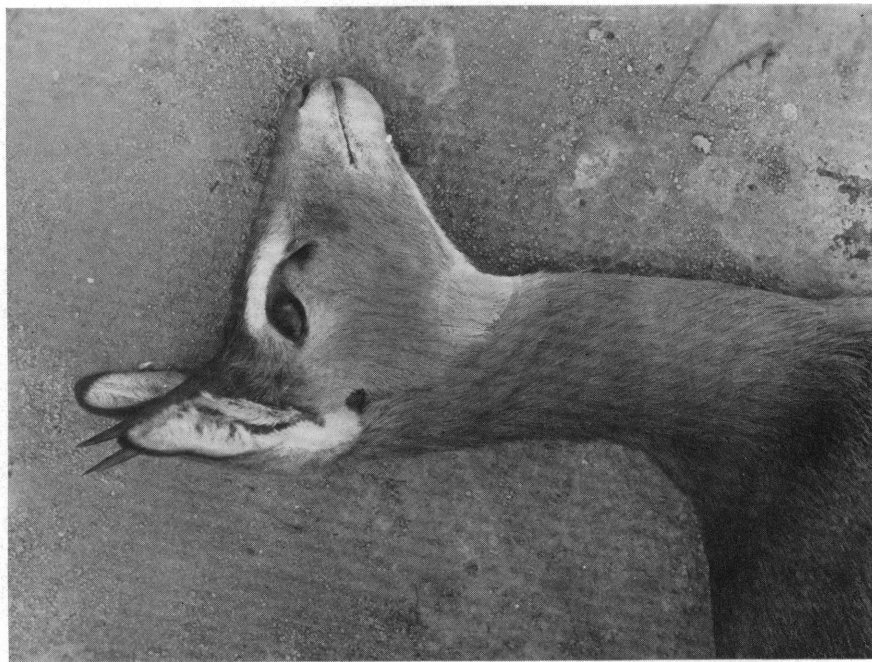


b

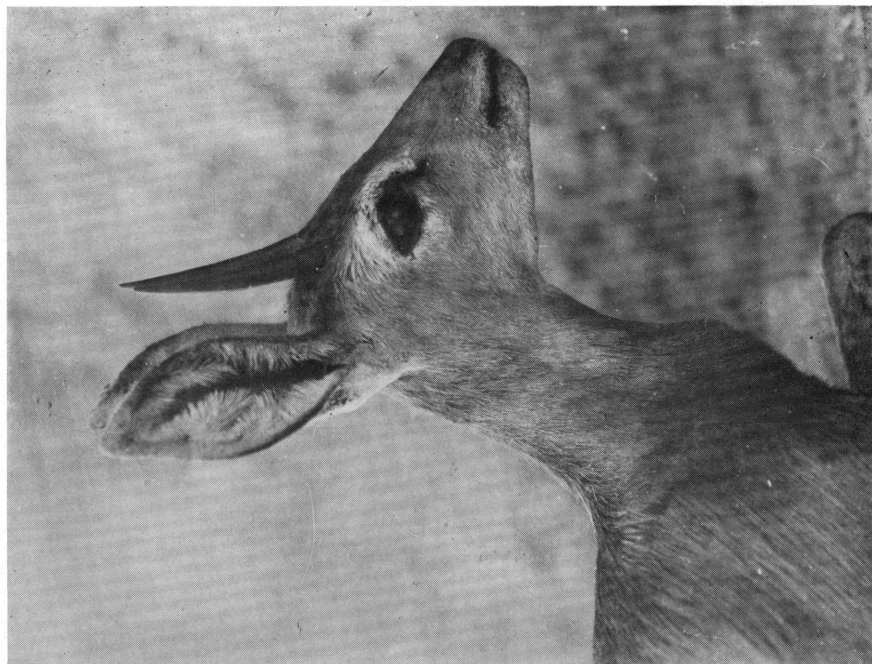
- a. *Equus hartmannae*, Pico Azevedo, Angola.
 - b. *Equus burchelli antiquorum*, Luvando, Angola.
- Photographs by H. Lang.



Sylvicapra grimmia splendicula, male (above) and female, Chipopia, Angola.
Photographs by R. Boulton.



a

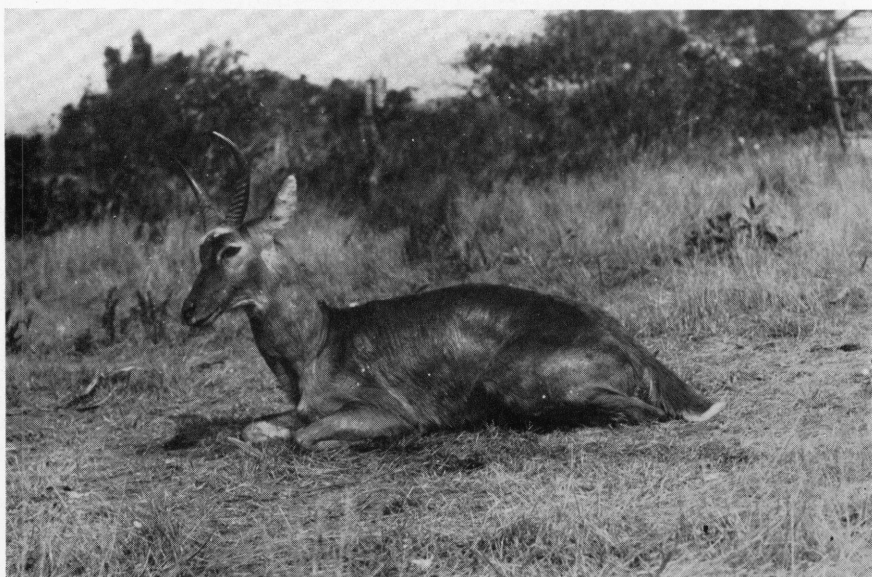


b

a. *Ourebia ourebia rutila*, male, Huambo, Angola.
b. *Raphicerus campestris kelleni*, male, 101 km. east of Mossamedes, Angola.
Photographs by H. Lang.

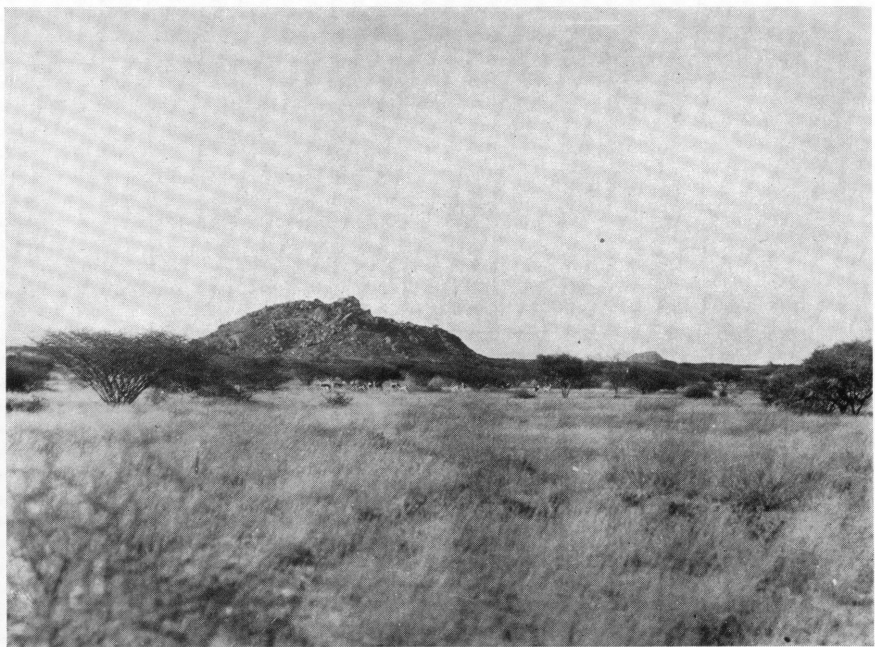


a



b

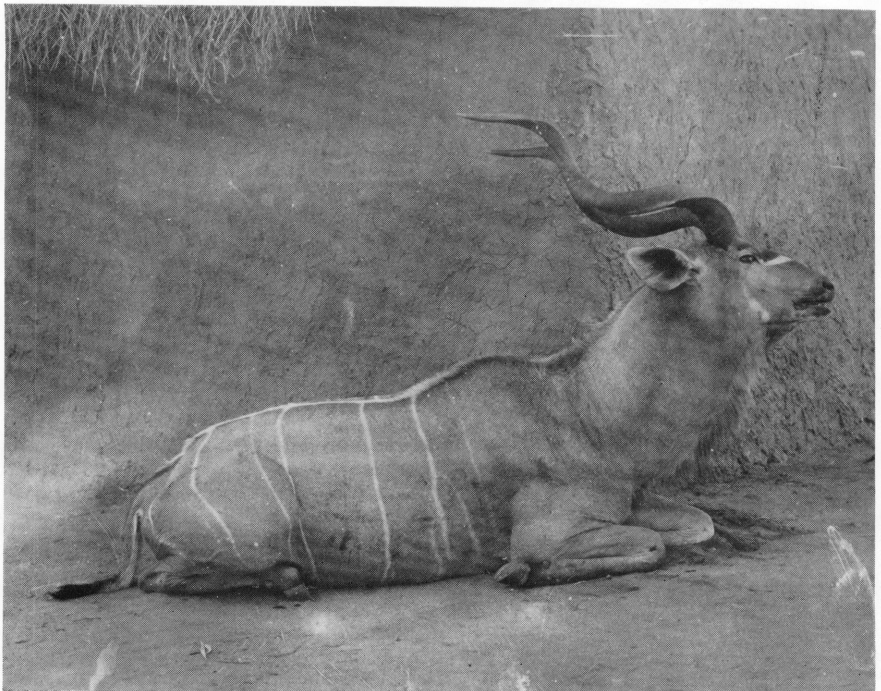
- a. *Rhynchotragus damarensis*, female, 101 km. east of Mossamedes, Angola.
Photograph by H. Lang.
- b. *Redunca arundinum*, male, Namba, Angola.
Photograph by R. Boulton.



- a. *Antidorcas marsupialis angolensis*, Pico Azevedo, Angola.
b. Herd of *Antidorcas marsupialis angolensis*, 101 km. east of Mossamedes, Angola.
Photographs by H. Lang.



a



b

- a. *Hippotragus niger varians*, male, with ticks on withers, Chissonque, Angola.
Photograph by A. Vernay.
- b. *Strepsiceros strepsiceros zambesiensis*, 101 km. east of Mossamedes, Angola.
Photograph by H. Lang.



a



b

a. Oil palm trees and rocky bluff at Hanha, Angola, habitat of *Funisciurus congicus flavinus* and *Papio comatus*.

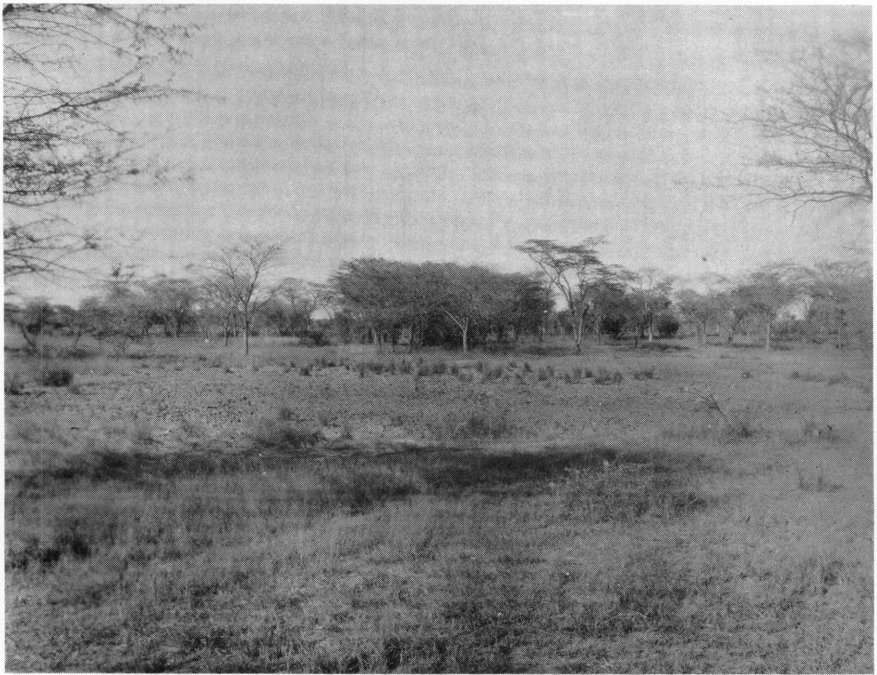
Photograph by H. Lang.

b. Wet forest (West African) at Namba.

Photograph by R. Boulton.



a



b

- a. Dry, open forest near Chipopia, non-deciduous.
- b. Deciduous dry forest near Chipopia.

Photographs by R. Boulton.



a



b

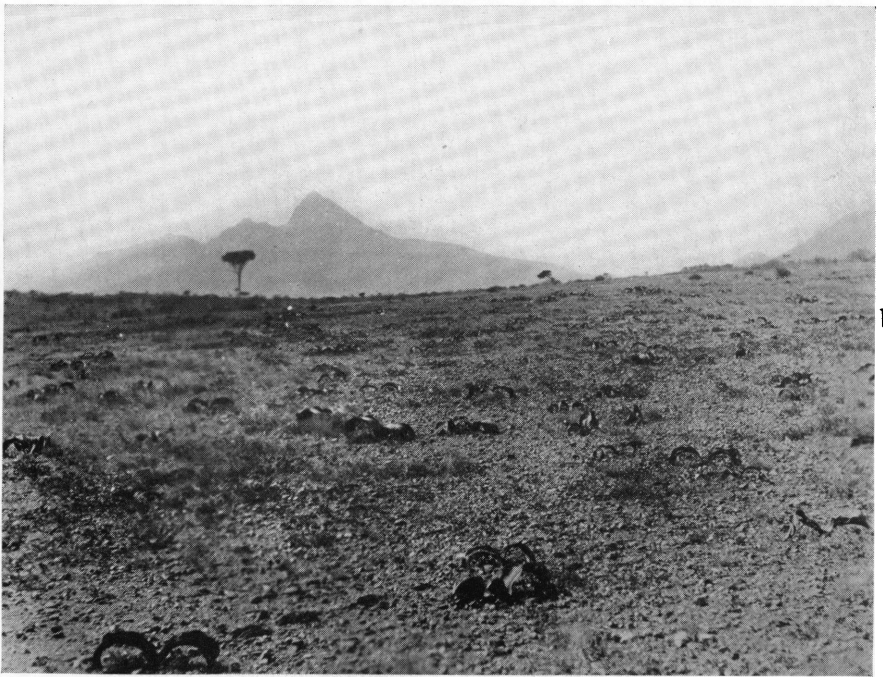
a. Cunene River at Capelongo.

b. Escarpment near Lubango.

Photographs by H. Lang.



a



b

a. *Welwitschia mirabilis*, Pico Azevedo, Angola.
b. *Welwitschia* desert, Pico Azevedo.
Photographs by H. Lang.

