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Article I.—THE MAMMALS OF ANGOLA, AFRICA

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PLATES I TO XVII; TEXT FIGURES 1 TO 36

CONTENTS

	PAGE
INTRODUCTION.....	3
GAZETTEER OF LOCALITIES.....	5
FAUNAL CONSIDERATIONS.....	11
KEY TO ORDERS OF ANGOLAN MAMMALS.....	15
ORDER INSECTIVORA: KEY TO FAMILIES.....	16
Potomogalidae.....	16
Chrysochloridae.....	16
Erinaceidae.....	17
Soricidae.....	17
Macroscelididae.....	23
Bibliography for Insectivora.....	26
ORDER CHIROPTERA: KEY TO FAMILIES.....	27
Pteropidae.....	28
Emballonuridae.....	35
Nycteridae.....	36
Rhinolophidae.....	38
Rhinolophinae.....	38
Hipposiderinae.....	40
Vespertilionidae.....	42
Vespertilioninae.....	42
Miniopterinae.....	52
Kerivoulinae.....	53
Molossidae.....	53
Bibliography for Chiroptera.....	60
ORDER PRIMATES:.....	61
Lorisidae.....	62
Cercopithecidae.....	63
Bibliography for Primates.....	67
ORDER RODENTIA: KEY TO FAMILIES.....	68
Sciuridae.....	69
Xerinae.....	70
Funambulinae.....	70
Anomaluridae.....	77
Pedetidae.....	77
Muscardinidae.....	78
Muridae.....	81
Murinae.....	81

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. Rudyerd Boulton of the Field Museum of Natural History, for assistance in identifying Angolan localities and photographs; Dr. A. Avinoff, Director, and Mr. J. Kenneth Douth 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 Rudyerd 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.

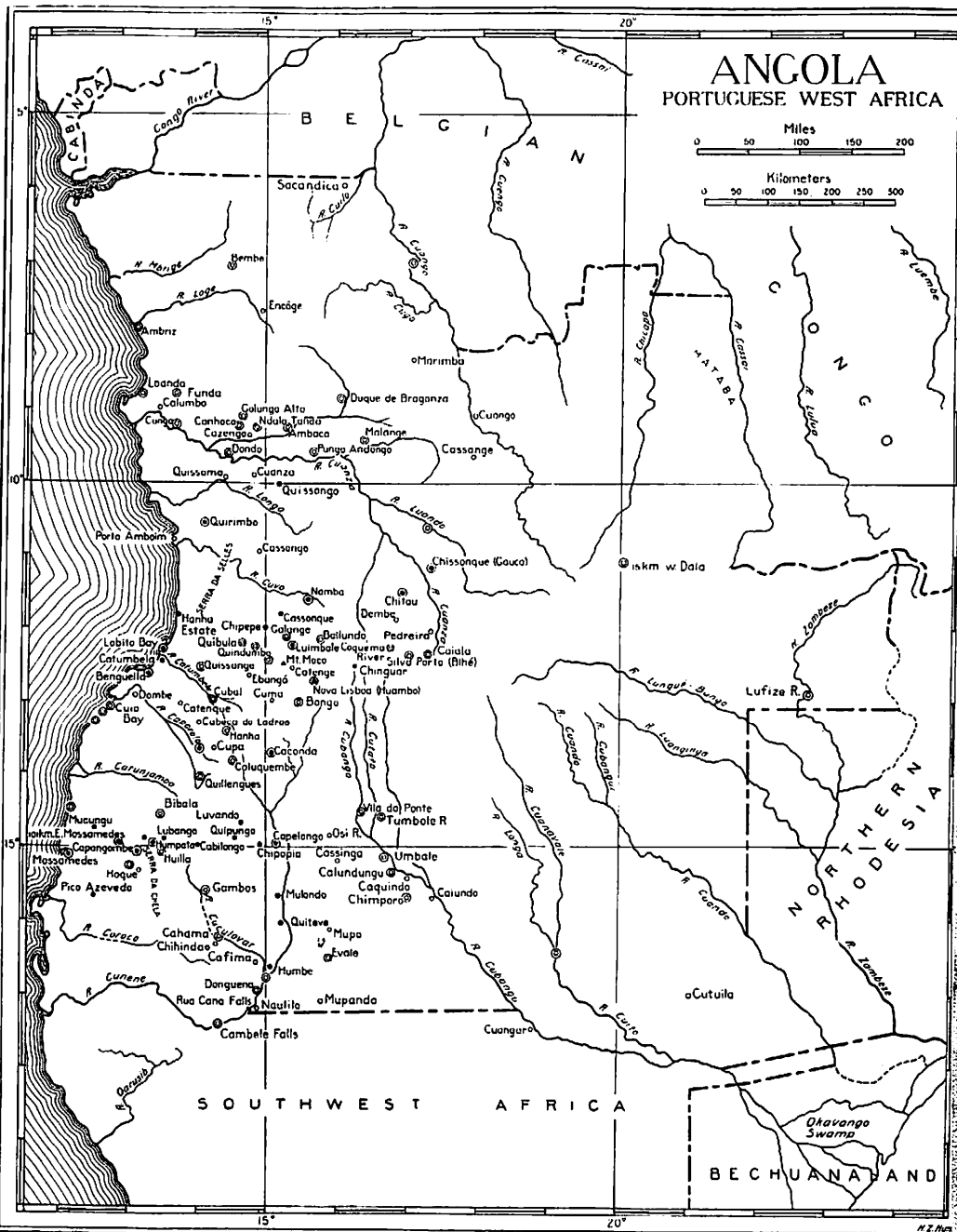


Fig. 1. Map of Angola, showing chief mammalian collecting stations. Double circles indicate type localities. Solid circles refer to American Museum and Carnegie Museum collections.

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 gem-bok 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 Chi-pepe, 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 (Ladroses)	13°20' S., 14°15' E.
Cabanga (Kawanga, Kuvanga)	16°50' S., 18°15' E.

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. Basisoccipito-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 Bocage (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: Hôanib and Uniab Rivers, the Kaokoveld, 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. xxxii. Type locality: Angola.

Equus burchelii. 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.

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