

**Article VII.—NOTES ON THE SYNONYMY AND NOMENCLATURE OF THE SMALLER SPOTTED CATS OF TROPICAL AMERICA**

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## INTRODUCTION

In the preparation of the preceding paper on Severtzow's Classification of the Felidæ it was necessary to examine all of the available material representing the smaller cats of Tropical America. Unfortunately they are still scantily represented in museums, although the number of specimens has somewhat increased in recent years, notably in some of the museums of this country. The present notes are based on a reëxamination of the specimens in The American Museum of Natural History and on those in the United States National Museum at Washington, which, through the kindness of Mr. Gerritt S. Miller, Curator of Mammals, have been kindly loaned to me for study. I am also indebted to Dr. Witmer Stone, of The Academy of Natural Sciences of Philadelphia, for the loan of the type specimen of *Felis braccata* Cope. Eight specimens have been received for examination from the Carnegie Museum of Pittsburgh, through Mr. W. E. Clyde Todd, from important localities not otherwise represented. The number of specimens, about 150, has been too small, however, for more than a tentative reconnaissance.

Pocock's 'The Classification of Existing Felidæ,' published in 'The Annals and Magazine of Natural History' in November 1917 (ser. 8, XX, pp. 329-350), was the chief incentive to the present investigation, since his classification of the South American species did not coincide with my impressions of their relationships based on previous study, particularly with regard to his genus *Herpailurus* (*loc. cit.*, p. 346), which covers a number of widely diverse groups. As Severtzow's paper on the Felidæ, published in 1858, is so fundamentally associated with the nomenclature of this family it seemed desirable as a first step to present a collation of the names employed by these two authors, resulting in the article presented above (pp. 335-340). The purpose of the present paper is to give a list of the currently recognized forms (species and subspecies) of the smaller cats of Tropical America (therefore excluding the pumas and jaguars), arranged in groups according to their obvious alliances. These groups are given, tentatively and for convenience, the nomenclatural rank of genera. Their evaluation by future investigators will be subject to personal equation, from the viewpoint of whether all cats should be placed in *Felis*, because they are neither bears nor wolves, or that a few leading types may be segregated, to show that the domestic pussy is neither a lion, nor quite a leopard, nor a lynx, or whether it is better to indicate that even among the smaller cats there is some diver-

sity of structure and relationship. To illustrate, the latest faunal list of North American Felidæ includes 41 forms, of which 16 are placed in the genus *Lynx* and 25 in the genus *Felis*. Of course the merest tyro in natural history will see at a glance that a part are lynxes and the rest are "cats," but only a specialist in cat nomenclature will be able to recognize which are big cats (as pumas and jaguars) or small cats, or which are plain-colored and which are elaborately patterned with spots and bands, or what are their natural relationships, except in the case of subspecies where the trinomial is the key. A further use of generic divisions would not obscure the fact that they are all cats but would indicate that at least all cats are not alike, and perhaps inspire an interest as to how they differ.

As there is at present a dearth of good illustrations, conveniently accessible, of the cranial characters of the smaller American cats, it has seemed desirable to place before the student comparative figures of the skulls of each of the groups here given generic rank, regardless of the taxonomic value the future may assign to them.

As the result of recent explorations in Central and South America by The American Museum of Natural History it is possible to add to the previous knowledge of a hitherto little-known species (*Felis guigna* Molina), long since recorded from Chili, and of others more recently recorded from Argentina and southern Brazil. Photography has been utilized to indicate, in a few instances, variations in color pattern.

Special attention has been given to questions of nomenclature, which in certain cases have been presented with considerable detail, on account of their general bearing and peculiar interest. The cranial illustrations are from pen-drawings by Mrs. Ziska. The preparation of photographic illustrations was made under the supervision of Mr. Lang, Assistant Curator of Mammals.

The number of forms recognized in the present paper is 37, of which 7 are rated as species and 26 as subspecies, referred to 7 superspecific groups. The one hundred or more specimens examined include the types or practically topotypic specimens of about two-thirds of these thirty-seven forms. Doubtless many regional forms are as yet unrecorded, since vast regions of South America are practically unknown as regards their Felidæ, and will so remain until systematic exploration, with special reference to securing these elusive beasts has brought together a hundred-fold more specimens than are now available for their intensive study.



**LEOPARDUS**

*Leopardus* GRAY, Ann. Mag. Nat. Hist., (1) X, p. 260, Dec. 1842. Not *Leopardus* GRAY, 1867. Type, by subsequent designation (Pocock, 1906), *Felis pardalis* Linné.

*Oncoides* SEVERTZOW, Rev. et Mag. de Zool., (2) X, pp. 386, 390, Sept. 1858. Type, by subsequent designation (Allen, 1905; Pocock, 1917), *Felis pardalis* Linné.

*Pardalis* GRAY, Proc. Zool. Soc. London, 1867, p. 270. Type, by tautonymy, *Felis pardalis* Linné.

As noted in the preceding paper, it may be questioned whether *Pardalis* Gray should not have been given preference over *Leopardus* Gray for the larger ocelots. Although the latter has twenty-five years priority of publication, its type was not fixed and the status of the genus was not determined till seventy-five years later. In the meantime *Pardalis* was established (in 1867), the type being automatically (by tautonymy) the species designated in 1906 as type of *Leopardus*. In view of the fact that such ruling would result in the seeming absurdity of rendering *Leopardus* a synonym of a much later established genus, *Leopardus* is here given preference.

**1. *Leopardus pardalis pardalis* (Linné)**

*Felis pardalis* LINNÉ, Syst. Nat., ed. 10, I, 1758, p. 42. Type locality, "Mexico," here more definitely assigned as State of Vera Cruz. Originally based on the *Catopardus Mexicanus* of Hernandez.

The large, strongly colored ocelot of southeastern Mexico.

**2. *Leopardus pardalis griffithii* (J. B. Fischer)**

*Felis griffithii* J. B. FISCHER, Synop. Mamm. Addend., Emend. et Index, 1830 p. 369, (= 569) = *Felis ocelot* GRIFFITH, Anim. Kingd., V, 1827, p. 433, No. 17 = Ocelot No. 3, Ham. Smith (ined.), idem, II, p. 476, and Pl. (animal) facing p. 169. "A young female of this is now in Mr. Bullock's Mexican collection. It came from Mexico." Ham. Smith, idem, II, p. 477.

*Felis canescens* SWAINSON, Anim. in Menageries, 1838, p. 120, fig. 17. Based on "Ocelot No. 3" of Ham. Smith. Hence, = *Felis griffithii* Fischer.

*Felis albescens* PUCHERAN, in Geoffroy, Voy. de la Venus, Zool., 1855, p. 149. Based on a specimen from Arkansas.

*Felis pardalis albescens* ALLEN, Bull. Amer. Mus. Nat. Hist., XXII, pp. 219-221, July 19, 1906. Escuinapa, Sinaloa. Individual variation and measurements, based on a series of 24 specimens.

*Felis limitis* MEARNS, Proc. Biolog. Soc. Washington, XIV, p. 145, Aug. 9, 1901; Proc. U. S. Nat. Mus., XXV, 1902, pp. 237, 241-244. Type locality, Brownsville, Texas. To replace *albescens* Pucheran, considered by Mearns to be untenable.

*Felis pardalis limitis* BAILEY, N. Amer. Fauna, No. 25, p. 66, Oct. 24, 1905. Texas.

In 1902 the late Dr. Mearns, in his paper on the ocelots,<sup>1</sup> wrongly considered *Felis albescens* Pucheran as a synonym of *Felis brasiliensis* F. Cuvier, although Pucheran, in referring the Arkansas specimen provisionally to *Felis brasiliensis*, had such grave doubts of its proper reference to the Brazilian animal that he decided to substitute for it the name *Felis albescens*, which he said would serve to recall its light or whitish coloration, he thus giving validity to the name *albescens*. Mearns proposed the name *limitis* to replace *albescens*, designating Brownsville, Texas, as the type locality of *limitis*. In 1906 I adopted *albescens* for the subspecific designation of the pale form of northwestern Mexico, on the basis of a large series from Escuinapa, Sinaloa, finding that "specimens from Brownsville, Texas, . . . Arizona and Chihuahua" did not differ "essentially from the Escuinapa series."

The correct name for the pale form of northern Mexico appears to be *griffithii* of J. B. Fischer, given in 1830 to Hamilton Smith's "Ocelot No. 3," based on a pale specimen in "Bullock's Mexican collection . . . from Mexico," on which Swainson's name *canescens* was based in 1838. In case the Rio Grande form should prove separable the proper name for it is *albescens*, while *griffithii* would apply to the form of northern Mexico.

### 3. *Leopardus pardalis mearnsi* (Allen)

Figures 1 to 3, 12a.

*Felis costaricensis* MEARNS, Proc. U. S. Nat. Mus., XXV, p. 245, Sept. 17, 1902. Type locality, Talamanca, Costa Rica. Not *Felis bangsi costaricensis* Merriam, 1901.

*Felis mearnsi* ALLEN, Bull. Amer. Mus. Nat. Hist., XX, p. 71, Feb. 29, 1904. Substitute name for *costaricensis* Mearns, preoccupied.

*Felis pardalis mearnsi* ALLEN, Bull. Amer. Mus. Nat. Hist., XXVIII, p. 108, April 30, 1910. Rio Coco and Pena Blanca, Nicaragua (eastern slope of the highlands).

A large dark form, based on a series of seven specimens. Darker and larger than *L. pardalis pardalis*. Basilar length of three male skulls, 134, 128, 127 mm.; of two female skulls, 117, 112 mm. (Mearns, *loc. cit.*, p. 249), as against 103–118 for ten adult male and 96–102 for three adult female skulls from Escuinapa; zygomatic breadth, same specimens, 108, 99, 96 (males), 92, 92 (females), as against 81–94 (males) and 82–85 (females) from Escuinapa.

Two names had been given to ocelots of the *pardalis* group from Central America previous to Mearns's description of his *Felis costaricensis*, but they prove very difficult to identify and have thus far been held in abeyance. They are *Leopardus griseus* and *L. pictus* of Gray, de-

<sup>1</sup>The Ocelot Cats. By Edgar A. Mearns, Major and Surgeon, U. S. A., Proc. U. S. Nat. Mus., XXV, pp. 237–249, Sept. 17, 1902.

scribed in 1842 (Ann. Mag. Nat. Hist., X, p. 260). The first is said to have come from Guatemala, the other from Central America. They seem quite different from Mearns's species from Talamanca, Costa Rica, being differently colored and also much smaller. They were currently treated as synonyms of *Felis pardalis* before the group was divided into species.

4. ***Leopardus pardalis sanctæmartæ*** (Allen)

*Felis sanctæmartæ* ALLEN, Bull. Amer. Mus. Nat. Hist., XX, p. 332, Oct. 8, 1904. Type locality, Bonda, Santa Marta, Colombia.

Coast region of northern Colombia (Santa Marta) and northern Venezuela (Pueblo Nuevo, Bolivar Railway).

5. ***Leopardus pardalis maripensis*** (Allen)

*Felis maripensis* ALLEN, Bull. Amer. Mus. Nat. Hist., XX, p. 331, Oct. 8, 1904. Type locality, Maripa, Caura district, Venezuela.

A large dark form known only from the type. Basilar length of the skull, 121 mm.; zygomatic breadth, 90 mm.

6. ***Leopardus pardalis tumatumari*** (Allen)

Figure 19

*Oncoides pardalis tumatumari* ALLEN, Bull. Amer. Mus. Nat. Hist., XXXIV, p. 632, Dec. 30, 1915. Type locality, Tumatumari, British Guiana.

*Felis chibigouazou* MEARNS (not Griffith), Proc. U. S. Nat. Mus., XXV, pp. 246, 249, Sept. 17, 1902. Part; only the redescription based on a specimen from Surinam (not on a specimen from Chapada, Brazil, as stated on p. 239, *loc. cit.*); not the citations.

*Felis pardalis ocelot* OSGOOD, Field Museum Nat. Hist., Zool. Ser., X, p. 212 Oct. 31, 1916. Santarem, Brazil.

A dark large form, the dark markings intense black and sharply defined, and the ground color tawny. Basilar length of the type skull (male), 139 mm.; zygomatic breadth, 97.5. Next in size to the Costa Rican *L. p. mearnsi*. The Guianas and northeastern Brazil. The specimen here figured (Fig. 19) is the one recorded by Osgood (*loc. cit.*) as *Felis pardalis ocelot*.

7. ***Leopardus pardalis æquatorialis*** (Mearns)

*Felis æquatorialis* MEARNS, Proc. U. S. Nat. Mus., XXV, p. 246, 1902. Type locality, Paramba, northwestern Ecuador.

*Oncoides pardalis æquatorialis* ALLEN, Bull. Amer. Mus. Nat. Hist., XXXV, p. 222, May 31, 1916. Rio Cauca and Caquetá districts of Colombia.

Similar in size and general coloration to *L. p. mearnsi* of Costa Rica.

8. *Leopardus pardalis pusæa* (Thomas)

*Felis pardalis pusæa* THOMAS, Ann. Mag. Nat. Hist., (8) XIII, p. 347, March 1914. Chongon, coast region of Ecuador, 15 miles west of Guayaquil.

A small pale form of the southern coast region of Ecuador. Condylbasal length of skull, ♂ 121, ♀ 119; zygomatic breadth, 81, 80.

9. *Leopardus pardalis chibigouazou* (Griffith)

Figures 14 to 18

*F[elis] chibigouazou* GRIFFITH, Anim. Kingd., V. 1827, p. 167; II, fig. of animal, Pl. facing p. 475 (ex Hamilton Smith MSS.). Cites "Ocelot No. 1, Hamilton Smith, MSS.," and "Chibigouazou, d'Azara Quad. du Paraguay, II, 152."

*Felis chibiguazu* J. B. FISCHER, Synop. Mamm., Addend., 1830, p. 368 (= 568). Entirely from Griffith, including citation of Azara.

*Felis chibigouazou* MEARNS, Proc. U. S. Nat. Mus., XXV, 1902, pp. 237, 239, 246, 249. Part; not the redescription from a Surinam specimen (No. 13005, ♂, U. S. Nat. Mus.; cf. last column but one of table of measurements, *loc. cit.*, p. 249).<sup>1</sup> Range given (p. 237) as, "Inhabits Brazil and the northeastern part of South America."

*Oncoides pardalis chibigouazou* ALLEN, Bull. Amer. Mus. Nat. Hist., XXXV, p. 580, Aug. 9, 1916. Curumbá, Matto Grosso, Brazil.

*Felis hamiltonii* J. B. FISCHER, Synop. Mamm., Addend., 1830, p. 368 (= 568) = *Felis ocelot* ♂, or No. 2, Hamilton Smith MSS. "South America."

*Felis maracaya* WAGNER, Schreber's Säuget., Suppl., II, 1841, p. 492. Ostensibly a new name for "*Felis pardalis* Pr. Neuw. Beiträg., II, p. 361." Cites in addition, Chibigouazou, Azara, Essai, I, p. 152, and Rengger's Paraguay, p. 191, from whom the measurements are taken and most of the description; gives the "Heimath" as Northern Patagonia, through Paraguay and Brazil.

A light colored form (ground color usually light buff to pale ochraceous) of Paraguay and Matto Grosso. Its primary basis is the Chibigouazou of Azara, as implied by its specific name and as shown by the primary references of Griffith and subsequent authors to Azara. Hamilton Smith, in his inedited notes in Griffith's 'Animal Kingdom' (II, p. 476) states that of his four Ocelots, "Both No. 1 and No. 2 are from South America." He adds: "I am inclined to think one (or both) of these (if varieties) must be the Chibigouazou of Azara." There is no extant type and no more definite type locality than "South America."

<sup>1</sup>There is an unfortunate misstatement in Mearns's paper in regard to the locality of the specimen from which he took his redescription of Griffith's *Felis chibigouazou*. On page 239 he says it was "from Chapada, Brazil, with which Smith's plate figure and description closely agree." On page 237, in his "key to the American Ocelots," he gives the range of *F. chibigouazou* Griffith as "Brazil and the northeastern portion of South America." In his description of the species on page 246 he makes no reference to the specimen (or specimens) he used further than (under "skull and teeth") a cross-reference to his table of cranial measurements, which is on page 249. In this table (column two from the right) the only specimen under *Felis chibigouazou* is "No. 15005, Surinam, South America." It was on the basis of his statement on page 239 that I said in 1916 (Bull. Amer. Mus. Nat. Hist., XXXV, p. 580): "His [Mearns's] description is based on a specimen from Chapada, Matto Grosso, not far from where the present series [referring to those then in hand] was collected, and near the region (Paraguay) of Azara's Chibigouazou." As, however, the Surinam specimen is the only one explicitly mentioned as representing this species it must be inferred that the reference to "Chapada, Brazil" on page 239 is a lapsus and one easily misleading to the reader.

The *Felis* Ocelot of Smith and Griffith

Hamilton Smith, in his inedited notes and drawings in Griffith's Animal Kingdom, Volume IV, 1827, pp. 475-480, with facing but un-numbered plates, was the first author to bring confusion into the history of the American Ocelots, of which he figured five, only one of which (*Felis catenata*) he formally named, designating the others numerically as Ocelots Nos. 1-4, and the drawings relating to them in a corresponding manner. Previously the group had been known collectively as *Felis pardalis* Linné. Smith, in the opening paragraph of his notes (which are distinguished by enclosure in marks of quotation), says: "My present view of the Ocelots is that they form a subordinate group in the great family of the Felinæ. . . . They belong all to the New World, but there are two or three species of the Old that approach them in several particulars, and therefore might make the next group. I shall refer in the following descriptions to my drawings numerically. My appropriation of their types to species hitherto described, must, in our present state of knowledge, be conditional only." The next paragraph begins, "*Felis* Ocelot, No. 1," followed by twenty lines giving a description of its coloration, without reference to its size or any other feature, or to its relationships. Then follows "No. 2," (not otherwise designated), with a description six lines long, to which are added remarks referring to both No. 1 and No. 2: "These," he says, "are both from South America. I have examined several of them alive, and about twelve in a stuffed form. I incline to think that one (or both) of these (if varieties) must be the Chibigouazou of Azara. . . . I believe Nos. 1 and 2 to be South American, and Nos. 3 and 4 Mexican, though I do not mean to assert that each may not be found in the country of the other; and if this be so, Azara's appellative seems likely to belong to the former" (i.e., Nos. 1 and 2).

Descriptions of No. 3 and No. 4 follow in due sequence. Of No. 3 he says: "A young female of this is now in Mr. Bullock's Mexican collection. It came from Mexico. I have examined five or six specimens, and believe I have sufficient grounds for considering the differences between this and the preceding [Nos. 1 and 2] not to arise from nonage." Of No. 4 he says: "The specimen figured was formerly in Bullock's collection, supposed to belong to southern Mexico, Honduras, etc." He then refers collectively to Nos. 1-4: "Whether these few are specifically different or hereditary varieties, I do not mean to determine; but from the number of specimens of each that have fallen under my observation, there seems little doubt that one or the other of these

alternatives is correct, and that the several figures are not mere individual differences." The figures (drawings) are engraved separately as plates and are legended "Ocelot No. 1 [to 4] of Hamilton Smith."

The account of the *Felis catenata* follows, and begins: "The *F. catenata* is an undoubted species, of the size of a Wild Cat." Following the description he adds: "Of this I have observed two specimens, one in Bullock's former collection, the other in the Museum at Berlin, which I examined with Professor Lichtenstein, and which proving by the teeth to be an old specimen, convinced him of the reality of its being a distinct species, and not a young Ocelot as he had previously conjectured." It is accordingly not numbered and bears the plate legend "*Felis catenata* Hamilton Smith," with the vernacular name "The Linked Ocelot," supplied perhaps by Griffith. The species has never been confirmed, although often quoted and the figure copied by compilers.

Smith's inedited notes and drawings end with his account of a cat from the interior of Guiana which he thought might be the *Felis colocolo* of Molina. But this forms a subject apart from the ocelots and is treated below in connection with the real *Felis colocolo* Molina (pp. 371-373).

From the foregoing it will be seen that if Smith's "Felis Ocelot" (not in italic type as are his *Felis catenata* and other technical names of cats in his notes) is taken seriously it can only be construed as a synonym of *Felis pardalis* Linné, which Smith does not mention, all his four ocelots being placed under Felis Ocelot, equivalent to *Felis pardalis* as then currently recognized. Griffith, however, in Volume V of his 'Animal Kingdom,' which has the same date as Volume II, seems to have used the name in a more formal or technical way for Smith's Nos. 2 and 3, Smith's No. 4 being synonymized by him with *Felis pardalis* Linné. No. 1 is named, in due form, *Felis chibigouazou*. The other two are listed and numbered as species under *Felis* as follows: "16. *F. ocelot*,  $\beta$ ," with, as a cross-reference "*Felis Ocelot*  $\beta$ , or No. 2, Hamilton Smith Mss." as a synonym; "17. *F. ocelot*  $\gamma$ ," with, as a cross-reference, "*Felis Ocelot*  $\gamma$ , or No. 3, Hamilton Smith." Hence Griffith's Nos. 16 and 17 have a nomenclatural status to be reckoned with.

Three years later, J. B. Fischer, in his 'Synopsis Mammalium' (1830), pp. 568-569 [368-369], renamed "*Felis ocelot*  $\beta$  Griffith" as "*Felis hamiltonii*," and "*Felis ocelot*  $\gamma$  Griffith" he also renamed *Felis griffithii*. Therefore Mearns was quite wrong when in 1902 (*loc. cit.*, p. 239) he restricted "*Felis ocelot* Smith" to "Ocelot No. 2" by "elimination," he being unaware that all of Smith's four ocelots had been named as early as 1830, leaving no opportunity for the application of the principle of

elimination to the case. Fischer followed Griffith in assigning Smith's Ocelot No. 4 to *Felis pardalis* Linné, and his Ocelot No. 1 to *Felis chibigouazou* Griffith. Only Nos. 2 and 3 are left for further consideration. If either or both are satisfactorily identifiable there is still little chance for the resuscitation of the *Felis ocelot* of Smith and Griffith, as neither are recognizable from Smith's descriptions and figures, and neither has a definite type locality, No. 2 being supposed to be South American while No. 3 is stated to have come from Mexico, and thus may be referable to either *pardalis* (s.s.) or to *griffithii*. In view of the known wide range of purely individual variation in pattern of markings—the only character here available—it is evident that no assignment of these names to a regional form can be made except by arbitrary determination, which of course if so made would be open to challenge. As evidence of this, attention is called to the photographic illustrations given below of individual variation in the tone of the ground color and in pattern of markings in series of ocelots from localities in Matto Grosso, Brazil, which could doubtless be duplicated in a large series of specimens from many other localities.

So much space would not be here given to a discussion of the long discredited ocelots of Smith and Griffith, except for Mearns's invalid assignment<sup>1</sup> of "*Felis ocelot* Smith," and its subsequent acceptance.<sup>2</sup>

#### Undentifiable Forms Apparently Referable to *Leopardus*

In the Ocelots, as in most other groups of the Felidæ, and of many other groups as well, many unidentifiable names were given by various writers of the eighteenth and first half of the nineteenth centuries, which, owing to inadequate descriptions, prove the bane of subsequent more critical revisionists. In many cases this is due not wholly to lack of detail in the descriptions, or to the poor quality of the accompanying illustrations, but to lack of information as to the geographical sources from which their material was derived. This was often wholly unknown

<sup>1</sup>The points apropos of Mearns's assignment of the name *Felis ocelot* Smith are here presented synoptically:

	Mearns, 1902	Fischer, 1830
" <i>Felis ocelot</i> Smith"	Ocelot No. 1 = <i>Felis chibigouazou</i> Griffith, 1827.	= <i>Felis chibigouazu</i> Fischer ex Griffith.
	Ocelot No. 2 = <i>Felis ocelot</i> Mearns ex Smith.	= <i>Felis hamiltonii</i> Fischer.
	Ocelot No. 3 = <i>Felis canescens</i> Swainson, 1838.	= <i>Felis griffithii</i> Fischer.
	Ocelot No. 4 = <i>Felis pardalis</i> Mearns, ex Griffith.	= <i>Felis pardalis</i> Fischer ex Griffith.

<sup>2</sup>Field Mus. Nat. Hist., Zool. Ser., X, p. 212, Oct. 31, 1916. Type locality designated as Guiana. Smith's figure of his Ocelot No. 2, however, has very little resemblance to the ocelot of Guiana (my *Leopardus pardalis tumatunari*), much less indeed than his Ocelot No. 1, referred by Griffith and later authors to Azara's Chibigouazou.

to them, or if known was not stated, or stated in too general terms, and thus is inadequate to meet modern requirements. The case of Hamilton Smith and his ocelots is only an illustration of a prevailing condition. Descriptions and illustrations based on menagerie specimens, either living or dead, from unknown localities, and seldom preserved as types, prove an inherited curse rather than an aid in modern research.

Among the unidentifiable names given to the *pardalis* group in addition to *Felis ocelot* Smith and Griffith and *Felis catenata* H. Smith (1827), are *Felis mitis* F. Cuvier (1820), *Felis brasiliensis* F. Cuvier (1828, name preoccupied), *F. armillata* F. Cuvier (1832), *Felis pseudo-pardalis* Boitard (1842), *Felis melanura* Ball (1844, no locality nor measurements), *Felis pardalis minimus* Wilson (1860, Realejo, Nicaragua, but "too young to eat anything except milk"), *Felis pardoides* Gray (1867), *Panthera ludoviciana* and *P. jardinii* Fitzinger (1869), and others.

### Individual Variation in the Color Characters of Ocelots

Figures 14 to 18.

A series of eight specimens—flat skins (hunters' pelts, of which only two have skulls)—collected by George K. Cherrie in 1917 at Descalvados on the Paraguay River about 300 miles north of Curumbá, in Matto Grosso, well illustrates the wide range of individual variation in color in ocelots. The color patterns of five of these specimens are shown below in Figures 14 to 18 (pp. 402-406); the other three are variously intermediate in ground color and markings between the five that are figured, no two of the series being alike. The ground color varies in the different specimens from deep ochraceous buff to pale buff. This feature is indicated to only a slight degree in the photographic reproductions by the depth of tone. The pattern of coloration, however, is sharply defined and permits of comparison of details in the markings of the different specimens. As regards the ground color, it is deepest in the specimen represented in Fig. 14, less deep in Fig. 15, but much deeper in this than in either of the other three. In the specimens shown in Figs. 16 and 17, the ground color is practically the same, while the one shown in Fig. 18, represents the extreme of paleness for the series. In regard to the color patterns, attention is called to the variation in the size or areas of the black markings in comparison with the extent of the intervening ground color, the extremes being represented in Figs. 1 and 5. Also the diversity presented in the nape bands, the shoulder markings, and in the median dorsal stripes.



Fig. 19 is introduced to illustrate the contrast between the light phase of southern Brazil and the dark form of the Lower Amazon and the Guianas, in which the ground color is tawny and the dark markings are intense black.

A series of flat skins (hunters' pelts) from Curumbá, received from the Roosevelt South American Expedition, completely parallels the series of eight already described in tone of ground color and character of markings. The ground color ranges from pale buff to ochraceous buff, and the markings are equally variable in extent in comparison with the intervening areas of ground color and in pattern. A smaller proportion, however, have the median dorsal line solid black.

In these Matto Grosso specimens, as is the rule in ocelots generally, the ground color from the crown to a little behind the withers is of a deeper tone than that of the posterior half of the dorsal area. Similarly the median third of the dorsal area is of a much deeper tone than the lateral third on either side of the central area.

#### MARGAY GRAY

*Margay* GRAY, Cat. Carniv., Pachyderm., and Edentate Mamm. Brit. Mus., 1869, p. 21. "Smaller, small-headed, spotted American Cats." Type, by subsequent designation (Allen 1916, Pocock 1917), *Felis wiedii* Schinz.

*Margay* ALLEN, Bull. Amer. Mus. Nat. Hist., XXXV, p. 550, footnote, Aug. 8, 1916. *Felis macroura* Wied (= *Felis wiedii* Schinz) designated as type.

*Oncoides* SEVERTZOW, Rev. et Mag. de Zool., (2) X, pp. 386, 390, Sept. 1858. Part; *Felis macroura* Wied and its near allies only.

*Leopardus* Pocock, Ann. Mag. Nat. Hist., (8) XX, p. 344, Nov. 1917. Part; *Felis wiedii* and its allies only.

While Pocock (*loc. cit.*, p. 345) includes the smaller spotted American cats in *Leopardus* he recognizes that they form a group quite different from the true ocelots. He says: "In addition to the true ocelots, often called jaguars, I refer to this genus *L. wiedii* (*macroura*), commonly cited as *tigrina*, which may be described as a small, long-tailed, smooth-skulled representative of the ocelots. The skull is like that of a young ocelot in most respects, showing at most a shallow postorbital constriction, with the temporal crests forming a lyriiform area generally wide but varying in width with age and possibly locally. The skulls differ, however, from those of ocelots in having a tolerably regular rounded low occipital area; even when the occipital crest is well developed its edges have no definite lateral emargination; and the inferior edge of the orbit is thin, with the preorbital thickening hardly developed." These are some of the differences that distinguish the two groups, but there are

others of equal or greater importance, among which are the general contour of the skull and the proportionate development of different regions. In a comparison of skulls of the two groups, particularly those of old males, the first thing to attract attention is the small size and weak structure of the skull in the *wiedii* group in contrast with that of the *pardalis* group, that of the former being much less than half the size of the latter. In *wiedii* the dorsal contour is evenly convex from the nasal to the occipital border, with neither sagittal nor lambdoid crests, which are highly developed in *pardalis*; the brain-case is broad and short, its point of greatest elevation being at the frontoparietal suture instead of inter-orbital; the orbits are very large, the axial diameter about 32 per cent of the occipitonasal length of the skull against less than 25 per cent in *pardalis*, and they are often closed posteriorly in *wiedii* and broadly open in *pardalis*; the postorbital constriction is slight or nil in *wiedii*, well developed in *pardalis*; in *wiedii* the postorbital processes are weak but long and slender, often meeting and sometimes coalescing with the process of the malar in *wiedii*, heavy and short in *pardalis*, leaving the middle third of the posterior border of the orbit open; in *wiedii* the zygomata are narrow and weak, in *pardalis* broad and heavy; in *wiedii* the dental armature is weak, in *pardalis* heavy, in agreement with the weak general structure of the skull in *wiedii* and its heavy ossification in *pardalis*. The following comparative cranial measurements, based respectively on an average old male skull of *Leopardus pardalis griffithii* from Sinaloa, Mexico, and an old male skull of *Margay tigrina wiedii* from southern Matto Grosso, Brazil, indicate some of the proportional differences between the skulls of *Leopardus* and *Margay*. Total length, *griffithii* 144 mm., *wiedii* 91 (ratio, *griffithii* being 100, 63.4); condylobasal length, 135, 84 (ratio 62.2); zygomatic breadth, 99.5, 61.3 (ratio 62.5); breadth at postorbital constriction, 38, 31.5 (ratio 83); tip to tip of postorbital processes, 55, 52 (ratio 94.5); greatest width of brain-case, 54, 42 (ratio 77.7); upper tooththrow (c-m), 44.3, 27.5 (ratio 62.1).

Young skulls of the *pardalis* group before the strong crests have formed are not so strikingly different, except in size, from the skull of the *wiedii* forms. The general appearance of the skull in the *pardalis* forms changes greatly with age after the animal has reached maturity. In the *wiedii* forms, on the other hand, mainly owing to the non-development of crests, the general aspect of the skull changes little with age, having acquired its mature form and nearly its mature size by the time the permanent teeth are fully developed.

In 1903 Thomas published<sup>1</sup> some very suggestive observations on the smaller spotted American cats, in which he formally recognized three "types" or groups, and suggested two others as follows:

"I. Size larger. Fur soft and thick. Nape-hairs generally reversed forwards, at least in part." Typified by "*Felis wiedii* Schinz (*F. macroura* Wied), and many others, including *F. glaucula* sp. n."

"II. Size rather smaller. Fur harsher. Nape-hairs not reversed. General colour darker. Skull long and narrow, somewhat resembling that of the Jaguarondi, with narrow braincase and elongated face." Typified by *Felis guttula* Hensel.

"III. Size smallest. Fur medium or harsh. Nape-hairs not reversed. Skull small and delicate, with smooth braincase and elongated." Typified by "*Felis pardinoides* Gray (*F. guigna* Molina of Hensel)."

"In addition," Thomas continues, "the small-spotted *F. geoffroyi*, with its little ally *F. salinarum*, sp. n., makes yet a fourth Neotropical section of the group; while a fifth appears to be formed by the true *F. tigrina*, judging by a small cat from Cayenne which may be assigned to that species, and is distinguished by its small size, bright colouring, and delicate skull; but it is in too imperfect a state for me to describe it more fully." (Thomas, *loc. cit.*, pp. 234-235.)

The genus *Margay* Gray, as here restricted, comprises the *Felis tigrina* (including *F. wiedii*) and *Felis glaucula* groups, characterized by reversed nape-hairs, large size, and a highly arched brain-case, and is equivalent to Thomas's "type I" and his tentative "type fifth."<sup>2</sup> The range of the *Margay* group extends from Espirito Santo and Matto Grosso, Brazil, to Jalisco, Mexico.

Thomas's types II and III, of which *Felis guttula* Hensel and *Felis pardinoides* Gray are respectively designated by Thomas as representative, are tentatively united to form a single group of at least subgeneric value, which for convenience is here treated as a full genus. No existing name being available for the group, the designation **Oncilla** is here provided, with *Felis pardinoides oncilla* Thomas as type. The distribution of this group appears to coincide very nearly with that of *Margay*. The skull of *Oncilla*, in its smoothness and weak structure, resembles

<sup>1</sup>'The Spotted Tiger-cats of Brazil,' in 'Notes on Neotropical Mammals of the Genera *Felis*, *Hapale*, *Oryzomys*, *Akodon*, and *Ctenomys*, with Descriptions of New Species.' By Oldfield Thomas. Ann. Mag. Nat. Hist., (7) XII, pp. 234-243, Aug. 1903.

<sup>2</sup>Thomas says that "a fifth [type] appears to be formed by the true *F. tigrina* [Schreber], judging by a small cat from Cayenne which may be assigned to that species. . . ." Apropos of this I may state that there is a skull in the collection of the American Museum labeled as from Cayenne, purchased for the Museum many years ago by D. G. Elliot as a part of the Verreaux Collection, that is indistinguishable from skulls I have identified as *Felis wiedii* or from other skulls of the *wiedii* type from the Santa Marta and Caqueta districts of Colombia.

that of *Margay*, but the dorsal outline is less convex and the brain-case less expanded. It is also much narrower in proportion to its length; the postorbital processes, though slender, are much shorter, and the audital bullæ are less inflated, and relatively much smaller and narrower. The nape-hairs are not reversed; the coloration is often much darker, but the color pattern is not essentially different.

*Felis geoffroyi*, Thomas's fourth type, may well be kept separate, for which Severtzow's *Oncifelis* is available, while *Felis parjeros* and its subspecies are also kept separate as *Lynchailurus* Severtzow. The hitherto little-known *Felis guigna* Molina, although nearly related to *Oncilla* in cranial characters, may be referred to *Noctifelis* Severtzow, on the basis of external differences, and forms its only representative.

The three groups, *Margay*, *Oncilla*, and *Noctifelis* are closely related and differ markedly from *Leopardus* on the one hand and from *Oncifelis* on the other. In case they should be regarded as only subgenerically separable, the oldest name for the combined group is *Noctifelis* Severtzow, with *Noctifelis* s. s., *Margay*, and *Oncilla* as subgenera.

The number of local forms of *Margay* and *Oncilla* and their geographical relationships cannot now be determined, as they are poorly represented in museums. In order to satisfactorily settle these questions a large amount of material will have to be brought together, comprising large series of specimens from many localities. Hence it will doubtless be many years before such conditions will be realized. The early described forms are, as usual, extremely difficult to determine, the descriptions being too vague to be distinctive, and usually based on specimens from undesignated or wrongly designated localities.

### 1. *Margay tigrina tigrina* (Schreber)

*Felis tigrina* SCHREBER, Säug., III, Pl. cvi, 1775, text, p. 396, 1777 (= *Le Margay* BUFFON, Hist. Nat., XIII, 1765, pp. 248-253, Pl. xxxvii).

Based on Buffon's description and figure of a specimen from Cayenne. Probably ranges into eastern Venezuela and northern Brazil.

### 2. *Margay tigrina wiedii* (Schinz)

Figures 4a, 6a, 9a, 12a

*Felis wiedii* SCHINZ, Thierreich, I, 1821, p. 235. Based on specimens in the Wied Coll. from Brazil.

*Felis macroura* WIED, Beitr. Naturg. Brasilian, II, 1826, pp. 371-379; Abild., Lief. 3, plate and text without numeration. Southeastern Brazil = *F. wiedii* Schinz, based on the same specimens.

*Felis macrura* HENSEL, Abhandl. Akad. Berlin, 1872, p. 71. Rio Grande do Sul, Brazil.

*Margay tigrina wiedii* ALLEN, Bull. Amer. Mus. Nat. Hist., XXXV, p. 580 and footnote, Aug. 9, 1916. Part; only the specimen from Florença. Type locality of *wiedii* determined as northern Espírito Santo, Brazil.

Southern Brazil, west to southern Colombia. Its range is at present very imperfectly known.

### 3. *Margay tigrina vigens* (Thomas)

*Felis wiedii vigens* THOMAS, Ann. Mag. Nat. Hist., (7) XIV, p. 192, Sept. 1904. Igarapé-Assu, near Para, Brazil.

Range unknown. Described from a single specimen. The cranial measurements agree closely with a skull from Cayenne, including the large size of the bullæ.

### 4. *Margay glaucula glaucula* (Thomas)

*Felis glaucula* THOMAS, Ann. Mag. Nat. Hist., (7) XII, p. 235, Aug. 1903. Beltram, Jalisco, Mexico.

A large form characterized by the paleness of the ground color, "grey instead of fulvous or tawny." "This grey Mexican representative of the *F. wiedii* group contrasts markedly in color with the tawny forms found to the south of it from Costa Rica to S. Brazil." Other specimens are also referred to it from "Tatemales, Sinaloa, and N. Yucatan." Skull of type: greatest length 94.5, basal length 82, zygomatic breadth 63, tip to tip of postorbital processes 49. I have examined specimens from Yucatan (Nat. Mus.), Cordoba and Los Masos, Mexico (Amer. Mus.).

### 5. *Margay glaucula nicaraguæ*, new subspecies

Type, No. 28957, ♂ ad., Volcan de Chinandego, Nicaragua, August 20, 1908; W. B. Richardson.

Similar in general color pattern to *M. glaucula glaucula* but much more richly colored and apparently larger.

Ground color of upperparts fulvous instead of "pale drab gray"; black markings narrow, linear, sharply defined, occasionally enclosing patches of the ground color, arranged on the thighs in transverse rows of large oval blotches, on the shoulders in vertical bands; whole underparts and inside of limbs pure white, the chin, throat, and abdominal region unspotted, the pectoral area with narrow linear stripes of black, and a broad black throat band. Differs from a specimen of typical *glaucula* from Los Masos, Jalisco, Mexico, chiefly in its much richer, more fulvous coloration.

Collector's measurements of the type in the flesh: total length, 1260 mm.; head and body, 750; tail vertebrae, 510; hind foot (from skin), 116. Skull: total length, 107; basal length, 93; condylobasal length, 100.9; zygomatic breadth, 72.2; nasals on middle line, 18.7; interorbital breadth, 19.2; tip to tip of postorbital pro-

cesses, 51.6; interorbital constriction, 32.3; breadth of brain-case, 43; palatal length (from notch to anterior base of incisors), 40.5; length of bulla, 20.8; length of  $p^4$ , 12.4.

An adult female from Matagalpa, Nicaragua, is also referred to this subspecies, which resembles the type in all essentials except that it is just appreciably lighter in coloration and slightly smaller. It is however much more richly colored and decidedly larger than either an adult male from the type region of *glaucula*, or than the type of *glaucula* as indicated by the description. Total length, 970; head and body, 580; tail, 390; hind foot (from skin), 110. Skull: condylobasal length, 89; zygomatic breadth, 65.8; interorbital breadth, 16.9; tip to tip of postorbital processes, 52.5; postorbital constriction, 35.2; length of bulla, 19.7; breadth of brain-case, 47.5; length of  $p^4$ , 11.3.

#### **ONCILLA**, new genus

Type, *Felis pardinoides oncilla* Thomas.

Skull without crests, smooth and of weak structure, as in *Margay*, but with dorsal outline much less convex and frontal area flatter, brain-case narrower, skull narrower in proportion to its length, postorbital processes slender and short, audital bullæ less inflated and narrower in proportion to their length. Nape-hairs normal instead of reversed, pelage soft and full, color sometimes richer and darker but color pattern nearly the same as in *Margay*.

#### 1. ***Oncilla pardinoides pardinoides*** (Gray)

*Felis pardinoides* GRAY, Proc. Zool. Soc. London, 1867, p. 400; Cat. Carniv., Pachyd. and Edentate Mamm. Br. Mus., 1869, p. 27. "Hab. India (Capt. Innes; from Zool. Soc. Mus.)."

*Felis pardinoides* GRAY, Ann. Mag. Nat. Hist., (4) XIII, 1874, pp. 51-52. "I will not undertake to vouch for the accuracy of the habitats we receive from the Zoological Society; the Indian habitat has not been confirmed; and the species has a very South-American aspect."

*Felis pardinoides* GRAY, idem, p. 475, June 1874. "The British Museum has received, from Mr. Edward Gerrard, a cat from Bogotá that I have no doubt is the same species as the typical specimen of *Felis pardinoides*, . . ."

*Felis pardinoides* ELLIOT, Proc. Zool. Soc. London, 1872, p. 203; Monog. Felidæ, 1883, Pl. xx, lower figure. Confidently refers *Felis pardinoides* Gray to *Felis geoffroyi* D'Orbigny and Gervais, as an immature specimen of the latter.

*Felis guigna* HENSEL, Abhandl. Akad. Berlin, 1872, p. 74. Rio Grande do Sul. Part; not the melanistic specimen from Chili.

*Felis pardinoides* THOMAS, Ann. Mag. Nat. Hist., (7) XII, pp. 236-237, Aug. 1903. Redescribed from Espiritu Santo specimens. No reference is made to Gray's previous designation of Bogotá as the type locality of his *Felis pardinoides*. (Cf. above, the citation of Gray at June 1874.)

Southeastern Brazil (Espiritu Santo and Rio Grande do Sul), apud Thomas.

Dimensions of male as given by Thomas: "Head and body 500 mm.; tail 255; [=total length 755]; hind foot 105; ear 38. Skull: greatest length 83; basal length 71.5; zygomatic breadth 49.5; nasals, length in middle line 16.5; . . . interorbital breadth 14.2; tip to tip of postorbital processes 32; intertemporal breadth 25; . . . breadth of braincase 38; length of bulla 17; . . . length of  $p^4$  on outer edge 9.6."

## 2. *Oncilla pardinoides oncilla* (Thomas)

1. *Felis pardinoides oncilla* THOMAS, Ann. Mag. Nat. Hist., (7) XII, p. 237, Aug. 1903. Based on a skin from Volcan de Irazu, Costa Rica.

*Felis carrikeri* ALLEN, Bull. Amer. Mus. Nat. Hist., XX, p. 47, Feb. 29, 1904. Pozo Azul, Pirris Province, Costa Rica. Apparently a melanism of *O. pardinoides oncilla* (Thomas). I have before me a similar melanism of *O. pardinoides emerita* from Merida, Venezuela.

Known only from Costa Rica.

## 3. *Oncilla pardinoides andina* (Thomas)

*Felis pardinoides andina* THOMAS, Ann. Mag. Nat. Hist., (7) XII, p. 238, Aug. 1903. Jima, Province of Azuay, Ecuador. Altitude 2400 m.

*Felis pardinoides andina* Lönnberg, Ark. för Zoologi, VIII, No. 16, p. 6, July 12, 1913. Ahunchi, below Malchinqui, and north side of Mt. Pichincha, at altitudes of 10,000 to 11,000 ft.

Known only from the Andes of Ecuador.<sup>1</sup>

Type, total length 810, "head and body 520, tail 290, hind foot 109, ear 41. Skull, greatest length 86, basal length 73.5, zygomatic breadth 53.5, breadth of braincase 41."

## 4. *Oncilla pardinoides emerita* (Thomas)

Figures 4b, 6b, 9b, 12c

*Felis pardinoides emerita* THOMAS, Ann. Mag. Nat. Hist., (8) X, p. 44, July 1912. Montes de la Cutala, Merida, Venezuela.

*Margay tigrina wiedi* ALLEN, Bull. Amer. Mus. Nat. Hist., XXXV, p. 223, May 31, 1916. Part; the Andalucia specimen only.

*Margay tigrina emerita* ALLEN, Bull. Amer. Mus. Nat. Hist., XXXV, p. 582 (footnote), Aug. 9, 1916. Record of a specimen (practically a topotype) from Merida, Venezuela.

Merida, Venezuela, and southward in the Eastern Andes to Huila, Colombia.

Type: total length 810 mm.; "head and body 480, tail 380, hind foot 98. Skull: greatest length 85, condylobasal length 81.3, zygomatic

<sup>1</sup>The specimen recorded by me in 1916 (Bull. Amer. Mus. Nat. Hist., XXXV, p. 123), from Loja, Ecuador, alt. 8000 ft., as *Margay wiedi andina* was wrongly identified, it proving to be a *Margay* and not an *Oncilla*.

breadth 5.5 [=55.0], breadth of braincase 40." Feet "scarcely darker below than above" (Thomas, *loc. cit.*).

A skin without skull (from Andalucia, Huila, Colombia, altitude 5000 feet) was referred by me in 1916 (*loc. cit.*) to *Margay tigrina wiedi*. The mislaid skull has since been found and shows that the specimen is referable to *Oncilla*, not to *Margay*. Reëxamination of the skin shows that it is a male (not a female as first supposed), and that it agrees in all external characters with a topotype of *emerita*, being as pale (or slightly paler) than this pale form, even to the pale foot-soles. Total length (collector's measurements), 800 mm.; head and body, 380; tail, 420; hind foot (c.u.), 110. Skull: greatest length, 88; condylobasal length, 82.6; zygomatic breadth, 59.3; breadth of brain-case, 41.6.

#### 5. *Oncilla pardinoides elenæ* (Allen)

*Margay tigrina elenæ* ALLEN, Bull. Amer. Mus. Nat. Hist., XXXIV, p. 631, Dec. 30, 1915. Santa Elena, Antioquia, Colombia. Altitude 9000 feet.

Known only from the type locality. Similar in a general way to *O. p. emerita* (Thomas), from Merida, Venezuela, with topotypes of which it has been compared.

#### 6. *Oncilla caucensis* (Allen)

*Margay caucensis* ALLEN, Bull. Amer. Mus. Nat. Hist., XXXIV, p. 631, Dec. 30, 1915. Las Pavas, near San Antonio, Upper Rio Cauca, Colombia. Based on a skin, but the skull (imperfect, preorbital region and mandible only preserved) has since been found.

Known only from the type. Characterized by the deep fulvous ground color of the upperparts, lighter fulvous underparts, and sharply defined, intensely black markings.

#### 7. *Oncilla guttula guttula* (Hensel)

*Felis guttula* HENSEL, Abhand. Akad. Berlin, 1872, p. 73. Rio Grande do Sul, Brazil.

Range, southern Brazil (Thomas). A specimen from "Parana," and another from Curumbá, Matto Grosso, both hunters' skins without skull, are provisionally referred to this form.

#### 8. *Oncilla guttula emiliæ* (Thomas)

*Felis emiliæ* THOMAS, Ann. Mag. Nat. Hist., (8) XIII, p. 348, March 1914. Ipu, Ceará, Brazil.

"This striking cat . . . is clearly a representative in the dry country of Ceará of the South Brazilian *F. guttula*" (Thomas, *loc. cit.*).



**NOCTIFELIS SEVERTZOW**

*Noctifelis* SEVERTZOW, Rev. et Mag. de Zool., (2) X, pp. 386, 390, Sept. 1858. Type, by monotypy, *Felis guigna* Molina.

*Herpailurus* Pocock (not of Severtzow), Ann. Mag. Nat. Hist., (8) X, pp. 346, 350, Nov. 1917. Part; *Noctifelis* only.

*Noctifelis* closely resembles *Oncilla* in cranial characters, but is nearly one-fifth smaller in external measurements, while the cranial measurements are practically the same. It has, however, larger ears, absolutely as well as relatively, and a shorter and more heavily furred tail, so that the tail in *Noctifelis* has the appearance of being short and thick, instead of long and slender as in *Oncilla* and *Margay*. The color pattern in *Oncilla* is essentially the same as in *Margay* and *Leopardus*, the predominating features being heavy black bands extending from the forehead to the mid-dorsal region, and elongated black markings on the shoulders, flanks and thighs. In *Noctifelis* the black markings are reduced to small rounded spots, nowhere coalescing to form well-defined bands. It has the usual cat marks, as the whitish ear-spots and the cheek and throat bands, and in some instances nape-stripes are vestigially present. On the basis of external features *Noctifelis* is here recognized as a natural group, easily distinguishable from *Oncilla*. The type, and apparently the only known species, is the smallest and one of the most distinctively marked of the American small spotted cats. In seven skulls (six adult and one with the milk dentition),  $p^2$  is uniformly absent in all, although present as a rule in all the nearest allied groups.

***Noctifelis guigna* (Molina)**

Figures 4c, 7a, 10a, 12a, 20 to 22

*Felis guigna* MOLINA, Saggio sulla storia nat. del. Chili, 1782, pp. 295, 341. Forests of Chili.

*Felis guigna* PÖPPIG, Froriep's Notizen, XXV, No. 1, p. 7, July 1829. Talcahuano, Chili.

*Felis guigna* PHILIPPI, Arch. f. Naturg., Jahrg. 36, Bd. 1, 1870, pp. 41-43. Very common in Valdivia, Chili. Molina's descriptions of both the Guigna and Colocolo declared to be so sufficiently distinctive that one cannot doubt as to which of the Chilean species they refer (*loc. cit.*, p. 42).

*Felis guigna* HENSEL, Abhandl. Akad. Wissen. Berlin, 1872, p. 74. Part; only the casual reference to a melanistic specimen from Chili.

*Felis guigna* PHILIPPI, Arch. f. Naturg., Jahrg. 39, Bd. 1, 1873, pp. 8-12, Pl. II (animal and skull). Very abundant in the Province of Valdivia.

*Felis guigna* THOMAS, Ann. Mag. Nat. Hist., (7) XII, p. 240 (in text), Aug. 1903. Type locality given as Valdivia, Chili, on the basis of Philippi, as above cited.

Molina's brief account of this small cat proved a stumbling block to all succeeding systematists for nearly a century, when in 1870-1873,

Philippi<sup>1</sup> cleared up the mystery through first-hand knowledge of the species and its habitat.<sup>2</sup> After transcribing Molina's account in full, he comments on the fact that its internal evidence gave proof that Molina had seen these two cats (the Guigna and Colocolo) and that his descriptions of them were so good that one could not doubt as to which of the Chilean species they applied. He adds that *Felis guigna* was still very common in the Province of Valdivia, and refers to stuffed specimens in the museum at Santiago on which the fuller account in his second paper is based.

The earlier compilers recorded it as a little-known species, often as of doubtful validity; later it was sometimes synonymized with various earlier described forms, while other systematists were convinced that it was founded on an immature specimen of *Felis geoffroyi*.

As stated above *Felis guigna* Molina was first given a recognized basis by Philippi, who in 1873 gave a fairly good description of its external and cranial characters and figured the animal and the skull. The latter unfortunately was immature and imperfect, lacking the occipital part. This led to a misinterpretation of the case on the part of some later authors, who construed Philippi's *Felis guigna* as a young example of *Felis geoffroyi*. In the light of the series of specimens now available for study, however, it is evident that this inference was erroneous, and that the animal described by Philippi as the *Felis guigna* of Molina is a species remarkably distinct from any other known. Thomas (*loc. cit.*), on the basis of Philippi's paper, was justified in designating Valdivia as its type locality.

Philippi, in commenting on its abundance near Valdivia, says that it sometimes visited the outskirts of the city to steal fowls and meat. He relates that he had been informed it sometimes appeared in small bands ("schaarenweis"), and that on one occasion about twenty of them were killed in a single morning. He also states that it is often melanistic, wholly black examples being of frequent occurrence. Of four specimens in the museum at Valdivia he states that two were of the light-colored spotted phase and the other two entirely black. His figure represents

<sup>1</sup>Ueber *Felis Colocolo* Molina [und auch *Felis Guigna*]. Von Dr. R. A. Philippi in Santiago. Arch. f. Naturg., Jahrg. 36, Bd. 1, pp. 41-45.

Ueber *Felis Guigna* Molina und über die Schädelbildung bei *Felis Pajeros* und *Felis Colocolo*. Von Dr. R. A. Philippi, Arch. f. Naturg. Jahrg. 39, Bd. 1, 1873, pp. 8-15, Pl. II, *Felis Guigna* (animal and skull); Pl. III, Figs. 1, 2, *Felis Colocolo* (skull), Figs. 3, 4, *Felis Pajeros* (skull).

<sup>2</sup>Pöppig (*loc. cit.*) was unquestionably the first to give a clearly recognizable description of Molina's *Felis guigna*, although his citations ("*Felis Guigna*. Mol.—*Felis tigrina* L. ?") led to misunderstanding by subsequent writers. His diagnosis and detailed description could only have been based on an actual specimen, and his accompanying narrative of his sojourn of some months near Talcahuano render it certain that such was the case. In view of the specimens now available from the same district, it is easy to recognize that his description can relate only to this species.

the spotted phase. So far as I am aware no later report based on actual material has been published.

The present series of eight specimens was collected by D. S. Bullock, an American engineer and an intelligent and painstaking natural history collector, who spent some time near Valdivia in 1910-1911. The specimens comprise seven adults (4 males, 3 females) and a kitten still in first pelage and with the milk teeth. One of the adults lacks the skull, and the brain-case of three others is badly broken but they are available for most of the usual measurements. The labels give full field data and flesh measurements and the native name (written "wiña," probably phonetic for guña, the usual vernacular name of the species). They were nearly all taken at Marquhue, Temuco, Province of Cautin, about seventy-five miles north of Valdivia. The series shows considerable variation in color, some being much darker than others, possibly tending toward melanism.

One of lightest specimens of the series has the ground color of the upperparts deep buff, of the underparts clear white. The face markings are as usual in the small spotted cats, but much reduced in extent and distinctness, especially the superciliary lines and the dark bands from the side of the nose to the inner base of the ears, which are rudimentary and inconspicuous. The top of the head, from forehead to nape, is slightly freckled with touches of blackish. Of the usual nape-stripes only the two outer are recognizable as bands, they consisting of only partly coalesced dark brown or blackish spots. Elsewhere on the dorsal and lateral areas are small, solid, scattered blackish spots without any distinct arrangement except along the median dorsal area where they tend to form both axial and transverse rows, and oblique rows on the thighs. The upper surface of the feet is unspotted except for the proximal fourth. The tail is heavily ringed with black dorsally and laterally, a few of the apical bands nearly meeting below. The black annulations are about equal in breadth to the intervening spaces of ground color, and vary in number from 10 to 12, with a blackish tip. The white of the underparts has a broad brownish black cross-band on the throat, a few broken rows of small spots on the foreneck, a few scattered spots on the pectoral area, while large black spots predominate over the white on the thoracic region; the inguinal region and the inside of the thighs are white, the latter varied with more or less transverse rows of black spots. The ventral side of the tail is medially whitish. The soles of the feet are blackish, the tips of the hairs on the proximal part increasingly grayish.

In the darkest specimen the ground color above is of a less buffy

tone, and the dark spots are coarser and blacker, and tend in places to unite into irregular and rather indistinct bands, particularly on the nape and shoulders. The dark tail bands are broader, their width exceeding the interspaces. The dark spots below are larger and more intensely black; on the thighs they form rather heavy transverse bands. A young specimen in the woolly first pelage is marked as in the adults, but the spots are duller and less sharply defined.

The external measurements show that *Noctifelis guigna* is considerably smaller than any of the known forms of *Oncilla*, the average total length for four males being 644 mm., as against 804 for the same number of males of *Oncilla* (representing four subspecies); the corresponding measurements for head and body are respectively 439 and 503; tail 225 and 290; hind foot 96 and 108. The difference in cranial measurements of the same two series is, however, much less, the condylobasal length being respectively 80 and 84 mm., the zygomatic breadth 53.8 and 54.7, and the breadth of the brain-case 39.3 and 39.4.

#### EXTERNAL MEASUREMENTS OF *Noctifelis guigna* (MOLINA)

CAT. NO.	SEX	LOCALITY	TOTAL LENGTH	HEAD AND BODY	TAIL VERT.	HIND FOOT	EAR
33278	♂	Temuco, Chili	650	420	230	90	40
33283	♂	Temuco, Chili	648	418	230	100	46
33284	♂	Temuco, Chili	660	440	220	100	46
33286	♂	Temuco, Chili	700	480	220	96	43
33285	♀	Temuco, Chili	605	395	210	87	40
33287	♀	Temuco, Chili	640	390	250	94	40
33288	♀	Temuco, Chili	645	450	195	95	38
Average	4 ♂ ♂		644	439	225	96	44
Average	3 ♀ ♀		630	412	215	89	39

MEASUREMENTS OF SKULLS OF *Noctifelis guigna* (Molina)

(Same Specimens as in the Preceding Table)

Cat. No.	Sex	Total Length	Condylar Basal Length	Palatal Length	Zygomatic Breadth	Interorbital Breadth	Post-orbital Processes	Post-orbital Constriction	Breadth of Brain-case	Aud. Bullæ	Upper Tooth-row C-M <sup>1</sup>	Length of P <sup>4</sup>
33283	♂	83.5	80.5	31.6	53.7	14.7	38.2	28.0	39.8	16.4×11.2	26.1	9.5
33284	♂	85.8	79.1	31.2	52.2	13.9	32.5	23.0	39.8	17.5×11.7	25.0	9.5
33286	♂	....	80.0	30.9	56.3	15.1	....	....	....	17.0×11.8	24.4	9.2
33288	♂	....	77.9	29.5	53.1	15.7	37.5	25.0	....	17.8×11.1	23.8	9.7
33285	♀	79.2	73.7	28.4	51.1	15.6	....	25.5	38.8	16.2×11.2	22.8	9.1
Average	4 ♂♂	....	79.3	30.8	53.8	15.2	36.2	27.8	....	17.2×11.5	24.3	9.2

**ONCIFELIS SEVERTZOW**

*Oncifelis* SEVERTZOW, Rev. et Mag. de Zool., (2) X, pp. 386, 390, Sept. 1858. Type, by monotypy, *Felis geoffroyi* D'Orbigny and Gervais.

*Herpailurus* Pocock, Ann. Mag. Nat. Hist., (8) XX p. 346, Nov. 1907. Part; the *Oncifelis geoffroyi* group only.

The skull of *Oncifelis* is heavily ossified, the frontal region high and broad, the brain-case long and narrow, rostrum deep and broad, sagittal and lambdoid crests well developed in adults, and the dentition heavy. In certain features it resembles the skull of *Herpailurus*, differing from it greatly in others, as in the structure of the preorbital and palatal portions and in its much heavier dentition. Most of these differences have been noted by Pocock (*loc. cit.*, p. 347), who says: "*H. yaguarondi* and *H. geoffroyi* are widely divergent species in cranial characters, the former departing the most, the latter the least from the typical feline type." He might have added that this is also true in respect to their external characters, the general form being slender in *yaguarondi* and heavy in *geoffroyi*, the color in the former unspotted and in the latter profusely spotted, with a conspicuously annulated tail. He finally adds: "On account of the differences in the skulls the two species might be regarded as generically or subgenerically distinct, but the difficulties of definition would in that case be great on account of *H. pardinoides* and its allies occupying in many cranial respects an intermediate position between the two. . . ." This statement seems to betray a misapprehension of the characters of the *Felis pardinoides* group, here recognized as a special group, of at least subgeneric value, under the name *Oncilla*.

*Felis salinarum* Thomas is here associated with *geoffroyi* in the genus *Oncifelis*, but the two species are by no means closely related, *salinarum* being a much smaller species, with a much weaker skull and dentition. Both are spotted cats, with long and conspicuously ringed tails, but the details of coloration are quite different in the two forms. The *Felis colocolo* group is unrepresented in the material I have been able to examine, but judging from the literature, including Philippi's figures of the skull, it seems referable to *Oncifelis*, but the color characters do not indicate a close relationship with *geoffroyi*.

**1. *Oncifelis geoffroyi* (D'Orbigny and Gervais)**

Figures 5a, 7b, 10b, 13a, 23

*Felis geoffroyi* D'ORBIGNY AND GERVAIS, Bull. Soc. Philom. Paris, 1844, p. 40; Mag. de Zool., 1844, Mamm., Pl. LVII (animal); Voy. d'Amér. Merid., 1847, p. 21, Pl. XIII (skull), Pl. XIV (animal). Rio Negro, Patagonia.

*Felis (Oncifelis) geoffroyi* SEVERTZOW, Rev. et Mag. de Zool., (2) X, 1858, p. 386.

*Felis (Oncoides) geoffroyi* LAHILLE, Congr. cient. Lat. Amer., III, 1899, p. 178.

*Oncoides geoffroyi* ALLEN, Rep. Princeton Univ. Exped. Patagonia, III, part I, Mamm. Southern Patagonia, pp. 180-183, April 28, 1905. Cañon de las Vacas and mouth of Rio Santa Cruz, southern Patagonia.

*H[erpailurus] geoffroyi* Pocock, Ann. Mag. Nat. Hist., (8) XX, p. 347 (in text), Nov. 1917.

*Pardalina ? guigna* GRAY, Ann. Mag. Nat. Hist., (4) XIII, p. 51, Jan. 1874. Part; ". . . there can be no doubt that *Felis Geoffroyi* of D'Orbigny and Gervais is the same as *F. guigna* of Molina and Philippi."

*Felis geoffroyi* BURMEISTER, Descrip. phys. Répub. Argentine, III, 1879, pp. 124-126. Part; *F. guigna* of Molina considered as only a smaller southern form of *F. geoffroyi*.

*Felis geoffroyi* ELLIOT, Mon. Felidæ, 1883, Pl. xx, Part; not the synonymy, nor the lower figure of the plate, and only part of the description.

*Felis guigna* MIVART, The Cat, 1881, p. 410. Not *Felis guigna* Molina.

*Felis guigna* LYDEKKER, Handbook of Carnivora, 1895, p. 149. Part; only the more southern and eastern "race, *Felis geoffroyi* of the Argentine"

*Pardalina warwickii* GRAY, Proc. Zool. Soc. London, 1867, p. 267, fig. 4 (skull), p. 405, Pl. xxiv (animal). "*Himalaya* (Warwick). Probably from South America?"

*Pardalina warwickii* SCLATER, Proc. Zool. Soc. London, 1870, p. 796. Identified as *Felis geoffroyi*.

This species was originally described from specimens collected on the Rio Negro, Patagonia, in about latitude 40° south. It appears to range thence southward to the Straits of Magellan, and westward to the eastern base of the Andes, and has been reported from as far north as the Upper Parana. Its range to the northward, as formerly given, seems to have been not clearly distinguished from that of *S. salinarum*.

The few specimens I have seen appear to indicate a considerable range in the tone of the ground color, from nearly clear gray to pale fulvous, which is the tone represented in D'Orbigny and Gervais's figures. One of two specimens collected by Dr. Hrdlička near the type locality in 1910 (Nos. 171953 and 171954, U. S. Nat. Mus.) agrees closely in color with the original figure of the species, while the other is much paler. Gray's figure of his *Pardalina warwickii* (*loc. cit.*, animal) agrees closely in pattern of markings with *geoffroyi* but not in ground color, which is deep cinnamon instead of pale fulvous, and is probably over-colored, as Sclater (*loc. cit.*) unhesitatingly identified the type of *warwickii* with a specimen of *geoffroyi* from Patagonia by direct comparison.

## 2. *Oncifelis salinarum* (Thomas)

Figures 5b, 8a, 11a, 13b, 24 to 29

?*Felis colocolo* MATSCHIE, Sitzungsab. Gesells. naturf. Freunde Berlin, 1894, p. 60. Puna, near Jujuy, Argentina.

*Felis salinarum* THOMAS, Ann. Mag. Nat. Hist., (7) XII, p. 239, Aug. 1903. Cruz del Eje, Central Cordova, Argentina. Altitude 600 m.

*Felis salinarum* is described as "a small northern representative of *F. geoffroyi*." The type was a female of which the following measurements are given: "Head and body 435 mm.; tail 265; [total length 700]; hind foot 97; ear 37. Skull: greatest length 84.5; basal length 71; zygomatic breadth 56.5; length of nasals in midline 17; inter-orbital breadth 15.5; tip to tip of postorbital process 38; postorbital constriction 26.5; breadth of braincase 41.5; palate 32; length of upper incisive row 10; length of  $p^4$  on outer edge 10.7."

This species is represented by a series of eight specimens collected by Leo E. Miller and H. S. Boyle in southern Bolivia and northern Argentina for The American Museum of Natural History in 1915 and 1916. Four of them are skins, with skulls and field measurements, two of which are adult males, the others an adult female and a young female, the latter with the milk dentition still present. The remaining four are native skins without skulls, designation of sex, or flesh measurements. The two males are from the Province of Sucre at elevations of 8700 and 9400 feet, the adult female is from Tilcara, Santiago del Estero, Province of Jujuy, Argentina, at an altitude of 1800 feet, and the flat skins are from the nearby locality of Lavelle, at the same altitude. They vary in ground color from pale buffy white to rather deep buff; the dark markings are similar in pattern in all but vary somewhat in breadth, being a little coarser or heavier in some than in others. The color pattern is similar to that of *O. geoffroyi* and quite unlike that of *N. guigna*. (See Figs. 20 to 29, pp. 408-417.)

As shown by the tabulated measurements below, this species is much smaller than *geoffroyi*, and much larger than *guigna*. The females are much smaller than the males, and as the adult female of the present series agrees very closely with the measurements given for *salinarum*, and as four of the specimens closely agree with the description of that species, the whole series is referred with little hesitation to *salinarum*. On this basis *O. salinarum* appears to range in latitude from about 19° to 31°, and from an elevation of 1800 (central Cordova in Argentina) to above 9500 feet (Province of Sucre in Bolivia). Five of the specimens were taken at a point (Lavelle) only about 240 miles due north of the type locality of *salinarum* and at the same elevation; one at about the same distance still further north, and two (both males) some 300 miles north of the last named point, the total distance in latitude from the type locality northward to the most northerly point represented by the



present series being about 780 miles. A good series of well-prepared specimens from each of the four districts indicated might show noteworthy local differentiation, not revealed by the present small number of specimens, of which one half are merely hunters' pelts. The accompanying photographic illustrations (Figs. 24-29) show a close similarity in color pattern of specimens from points widely separated by latitude and elevation. It is to be noted that the measurements of the type skull (female) agree closely with those of the adult female of the present series, while the external or "flesh measurements" are much smaller.

There is a marked difference in the size of the skull, in ossification, and in the size of the teeth between the large male skull of *salinarum*, which is at least middle-aged or older (all the sutures except the nasal sutures indistinguishable) and the skull of *geoffroyi*, which is apparently much younger (most of the sutures clearly traceable). In *geoffroyi* the frontal region is more elevated, much broader and more heavily ossified, including the postorbital processes, the temporal ridges are nearer together and much more strongly developed, uniting posteriorly to form a crest 5.5 mm. in height, with a corresponding development of the occipital crests, heavy development of the suborbital region, and very heavy dentition. In the old male skull of *salinarum* the temporal ridges are slight (none present in the younger but fully adult male nor in the female), the general structure of the skull is relatively weak, with which the size of the teeth is correlated. In brief, the skull of *salinarum* is a large edition of that of *Oncilla* or *Noctifelis*, while that of *geoffroyi* is a reduced *Leopardus* type. Yet the color pattern of *salinarum* resembles closely that of *geoffroyi* and is not at all the same as that of *Oncilla*, and still less like that of *Noctifelis*. Hence *salinarum* forms a type of at least subgeneric value intermediate between *Noctifelis* and *Oncifelis*. (See the photographic reproductions of color patterns of *Noctifelis guigna*, *Oncifelis geoffroyi* and *O. salinarum*, pp. 408-417.)

# EXTERNAL MEASUREMENTS OF *Oncifelis salinarum*

CAT. No.	LOCALITY	DATE	SEX AND AGE	TOTAL LENGTH	HEAD AND BODY	TAIL VERTEB.	HIND FOOT	EAR
39004	Rio Cachimayo, Sucre, Bol., 8700 ft.	Dec. 9, 1915	♂	840	440	400	105	55
39010	Pulque, Sucre, Bol., 9400 ft.	Nov. 25, 1915	♂	840	500	340	110	52
41553	Lavelle, Santiago del Estero, 1800 ft.	June 30, 1916	♀	690	430	260	95	50
41551	Lavelle, Santiago del Estero, 1800 ft.	July 9, 1916	♀ juv. <sup>1</sup>	670	420	250	100	50
Type <sup>2</sup>	Cruz del Eje, Cordova, 1800 ft.	Nov. 28, 1901	♀	700	435	265	97	37

<sup>1</sup>With milk dentition.

<sup>2</sup>From Thomas, *loc. cit.*

# CRANIAL MEASUREMENTS OF *Oncifelis salinarum*

(Same specimens as in the Preceding Table)

CAT. No.	SEX	GREATEST LENGTH	CONDYLO-BASAL LENGTH	BASAL LENGTH	PALATAL LENGTH	NASALS ON MIDLINE	ZYGOMATIC BREADTH	INTER-ORBITAL BREADTH	POST-ORBITAL PROC.	POST-ORBITAL CONST.	BREADTH OF BRAIN-CASE	UPPER TOOTH-ROW (C-M)	OUTSIDE LENGTH OF P <sup>4</sup>
39004	♂	90.4	84.8	78.6	34.7	16.8	58.4	16.4	40.8	30.4	42.8	27.8	11.0
39010	♂	90.5	89.0	81.5	53.3	19.2	64.1	17.6	42.5	29.2	44.0	30.0	10.9
41553	♀	84.6	78.4	72.1	30.4	15.4	51.8	13.3	35.6	26.5	41.2	27.8	10.7
41551 <sup>1</sup>	♀ juv.	81.0	73.0	66.8	30.0	12.8	52.3	13.0	30.6	28.2	42.7	19.7	....
Type <sup>2</sup>	♀	84.5	.....	71.0	32.0	17.0	56.5	15.5	38.0	26.5	41.5	....	10.7
16698 <sup>3</sup>	♂?	107.6	98.3	91.3	41.7	21.0	71.7	20.4	....	28.2	45.5	31.7	13.3

<sup>1</sup>With milk dentition; p<sup>4</sup> fully up, crown of p<sup>4</sup> visible under roots of dp<sup>4</sup>.

<sup>2</sup>From Thomas, *loc. cit.*

<sup>3</sup>*Oncifelis geoffroyi*, from southern Patagonia.

Included for comparison with *O. salinarum*.

### 3. *Oncifelis colocolo* (Molina)

*Felis colocolo* MOLINA, Saggio sulla storia nat. del Chili, 1782, pp. 295, 341. Forests of Chili.

*Felis colocolo* PHILIPPI, Arch. f. Naturg., Jahrg. 36, Bd. 1, 1870, pp. 43-45, Pl. I, fig. 7 (animal). Based on a live specimen in the Zoological Garden of Santiago, captured at the Hacienda Dehesa, in a place called Infernillo, in the Cordillera de Santiago, a few leagues from the city of Santiago, late in September, 1869 (*loc. cit.*, p. 44). This locality is now designated as the type locality of the species.

*Felis colocolo* PHILIPPI, Arch. f. Naturg., Jahrg. 39, Bd. 1, 1873, pp. 11-14, Pl. III, figs. 1, 2 (skull).

*Felis colocolo* BURMEISTER, Descrip. phys. Répub. Argentina, III, 1879, p. 126. Includes *Felis jacobita* CORNALIA as a synonym.

*Felis jacobita* CORNALIA, Mem. Soc. Italiana di Sci. nat., I, No. 1, 1865, pp. 1-9, Pl. (animal). "Bolivia; circa Potosi et Humacuaca in montibus sat elevatis."

*Felis jacobita* MATSCHIE, Sitzungsber. Gesells. naturf. Freunde Berlin, 1912, No. 4, p. 258. Regarded as so importantly different from *F. colocolo* that both should stand as distinct "Rassen."

*Felis colocolo* ELLIOT, Mon. Felidae, 1883, Pl. XII (animal). Part; only in so far as it relates to *Felis jacobita* Cornalia, on which the plate and much of the description is based. The plate is an improved copy of Cornalia's, with the attitude altered and the general effect made more artistic.

*Felis colocolo* Molina, as well as Molina's *Felis guigna*, was first placed on a recognizable basis by Philippi in his papers on these species published (*loc. cit.*) in 1870 and 1873. His description and figure were made from a live specimen in the Santiago Zoological Garden, captured in the Cordillera de Santiago, not far from the city of Santiago, in September, 1869. It is characterized especially by its cross-banded pattern of coloration of the back and sides. While in a general way resembling *Felis pajeros* Desmarest, it is instantly distinguished from it by its very long conspicuously black-ringed tail. The cranial differences are set forth in Philippi's second paper (1873, *loc. cit.*) where the skull is figured and compared in detail with the skull of *F. pajeros*. He unfortunately omits to state whence the skull of either *Felis colocolo* or *F. pajeros* which he described were obtained, but the implication of the context seems to be that they were both of Chilean origin. The source of the living specimen (a young male) of *F. colocolo* which served as the basis of his description and figure of the animal is explicitly stated to be the Cordillera de Santiago, only a few leagues ("wenige Stunde") from the city of Santiago. It seems proper to accept this district as the type locality of the species.

The type of *Felis jacobita* Cornalia was sent to him from Buenos Ayres by Professor Mantegazza. Burmeister states (*loc. cit.*, p. 128): "J'ai vu moi-même à Buenos-Ayres, dans les mains de M. le professeur Mantegazza, l'exemplaire que Cornalia a fait dessiner; il avait été

chassé sur les montagnes au-dessus de Potosi et Hamacuaca en Bolivia.” He also states: “L’individu [de *colocolo*] que j’ai examiné, correspond au *Felis jacobina*, dont la description a été prise par Cornalia.” He accordingly refers *Felis jacobita* to *Felis colocolo* as a synonym without apparent reservation. A comparison of the figure of *jacobita* with the later published figure of *colocolo* by Philippi (who evidently was ignorant of the existence of Cornalia’s paper) shows a striking agreement in the pattern of markings in both, and the descriptions of the coloration are strikingly similar for both, except that Philippi makes no mention of the ventral surface, which Cornalia describes as “maculis ventralibus rubiginosus aut lete fulvis.”

*Felis colocolo* Molina is still very imperfectly known, not more than one or two specimens having apparently reached museums, but it is seemingly very distinct from its nearest allies, which are evidently *Felis geoffroyi* Desmarest and *Felis salinarum* Thomas. Its home, so far as known, is the high plateaus of the Andes in Bolivia and Chili.

The history of *Felis colocolo* Molina was long blended with that of *Felis colocolo* Hamilton Smith, who in 1827 (Griffith’s Animal King., II, p. 479 and illustration) described and figured a cat from Guiana which he doubtfully referred to Molina’s species. This proceeding gave rise to a new problem without shedding any light on the old one, and to the increase of synonymy, as, despite the geographic improbabilities, Hamilton Smith’s description and figure became a part of the history of Molina’s *Felis colocolo*, and its range became extended to include Guiana. As Smith’s use of the name, however, was provisional his description and figure of the Guiana specimen became in 1838 the *Felis lineata* of Swainson (Anim. in Menag., p. 128), and, in 1861, of the *Felis strigilata* of Wagner (Schreber’s Säug., Suppl., II, p. 546), and the Smith *colocolo*<sup>1</sup> still remained an unsolved enigma. Indeed, so good a naturalist as St. George Mivart in 1881 (The Cat, p. 413), included in his chapter on the “different kinds of cats” the *Felis colocolo*, giving its distribution as “Guiana and Chili, and doubtless intermediate countries also.” Still later, Richard Lydekker, in his ‘A Hand-book to the Carnivora’ (1895, pp. 177–179, Pl. xx1) gave new life to the legend of the *colocolo* cat, quoting Hamilton Smith’s original picturesque account in full (as good copy for a popular hand-book), and giving its distribution as “north-eastern and western South America, the species being recorded from Guiana and Chili,” etc.

<sup>1</sup>Type, by monotypy, of *Dendrailurus* Severtzow 1858 = *Dendrailurus* Pocock, 1917, invalid because based on an unidentifiable species.

Apropos of the foregoing I cannot resist the temptation to give in full the note by the late John Edward Gray entitled 'On *Felis colocolo*, Hamilton Smith, F. Cuvier, and Geoffroy,' published in 1874 (Ann. Mag. Nat. Hist., (4) XIII, pp. 259-260), since it throws light not only upon the character of this sub-mythical species, but as a revelation of historic interest in connection with the working methods of the artist-naturalist who contributed so largely of both drawings and text to Griffith's 'Animal Kingdom,' and consequently so disastrously and lastingly to the labors of subsequent investigators of the Felidæ, as indicated above in treating of the ocelots. Gray's note gives evidence that it was inspired by no unkind feeling toward his "late friend and teacher, Colonel Hamilton Smith," which fact adds to its interest and value.

Major Hamilton Smith made a figure of an animal "said to have been shot in the interior of Guiana by an officer of Lewenstein's Riflemen, and by him stuffed and sent to England, but which probably never reached its destination." It is represented as a white cat, with various-sized longitudinal brown dashes on its neck and body, with slate-coloured legs and feet, and a slender black tail with numerous white rings.

Of this drawing an account was published in Griffith's 'Animal Kingdom,' in Geoffroy and Cuvier's 'Histoire Naturelle des Mammifères' (where the animal is said to come from Surinam), and in Jardine's 'Naturalist's Library,' iii, p. 256, pl. xxvi, where the legs are erroneously left pale-coloured, though said to be blackish in the description.

I have never seen this cat, and am not aware of its ever having been seen or of its being in any museum in Europe. It certainly is not the *Felis colocolo* of Molina, from Chili, figured by Philippi, Wiegmann's 'Archiv.' 1870 p. 41, t.i. fig. 7, and [1873] t. iii. figs. 1 & 2.

My late friend and teacher, Colonel Hamilton Smith, drew animals most beautifully and with great facility, and made a very large collection of sketches and drawings of them and of antiquities and costumes, which he collected from museums that he visited, and books, and even fragments of skins. Unfortunately, instead of drawing the specimen or the figure of the animal which he examined as it was, he had the habit of improving its attitude, and even of making a beautiful drawing from a bad specimen, or from a fragment of a skin, or from a rough sketch, or from a woodcut or other figure which he found in some old book; and he very often did not mark his drawings whence or how they were obtained; so that it was difficult to tell their authority. He seldom finished or colored his sketches at the time he made them, but would mark on the parts of the drawing with the colour that they ought to be (as "red," "white," "black") without indicating the shade. This explains why the figures which are taken from his sketches in the first volume of Jardine's 'Naturalist's Library' (1842) were so erroneously coloured, and makes the determination of some of his figures doubtful. It was this defect that rendered his beautiful and extensive series of sketches of so little value to the zoological student.

#### 4. *Oncifelis colocolo neumayeri* (Matschie)

*Felis* (*Lynchailurus*) *colocolo neumayeri* MATSCHIE, Sitzungs. Gesells. naturf. Freunde Berlin, 1912, p. 259. Rio das Mortes, Matto Grosso, Brazil (Rio Tocantines drainage).

This is a large form of apparently the *colocolo* group, with which it agrees in general style of coloration, but the markings of the upperparts are described as not so distinctly cross-banded, with other differences of coloration. It is based on a skin (at least no skull is mentioned) the measurements of which are given as head and body 850 mm., tail 410, giving a total length of 1260 mm. This, with the geographical conditions, render it difficult to allocate. It is here included merely as a matter of record.

#### LYNCHAILURUS SEVERTZOW

*Lynchailurus* SEVERTZOW, Mag. de Zool., (2) X, 1858, pp. 386, 390. Type, by monotypy, *Felis pajeros* Desmarest.

*Pajeros* GRAY, Proc. Zool. Soc. London, 1867, p. 269. Type, by both monotypy and tautonymy, *Felis pajeros* Desmarest.

*Lynchailurus* ALLEN, Rep. Princeton Univ. Exped. to Patagonia, III, part I, p. 183, Pl. xxiv (skull), April 28, 1905 = *Lynchailurus* Severtzow.

*Dendrailurus* Pocock, Ann. Mag. Nat. Hist., (8) XX, pp. 348, 349, Nov. 1917. Type, by monotypy, *Felis colocolo* H. Smith = *Felis strigilata* Wagner, an unidentifiable species. Part; not of Severtzow.

General outlines and proportions of the skull much as in *Oncifelis*, but with differences in several important details, particularly in the size and form of the bullæ, which are not only larger and much more inflated, but have the outer chamber "enormously" (Pocock) enlarged; palatal region and mesopterygoid fossa much broader and the latter shorter; the facial portion of the skull correspondingly wider, and the dentition much weaker, particularly  $p^3$  and  $p^4$ . The color pattern is radically different from that of any of the other spotted American cats in having the tail without annulations, and in other respects in the coarse and rather weakly defined and faintly indicated body and head markings, although retaining many of the distinctively 'cat marks' of the felines. It is further distinguished by the character of the pelage, which is coarse and long, and by the presence of a prominent dorsal crest of lengthened black-tipped hairs, divided by a narrow pale line.

The *Lynchailurus pajeros* group ranges from southern Patagonia to northern Argentina in the pampas, and has been recorded as occurring in Chili, southeastern Peru, and also from the vicinity of Quito, Ecuador.

As already indicated in a preceding paper (supra, p. 338), Pocock

adopted *Dendrailurus* Severtzow for the Pampas cats, but the only species referred to this genus by Severtzow was the mythical *Felis strigilata* Wagner, based on Hamilton Smith's description of a cat from Guiana which he "conditionally" referred to *Felis colocolo* Molina. As Smith's *colocolo* is unidentifiable, the genus *Dendrailurus*, based solely upon it, is invalid and cannot be substituted for *Lynchailurus*, based exclusively on *Felis pajeros* Desmarest.

### 1. *Lynchailurus pajeros pajeros* (Desmarest)

*Le Chat Pampa*, AZARA, Essais sur l'Hist. nat. des Quad. de le Paraguay, 1801, pp. 179-184. "Les pampas, au Sud de Buenos-Ayres, entre les pajonals du 35.<sup>e</sup> et du 36.<sup>e</sup> degré de latitude."

*Felis pajeros* DESMAREST, Nouv. Dict. d'Hist. nat., VI, 1816, p. 114. From Azara, as above.

*Pajeros pampanus* GRAY, Proc. Zool. Soc. London, 1867, p. 269. New name for *Felis pajeros* Desmarest.

*Felis passerum* SCLATER, List of Vert. Anim., 1872, p. 40. The name *passerum* proposed as a classical substitute for the barbarous *pajeros* of Desmarest.

*Felis pajeros* PHILIPPI, Arch. f. Naturg., 1873, Bd. 1, pp. 10-15, Pl. III, figs. 1 and 2 (skull). Comparison of the skull structure with that of *Felis geoffroyi* (= *F. colocolo* Philippi, not of Molina nor of Ham. Smith). No localities mentioned for either.

*Felis pajeros* BURMEISTER, Descrip. phys. Répub. Argentine, III, 1879, pp. 128-130. Part. Found throughout the Province of Buenos-Ayres, but rare more to the northward, but a specimen is recorded from Entre-Rios; not rare in Chili.

The range of the type form of *pajeros* is at present impossible to define. The type locality is about midway the range of the group, with that of *p. crucina* at the southward in Patagonia; recently other forms have been set off at the northward, which are as yet known only from their respective widely separated type localities. It was first made known from the Province of Buenos Ayres by Azara as the Chat Pampa, from specimens he obtained inland from La Plata, in latitude 35° to 36°, from which region it has since been frequently reported, and is said to have formerly been common in Uruguay, but absent from Paraguay.

### 2. *Lynchailurus pajeros crucina* (Thomas)

*Felis pajeros* WATERHOUSE, Zool. Voy. Beagle, Mamm., 1839, p. 18, Pl. IX (animal). Santa Cruz, Patagonia.

*Felis pajeros crucina* THOMAS, Ann. Mag. Nat. Hist., (7) VIII, p. 247, Sept. 1901. Santa Cruz, Patagonia, lat. 50° S. Based on the Santa Cruz specimen described and figured by Waterhouse, as above.

*Felis pajeros crucina* ALLEN, Rep. Princeton Univ. Exped. to Patagonia, III, part I, 1905, pp. 183-186, Pl. XXIV (skull). Río Gallegos, Patagonia, lat. 51° S.

A large pale southern form, with the color markings indistinct except on the ventral surface and limbs, and with the dorsal crest strongly developed. Total length, 1070 mm.; head and body, 790; tail, 270. Skull: total length, 108; condylobasal length, 96.8; basal length, 91.7; zygomatic breadth, 78.6.

### 3. *Lynchailurus pajeros thomasi* (Lönnberg)

*Felis pajeros thomasi* LÖNNBERG, Ark. för Zoologi, VIII, No. 16, p. 7, Pl. 1 (animal), July 12, 1913. "Shot in a sugar-cane field near Quito, Ecuador."

Color pattern strongly defined; size smaller than in the more southern forms. Total length (male, type), 780 mm.; head and body, 510; tail, 270. Skull: greatest length, 88; condyloincisive length, 82; basal length, 76; zygomatic breadth, 64 (Lönnberg, *loc. cit.*).

Known only from the type, from a quite unexpected locality (Quito, Ecuador) for a member of the *pajeros* group.

### 4. *Lynchailurus parjeros garleppi* (Matschie)

*Felis (Lynchailurus) parjeros garleppi* MATSCHIE, Sitzungsber. Gesells. naturf. Freunde Berlin, 1912, No. 4, p. 259. Cuzco, Peru.

*Felis pajeros garleppi* LÖNNBERG, Ark. för Zool., VIII, No. 16, p. 9, July 1913.

According to Lönnberg (*loc. cit.*), *L. p. garleppi* is larger than his *L. p. thomasi*, and has "the blackish spots of the lower side less conspicuous, the reddish spots on the sides smaller and more continuous, the dark cross-bands of the hind legs less sharply developed, but the cross-bands of the forelegs complete and not broken up," etc. He gives measurements of the skull, in comparison with those of *thomasi*, those of *garleppi* being: condyloincisive length, 87 mm.; basal length, 78.3; zygomatic breadth, 66; length of  $p^4$ , 12 (as against 10 in *thomasi*). To Dr. Lönnberg is due the credit of making known the real characters of Matschie's *garleppi*, for which mammalogists should be grateful.

### 5. *Lynchailurus pajeros braccatus* (Cope)

Figures 30 and 31, type

*Felis braccata* COPE, Amer. Nat., XXIII, pp. 144-146, Feb. 1889. "Rio Grande do Sul, or in Matto Grosso" (=Chapada, Matto Grosso, Brazil). Skin, without skull.

Cope compared his *Felis braccata* (a skin without skull), with the *Felis yaguarondi* of authors, but so clearly pointing out its differences from that species in color markings and other features as to render it quite evident that his *braccata* was quite unlike any known phase of *yaguarondi*. Whenever it has since been mentioned, however, it has



been associated with the *yaguarondi* group. Feeling sure that the type specimen was in the museum of the Philadelphia Academy of Natural Sciences, I wrote to Dr. Witmer Stone, Curator of Mammals and Birds, requesting that, if practicable, he would kindly have it sent to me for examination. It proved to have been mounted, but nevertheless was duly forwarded. At a glance it was evident that its affinities were not with the *jaguarondis*, and as clearly that it was a member of the *Lynchailurus pajeros* group. The coarse, harsh pelage, the presence of an incipient dorsal crest of lengthened hairs, and the color pattern are as in the *pajeros* group, with the marked difference that the lower part of the limbs and feet are blackish instead of pale buffy gray. The general coloration of the upperparts is somewhat darker, due mainly to the darker tone of the underfur. The oblique and ill-defined bands on the sides are rather stronger and more obvious, as are the cross-bands on the proximal portions of the limbs, throat, and fore-neck, while the spotting of the underparts is better defined and darker. The apical two inches of the tail is black slightly grizzled with gray, in contrast with the more proximal part. The lower portion of the fore limbs, extending upward on the inner side, is brownish black, increasing distally in intensity to dull black on the feet. The hind limbs are similarly darkened. The ground color of the flanks, chin, and whole underparts is faintly yellowish, but the dark spots are not bordered with yellow as is usually the case in typical *pajeros*. The ears externally are black for about the anterior half, the rest of the outer surface being gray, with no distinctly lighter spot.

The dark color of the limbs and the wholly black feet at first suggest a melanistic specimen of the *pajeros* type but careful consideration of the coloration as a whole hardly bears out this impression, and it seems preferable for the present to allow *braccata* to stand as a probable regional form of the *pajeros* group, characterized especially by its dark limbs and feet.

The locality of the type specimen is given by Cope as "the province of Rio Grande do Sul or in Matto Grosso," the collector's label having been lost, and also the skull. The type was collected by Herbert H. Smith on his Chapada, Matto Grosso, expedition in 1882-1886, who, on his way to Chapada landed at Porto Alegre, Rio Grande do Sul, passing through this province in a northwesterly direction to the Uruguay River, stopping en route for several months at São João do Monte Negro in about latitude 28°, where he made collections which included, according to Cope's synopsis (*loc. cit.*, pp. 148-150), 26 species of mammals. In

the synopsis *Felis braccata* is placed in the Chapada list, and only *Felis geoffroyi*, of the cats, is credited to São João.

On Mr. Smith's return to the United States his collections of birds and insects were placed in storage at The American Museum of Natural History, his mammals and reptiles having been delivered direct to the late Professor E. D. Cope of Philadelphia, as per contract. Later his bird collection and duplicate mammals were purchased by this Museum. The latter numbered about eighty specimens, and were chiefly skulls and skeletons, representing about fifteen species. Among the five cat skulls is one (Amer. Mus. No. 354) that I have never been able to identify until now. It proves to be a *Lynchailurus*, but is so much smaller than the only other skull of this group I have been able to examine (an old male skull of *L. pajeros crucina* from southern Patagonia) that its relationship to this form was overlooked. It now proves, beyond reasonable doubt, to be the type skull of Cope's *Felis braccata*. It fortunately has still attached to it the collector's original label bearing the following legend: "No. 3. Gato Merrisco. Chapada, Matto Grosso, Nov. 1884." The skull is fully adult, and an examination of the skin shows that the specimen was a male. It differs mainly from the above-mentioned skull from southern Patagonia (about S. lat. 50°) in its much smaller size. It has, however, a vestigial p<sup>2</sup>, absent in the other, and the dorsal outline of the nasals forms a slight angle at the proximal third, instead of being evenly convex. The audital bullæ are also much less inflated. This discovery of the skull of the type specimen of *Felis braccata* renders it possible to assign with certainty the type locality of the species, on the basis of the collector's original field label.

*Lynchailurus pajeros* proves to be a wide-ranging, plastic group. While the color pattern and the general external and cranial characters remain almost unchanged through a geographic range of 34° of latitude (from about 18° to 52° S.) in the pampas country, and extends in the eastern Andean region to the equator, the color tones and texture of the pelage greatly vary locally, and the size of the animal decreases from the south northward, as shown by the measurements of skulls given below. In the extreme south the color markings are indistinct except on the cheeks, limbs, throat and ventral surface, and the general tone is pale and the pelage long and coarse. In the middle districts (typical *pajeros* of Buenos Ayres), the general tone is more fulvous, the markings on the sides of the body more distinct, and elsewhere edged or suffused with fulvous. In the extreme north (*thomasi*, Quito) the pelage is much softer and shorter and the body markings are more strongly defined and reddish

MEASUREMENTS OF SKULLS OF SUBSPECIES OF *Lynchaillurus pajeros*

	TOTAL LENGTH	CONDYLO- BASAL LENGTH	BASAL LENGTH	ZYGOM- ATIC BREADTH	INTER- ORBITAL BREADTH	POSTORB. CONSTR.	BREADTH OF BRAIN- CASE	LENGTH OF P <sup>4</sup>
<i>L. pajeros crucina</i> <sup>1</sup>	108.2	96.0	91.7	78.6	22.2	29.5	46.4	11.6
<i>L. pajeros pajeros</i> <sup>2</sup>	102.0	....	....	74.0	....	....	....	....
<i>L. pajeros braccatus</i> <sup>3</sup>	93.0	89.3	82.1	62.2	18.1	29.7	42.2	11.6
<i>L. pajeros garleppi</i> <sup>4</sup>	....	87.0	78.3	66.0	18.2	28.5	....	12.0
<i>L. pajeros thomasi</i> <sup>5</sup>	88.0	82.0	76.0	64.0	16.5	24.8	41.0	10.0

<sup>1</sup>No. 16695, ♂ ad., Rio Gallegos, Patagonia, lat. 52° S.<sup>2</sup>Type, No. 354, ♂ ad., Chapada, Matto Grosso, Brazil.<sup>3</sup>Type, ♂, Lönnberg, *loc. cit.*, p. 8.<sup>4</sup>Philippi, Arch. Naturg., XXXIX, Bd. 1, 1873, p. 15.<sup>5</sup>Type, measurements from Lönnberg, Ark. Zool., VIII, No. 16, July 1913, p. 9. Exact locality not stated.

(see Lönnberg's plate, *loc. cit.*). In *L. p. braccatus*, from the Upper Paraguay River, the body is dark gray with a faint tone of buff, the markings on the sides of the body are moderately pronounced, the black markings without fulvous edging, the limbs and feet blackish instead of gray.

The forms of this group are little known, three of them (so far as published records go) only from their respective type specimens, and representatives of the two older known forms appear to be extremely rare in collections.

#### HERPAILURUS SEVERTZOW

*Herpailurus* SEVERTZOW, Rev. et Mag. de Zool., (2) X, pp. 385, 390, Sept. 1858. Type, by monotypy, *Felis yaguarondi*. Proposed for the Yaguaroundi and Eyra of Azara, color phases of the same species.

*Herpailurus* POCCOCK, Ann. Mag. Nat. Hist., (8) XX, 1917, pp. 346, 350. Part; only the *H. yaguarondi* group.

The genus *Herpailurus* originally included only the slender-bodied, long-tailed, unspotted weasel-cats of the *yaguarondi* group, further well characterized by distinctive and well-known cranial characters. To this group the name is here restricted.

The *yaguarondi* group appears to be still poorly represented in museums and at present is very imperfectly known as to the regional forms that compose it. It presents two color phases, a gray and a red, which occur throughout its range, these phases having up to the beginning of the present century been supposed to represent different species, but for the last decade or so have been considered by specialists of the group as dichromatic conditions of a single species. Of the twenty specimens available for examination in this connection, the greater part are hunter's pelts, without skulls or flesh measurements. There is apparently very little difference in the external appearance of specimens from southern Matto Grosso, Brazil, on the one hand, and from Sinaloa, Mexico, and Cameron County, Texas, on the other. Several specimens from intermediate points, as Merida, Venezuela, the upper Rio Cauca region of Colombia, and Chiriqui, Panama, are quite different from either, in both phases of coloration. As there is evident in the material at hand a considerable amount of individual variation in specimens of each color phase, it seems the better course not to increase the names already existing until more representative material from many localities has been brought together.

1. *Herpailurus yaguarondi cacomitli* (Berlandier)<sup>1</sup>

Figures 5c, 8b, 11b, 13c

*Felis cacomitli* BERLANDIER, MSS., in Baird, Rep. U. S. and Mex. Bound. Surv., II, Mamm., 1859, p. 12. Matamoras, Tamaulipas, Mexico. MEARNS, Proc. U. S. Nat. Mus., XXIV, p. 207, Oct. 4, 1901. Dark phase.

*Felis cacomitli* ALLEN, Bull. Amer. Mus. Nat. Hist., XXII, p. 222, July 25, 1906. Escuinapa, Sinaloa, Mexico.

*Felis eyra* BAIRD, Mamm. N. Amer. 1857, p. 88, Pl. LXII (animal); Rep. U. S. and Mex. Bound. Surv., II, Mamm., 1859, p. 10, Pl. II (animal), Pl. XII, fig. 2 (skull). Matamoras, Tamaulipas, Mexico. Red phase.

*Felis apache* MEARNS, Proc. Biol. Soc. Washington, XIV, p. 150 (in text), Aug. 9, 1901. Matamoras, Tamaulipas, Mexico. Red phase. New name for *Felis eyra* Baird.

*Felis yaguarondi tolteca* THOMAS, Ann. Mag. Nat. Hist., (7) I, p. 41, Jan. 1898. Tatameles, Sinaloa, Mexico. Dark phase. To replace *F. cacomitli*, considered unavailable.

?*Felis fossata* MEARNS, Proc. Biol. Soc. Washington, XIV, p. 150, Aug. 9, 1901. Merida, Yucatan. Based on a skull, sex not known.

The first four names in the above citations (*cacomitli*, *eyra*, *apache*, *tolteca*) all doubtless refer to the same form, three of them relating to specimens from Matamoras, Mexico; the other (*tolteca*) was given to replace *cacomitli*, considered to be untenable. The last name, *fossata*, was based on a single skull from Merida, Yucatan, of which the sex was not known. The description affords no characters that are distinctive, but on geographical grounds a query has been prefixed to the citation.

The dozen or more skulls before me at this writing include three from the vicinity of Brownsville, three from Escuinapa, Sonora; the others are from various localities, including a very large skull from San José, Costa

<sup>1</sup>As the availability of the name *Felis cacomitli* Berlandier was formerly questioned, I give here its original basis and history.

The name first appeared as "*Felis cacomitli* Berl. MSS." in the synonymy under the heading "*Felis yaguarundi* Desmarest" in Baird's Mamm. N. Amer., 1858, p. 88. In the general text below Baird adds: "A skull (No. 1426) of this species, in the collection of Dr. Berlandiere, collected at Matamoras, with a full description of the animal by him, establishes a more northern distribution for this species than has hitherto been accorded."

Baird's report on the mammals of the Mexican Boundary, published a year later, contains (p. 12) the following, also under the heading *Felis yaguarundi*:

"The existence of this species on the Rio Grande, like the *F. eyra*, is established by a skull (1426) in the collection of Dr. Berlandiere, and a description in his MSS. as *Felis cacomitli*." The name was not adopted by Baird.

At the end of the account of *Felis yaguarundi*, on the next page (p. 13), the following is given in small type in marks of quotation:

"A kind of cat, or at least a digitigrade, common in Mexico before the conquest, but at present very rare.

"It is grey, but the hairs considered separately, are tinged with rufous and black; their extremities blackish.

"I have been assured that it is killed sometimes in the vicinity of Victoria, the capital of the State of Tamaulipas, and on the plateau of Mexico. On the borders of the Rio Bravo del Norte it is killed in the vicinity of Matamoras. I believe it is not found in Texas." (Berlandiere.)

Whatever may have been contained in Berlandier's "full description" mentioned by Baird, this is all that appears to have come down to us. Under present usage, however, the name *Felis cacomitli* is apparently available, having a tangible basis.

Rica. This skull is much larger than any of the others; it is also very old, and has a heavy lambdoid crest and a deep frontal sulcus. Whether these differences indicate a separable geographic form can be determined only by the examination of further material from the highlands of Costa Rica. The three specimens from Escuinapa vary in condylobasal length from 89.6 to 102 mm., and in zygomatic breadth from 58.5 to 77.4 mm., the extremes covering the range of a similar series from Brownsville, Texas. The same measurements in the Costa Rica specimen are 102 and 76.

## 2. *Herpailurus yaguarondi panamensis* (Allen)

*Felis panamensis* ALLEN, Bull. Amer. Mus. Nat. Hist., XX, p. 71, Feb. 29, 1904. Type locality, Boqueron, Chiriqui, Panama.

A very dark form known only from the type, a young adult female. Possibly the large skull from Costa Rica (collected near San José) is referable to this form.

Since describing this form, which I have still no doubt is entitled to recognition, two somewhat similar specimens (skins only) have been received from other and quite remote districts, which in their dark coloration strongly resemble the type of *panamensis*, especially characterized by a broad, black, median dorsal band extending to the tip of the tail, which latter is apically almost wholly black. In specimens from northern Mexico and Texas, and also from southern Matto Grosso, the dark dorsal band is either wholly absent or only incipiently developed. Specimens in the red phase from tropical regions, as Colombia and southern Bolivia, are far more intensely colored than are the specimens from either the northern or the southern border of the range of the group.

## 3. *Herpailurus yaguarondi melantho* (Thomas)

*Felis yaguarondi melantho* THOMAS, Ann. Mag. Nat. Hist., (8) XIII, 1914, p. 350. Pozuzo, Peru. Altitude 800 m.

Distinguished by large size, as indicated by an adult male and female on which the species is based. Condylobasal length of the two skulls: ♂ 111 mm., ♀ 101; zygomatic breadth, 75, 68. The same measurements of a large skull from San José, Costa Rica (referred to above), are 102 and 76.

In this connection Thomas makes the following interesting comment on the constituents of the jaguarondi group: "The different forms of the jaguarondi seem to be distinguishable by little but size, as their color varies exceedingly, specimens from the same locality, unquestionably

conspecific, often differing widely in their tone of grey, blackish, or rufous. The variation in the development of the protocone of the carnassial is also very striking, and it is well shown in the two specimens of the present form [*Felis jaguarondi melantho*], the male having it reduced (as is common in jaguarondis) and the female having quite a large one.

"The largest jaguarondi is this one from the Peruvian Andes, the central one from Venezuela to Argentina is intermediate in size, while the Guianian and Eastern Brazilian form, for which the name of *unicolor* is available, is the smallest of all."

#### 4. *Herpailurus jaguarondi unicolor* (Traill)

*Felis unicolor* TRAILL, Mem. Wernerian Soc., III, 1819, p. 170, Pl. x (animal). "Demerary, Guyana."

[*Felis jaguarondi*] *unicolor* THOMAS, Ann. Mag. Nat. Hist., (8) XIII, 1914, p. 350 (in text).

This, according to Thomas (*loc. cit.*), is the smallest member of the group; he signalizes its range as the Guianas and eastern Brazil.

#### 5. *Herpailurus jaguarondi jaguarondi* (Lacépède)

*L'yagouaroundi*, AZARA, Essais sur l'Hist. nat. Quad. du Paraguay, I, 1801, pp. 171-176, and Voy. dans l'Amér. Mérid., 1880, Atlas, Pl. x (animal).

*Felis jaguarondi* LACÉPÈDE, in Azara's Voy. dans l'Amér. Mérid., 1908, Pl. x (animal) = *L'yagouroundi* of Azara. No technical name is applied to the *Yaguarondi* in the chapter on mammals in Volume I of the Voyage.

*Felis jaguarondi* G. CUVIER, Ann. du Mus. d'Hist. nat., XIV, 1809, p. 158 = *Felis jaguarondi* Lacépède.

*Felis jaguarondi* DESMAREST, Nouv. Dict. d'Hist. nat., VI, 1916, p. 113; Mammalogie, I, 1820, p. 250, No. 361 = *Felis jaguarondi* Lacépède.

*L'Eyra* AZARA, Essais sur l'Hist. nat. Quad. du Paraguay, I, 1801, pp. 177-178.

[*Felis*] *eyra* G. FISCHER, Zoognosia, III, 1814, p. 228 = *L'Eyra* of Azara.

*Felis eira* DESMAREST, Nouv. Dict. d'Hist. nat., VI, 1816, p. 114 = *L'Eyra* of Azara.

*Felis eyra* F. CUVIER, Dict. des Sci. nat., VIII, 1817, p. 250 = *L'Eyra* of Azara.

*Felis* *L* [eo] *griseus* Oken, Lehrb. Naturg., Theil 3, Zool., Abth. 2, 1816, p. 1070 = *L'yaguarondi* of Azara.

*Felis darwinii* MARTIN, Proc. Zool. Soc. London, 1837 (Oct. 3, 1837), pp. 3-4. Buenos Ayres. Gray phase. Skin (without skull?) of an immature specimen.

Paraguay, Argentina, and southern Brazil. "Paraguay to Argentina" (Thomas, *loc. cit.*, 1914).

The name *Felis jaguarondi* has usually been credited to Desmarest (1816 or 1820), and the name *Felis jaguarondi* to G. Fischer (1814). The figure of Azara's *yagouaroundi*, in the atlas to his 'Voyage dans l'Amerique meridionale' (Plate x), published in 1808, bears the legend:

"Le Yagouarondi D'Az. *Felis yaguarondi* Lacép." G. Cuvier, one year later (1809, *loc. cit.*), used the form *Felis jaguarondi*, crediting the name to Lacépède, and citing plate x of the collection of plates to Azara's 'Voyage' and "Le jaguarondi du Paraguay" "que M. d'Azzara nous a fait connoître le premier."

The name *Felis eyra*, also usually attributed to Desmarest, was given by G. Fischer (Zoognosia, III, p. 228) to Azara's Eyra, which he called *Felis eyra*, but he did not name Azara's Yagouarondi, which he merely mentioned under his *Felis catus* (p. 228) as a little known species. His citation is: "3. *Yaugouroundi*, AZARA, Paraguaia, I, 171." There is thus no basis for the "*Felis jaguarundi* Fischer, Zoogn., 1814, p. 228." so often met with as a citation.



## LIST OF ILLUSTRATIONS

## Skulls

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- Fig. 6a. *Margay tigrina wiedii* (Schinz). Ventral view.  $\frac{1}{4}$ . Same skull as Figs. 4a, 9a, 12b.
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- 10b. *Oncifelis geoffroyi* (D'Orbigny and Gervais). Dorsal view.  $\frac{1}{4}$ . Same skull as Figs. 5a, 7b, 13a.
- Fig. 11a. *Oncifelis salinarum* (Thomas). Dorsal view.  $\frac{1}{4}$ . Same skull as Figs. 5b, 8a, 13b.
- 11b. *Herpailurus yaguarondi cacomitli* (Berlandier). Dorsal view.  $\frac{1}{4}$ . Same skull as Figs. 5c, 8b, 13c.

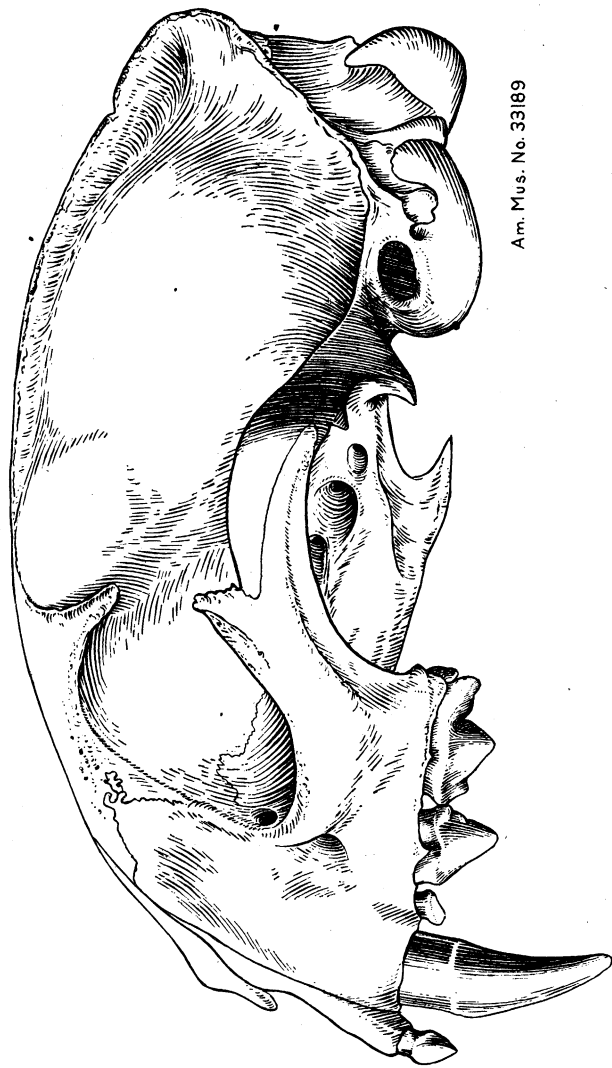
- Fig. 12a. *Leopardus pardalis mearnsi* (Allen).  $\frac{1}{4}$ . Same skull as Figs. 1-3.  
12b. *Margay tigrina wiedii* (Schinz).  $\frac{1}{4}$ . Same skull as Figs. 4a, 6a, 9a.  
12c. *Oncilla pardinoides emerita* (Thomas).  $\frac{1}{4}$ . Same skull as Figs. 4b, 6b, 9b.  
12d. *Noctifelis guigna* (Molina).  $\frac{1}{4}$ . Same skull as Figs. 4c, 7a, 10a.  
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13b. *Oncifelis salinarum* (Thomas).  $\frac{1}{4}$ . Same skull as Figs. 5b, 8a, 11a.  
13c. *Herpailurus yaguarondi cacomitli* (Berlandier).  $\frac{1}{4}$ . Same skull as Figs. 5c, 8b, 11b.

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- Fig. 14. *Leopardus pardalis chibigouazou* (Griffith). No. 41303, Descalvados, Matto Grosso, Brazil. George K. Cherrie, Roosevelt South American Expedition. Ground color of upperparts ochraceous buff.  $\frac{1}{8}$ .  
Fig. 15. *Leopardus pardalis chibigouazou* (Griffith). No. 41309, Descalvados, Matto Grosso, Brazil. George K. Cherrie, Roosevelt South American Expedition. Ground color of upperparts ochraceous buff, a little paler than in No. 41303.  $\frac{1}{10}$ .  
Fig. 16. *Leopardus pardalis chibigouazou* (Griffith). No. 41308, Descalvados, Matto Grosso, Brazil. George K. Cherrie, Roosevelt South American Expedition. Ground color of upperparts light ochraceous buff.  $\frac{1}{8}$ .  
Fig. 17. *Leopardus pardalis chibigouazou* (Griffith). No. 41307. Descalvados, Matto Grosso, Brazil. George K. Cherrie, Roosevelt South American Expedition. Ground color of upperparts light ochraceous buff.  $\frac{1}{4}$ .  
Fig. 18. *Leopardus pardalis chibigouazou* (Griffith). No. 41306, Descalvados, Matto Grosso, Brazil. George K. Cherrie, Roosevelt South American Expedition. Ground color of upperparts light buff.  $\frac{1}{8}$ .  
Fig. 19. *Leopardus pardalis tumatumari* (Allen). No. 40837, near Santarem, Brazil. George K. Cherrie, Collins-Day South American Expedition. Ground color tawny and white.  $\frac{1}{4}$ .  
Fig. 20a. *Noctifelis guigna* (Molina). No. 33287, ♀, Marquhue, Temuco, Cautin, Chili, July 19, 1910. D. S. Bullock. Dorsal view. Ground color ochraceous buff, markings deep black.  $\frac{1}{8}$ .  
20b. *Noctifelis guigna* (Molina). No. 33283, ♂, Marquhue, Temuco, Cautin, Chili, June 8, 1911. D. S. Bullock. Dorsal view. Ground color slightly lighter than in No. 33287 and black markings coarser, giving a much darker general effect.  $\frac{1}{8}$ .  
Fig. 21. *Noctifelis guigna* (Molina). Same specimens as Figs. 20a and 20b. Side view.  
Fig. 22. *Noctifelis guigna* (Molina). Same specimens as Figs. 20a, 20b. Ventral view. Ground color of foreneck and underside of tail light buff, rest of underparts clear white.

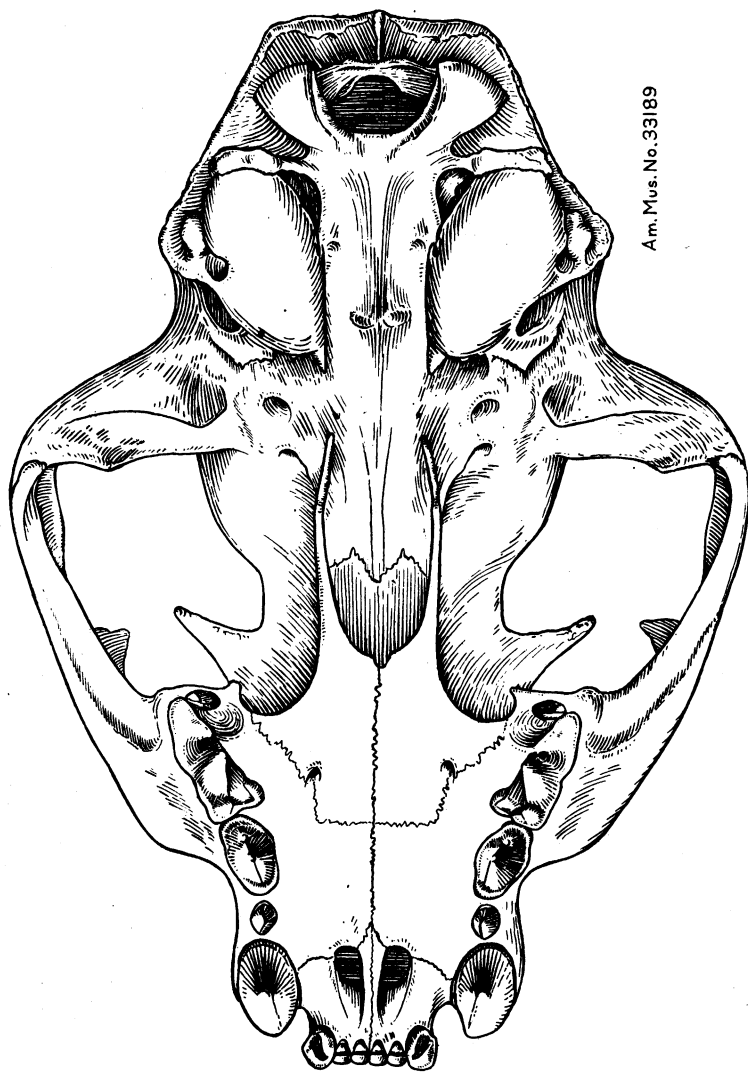
- Fig. 23. *Oncifelis geoffroyi* (D'Orbigny and Gervais). No. 16696, ♂, Cañada las Vacas, Patagonia (S. lat. 51°), July 26, 1899. Barnum Brown. The markings are black, the ground color light gray faintly toned with pale buff. For comparison with *O. salinarum*.  $\frac{1}{4}$ .
- Fig. 24. *Oncifelis salinarum* (Thomas). No. 39010, ♂, Pulque, Sucre, Bolivia, alt. 9400 feet, Nov. 25, 1915. Leo E. Miller and H. S. Boyle. Markings black, ground color buff.  $\frac{1}{6}$ .
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- Fig. 26. *Oncifelis salinarum* (Thomas). No. 41550, ♂?, Lavalley, Santiago del Estero, alt. 1800 feet, July 8, 1916, Miller and Boyle. Ground color buff, indistinguishable in tone from that of No. 39010.  $\frac{1}{6}$ .
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- Fig. 28. *Oncifelis salinarum* (Thomas). No. 41554, ♂?, Lavalley, Santiago del Estero, Argentina, alt. 1800 feet, July 8, 1916. Miller and Boyle. Ground color pale buff, indistinguishable from that of No. 39010.  $\frac{2}{11}$ .
- Fig. 29. *Oncifelis salinarum* (Thomas). No. 41555, ♂?, Lavalley, Santiago del Estero, Argentina, alt. 1800 feet, July 8, 1916. Miller and Boyle. Ground color gray with a faint buffy tone.  $\frac{1}{6}$ .
- Fig. 30. *Lynchailurus pajeros braccata* (Cope). Type, Museum of Philadelphia Academy of Natural Sciences. Chapada, Matto Grosso, Brazil. Side view of mounted specimen.  $\frac{1}{4}$ .
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Am. Mus. No. 33189

Fig. 1. *Leopardus pardalis mearnsi* (Allen). No. 33189, ♂, Matagalpa, Nicaragua. Lateral view of skull.  $\frac{1}{4}$ .



Am. Mus. No. 33189

Fig. 2. *Leopardus pardalis mearnsi* (Allen). Dorsal view.  $\frac{1}{4}$ . Same skull as Fig. 1.

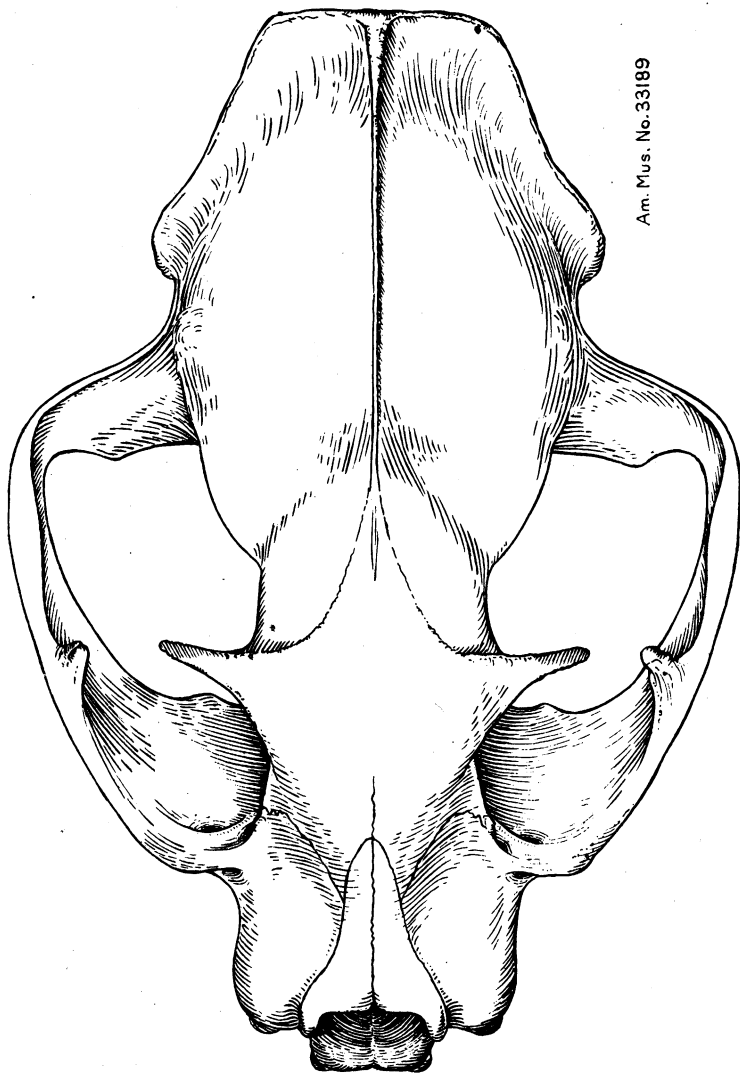


Fig. 3. *Leopardus pardalis meurnsi* (Allen). Ventral view.  $\frac{1}{4}$ . Same skull as Figs. 1 and 2.

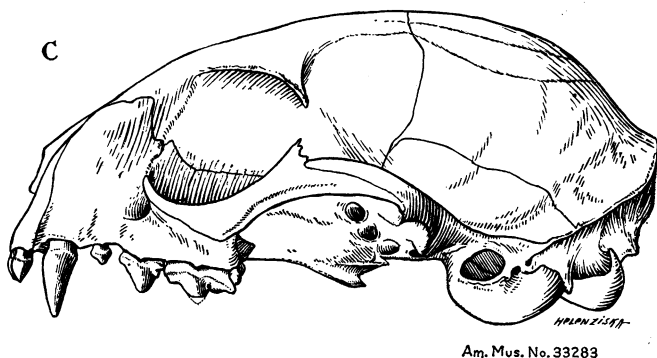
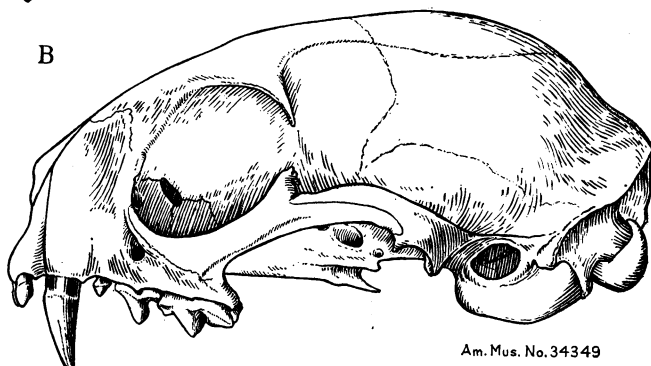
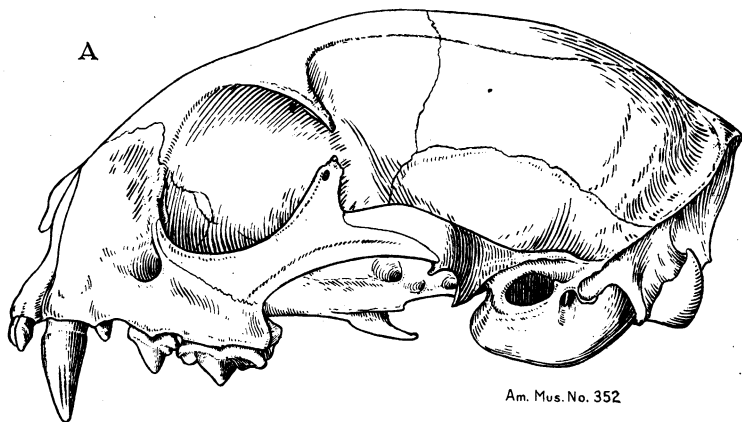


Fig. 4a. *Margay tigrina wiedii* (Schinz). No. 352, ♂, Cnapada, Matto Grosso, Brazil. Lateral view.  $\frac{1}{2}$ .

Fig. 4b. *Oncilla pardinoides emerita* (Thomas). No. 34349, ♂, Merida, Venezuela. Lateral view.  $\frac{1}{2}$ .

Fig. 4c. *Noctifelis guigna* (Molina). No. 33283, ♂, Marquhue, Temuco, Chile. Lateral view.  $\frac{1}{2}$ .



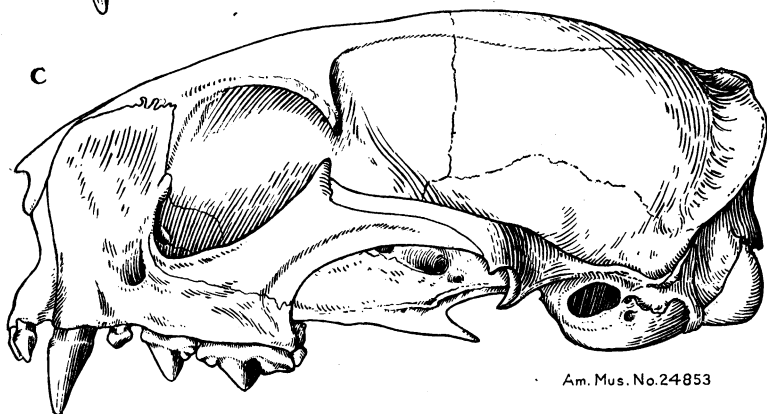
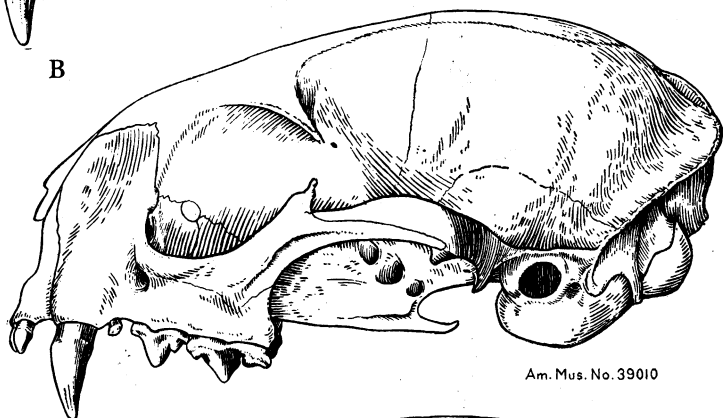
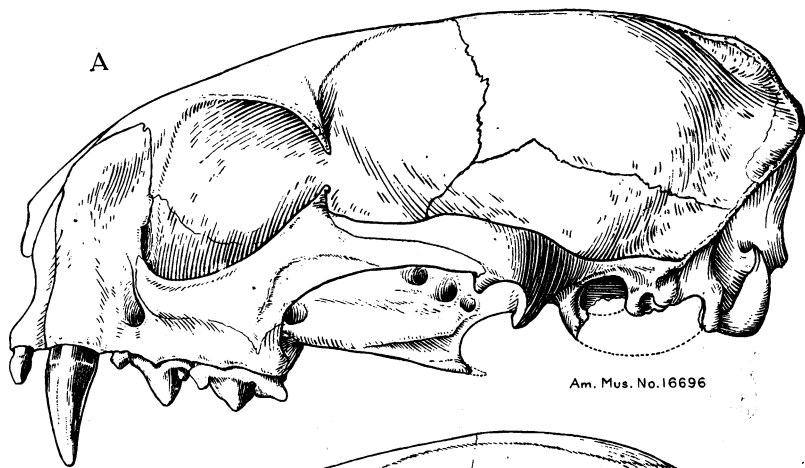


Fig. 5a. *Oncifelis geoffroyi* (D'Orbigny and Gervais). No. 16696, ♂, Cañada las Vacas Patagonia (S. lat. 51°). Lateral view.  $\frac{1}{4}$ .  
 Fig. 5b. *Oncifelis salinarum* (Thomas). No. 39010, ♂, Pulque, Sucre, Bolivia (alt. 9400 feet). Lateral view.  $\frac{1}{4}$ .  
 Fig. 5c. *Herpailurus yaguarondi cacomitli* (Berlandier). No. 24853, ♂, Escuinapa, Sinaloa, Mexico. Lateral view.  $\frac{1}{4}$ .

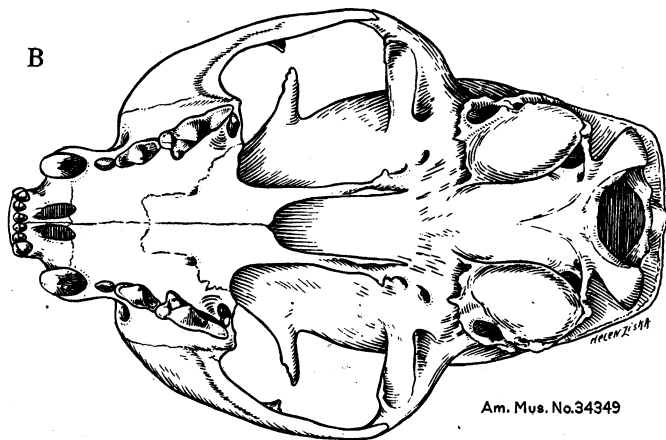
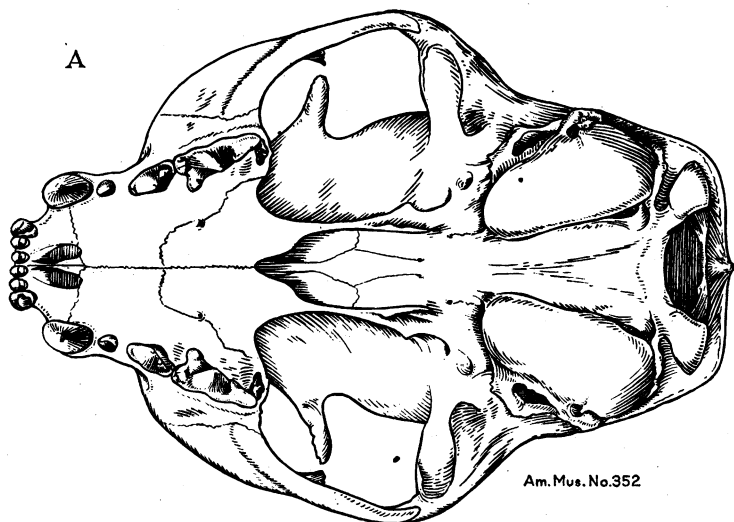
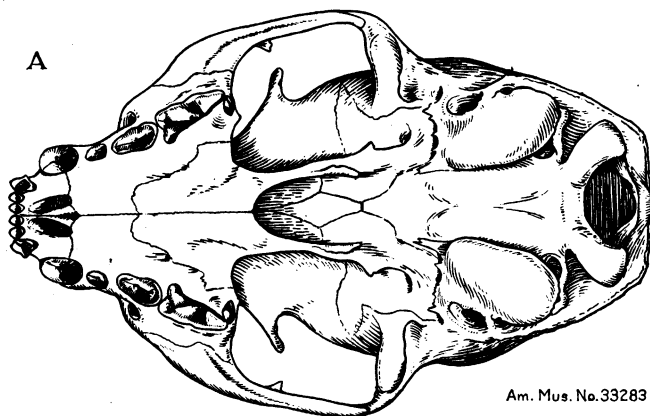


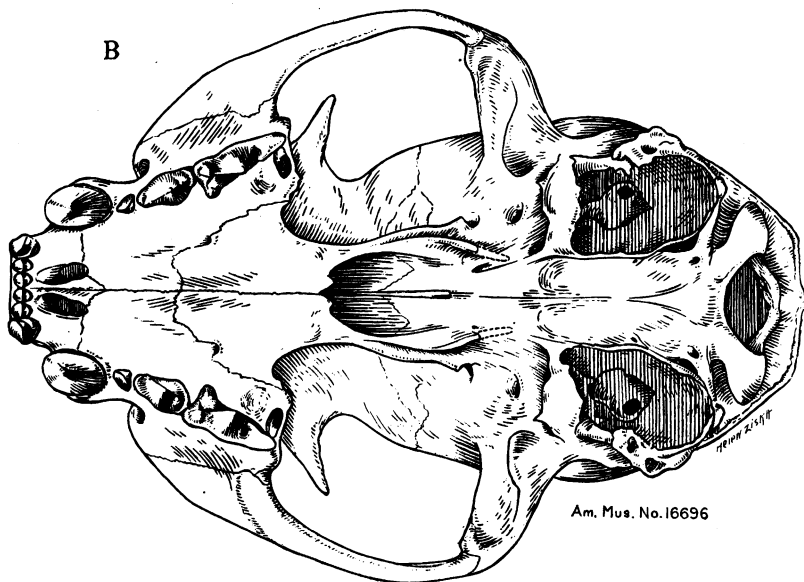
Fig. 6a. *Margay tigrina wiedii* (Schinz). Ventral view.  $\frac{1}{4}$ . Same skull as Figs. 4a, 9a, 12b.  
Fig. 6b. *Oncilla pardinoides emerita* (Thomas). Ventral view.  $\frac{1}{4}$ . Same skull as Figs. 4b, 9b, 12c.

A



Am. Mus. No. 33283

B



Am. Mus. No. 16696

Fig. 7a. *Noctifelis guigna* (Molina). Ventral view.  $\frac{1}{4}$ . Same skull as Figs. 4c, 10a, 12d.  
Fig. 7b. *Oncifelis geoffroyi* (D'Orbigny and Gervais). Ventral view.  $\frac{1}{4}$ . Same skull as Figs.  
5a, 10b, 13a.

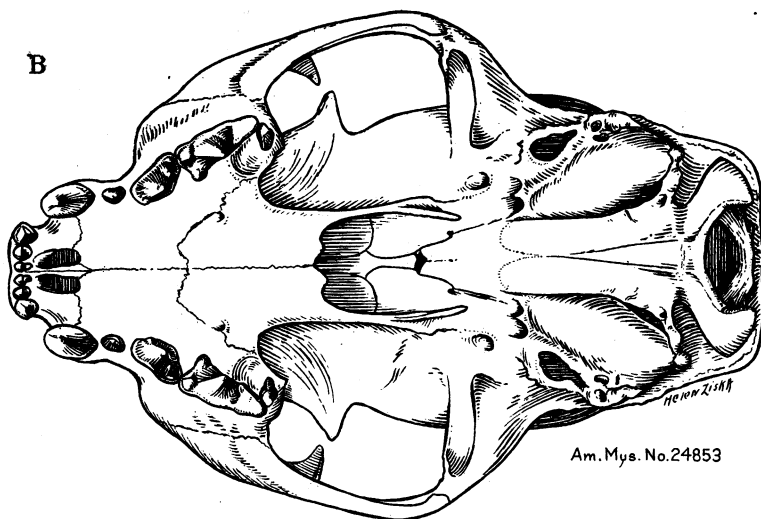
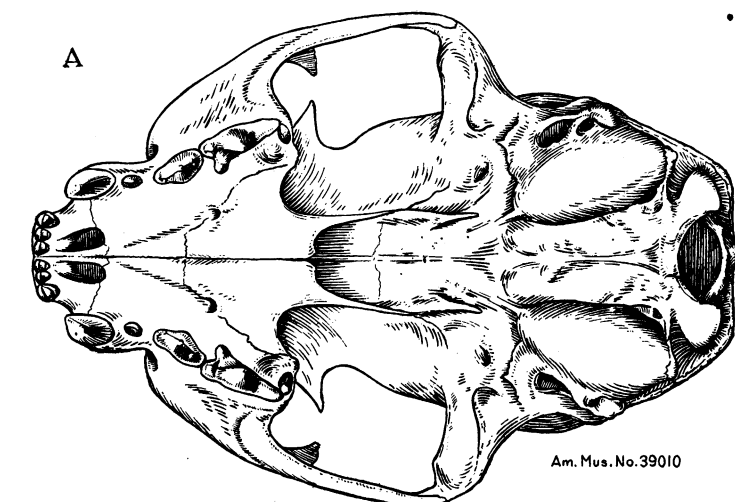


Fig. 8a. *Oncifelis salinarum* (Thomas). Ventral view.  $\frac{1}{2}$ . Same skull as Figs. 5b, 11a, 13b.  
 Fig. 8b. *Herpailurus yaguarondi cacomilli* (Berlandier). Ventral view.  $\frac{1}{2}$ . Same skull as  
 Figs. 5c, 11c, 13c.

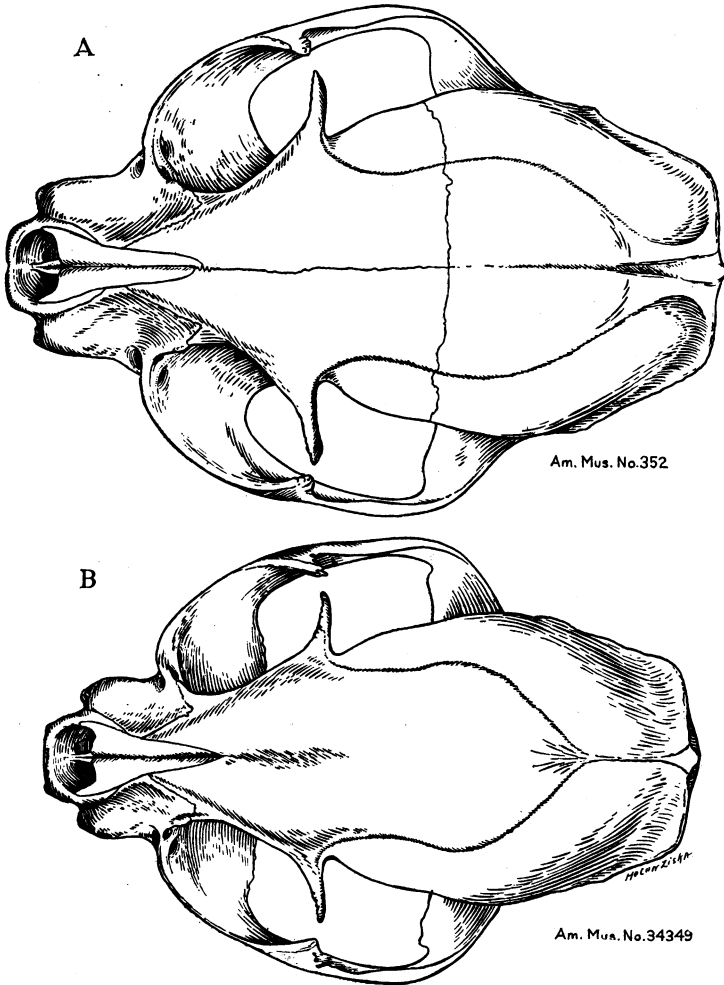


Fig. 9a. *Margay tigrina wiedii* (Schinz). Dorsal view.  $\frac{1}{4}$ . Same skull as Figs. 4a, 6a, 12b.

Fig. 9b. *Oncilla pardinaoides emerita* (Thomas). Dorsal view.  $\frac{1}{4}$ . Same skull as Figs. 4b, 6a, 12c.

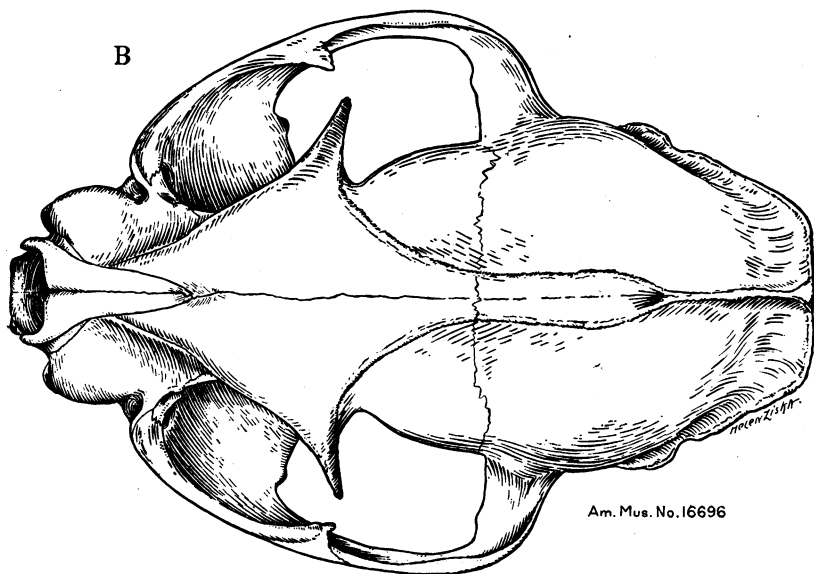
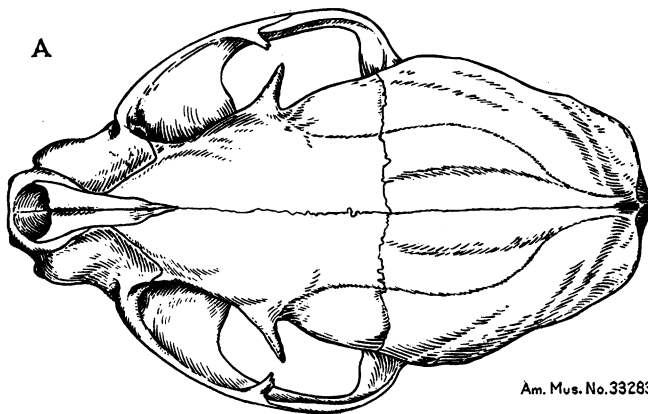


Fig. 10a. *Noctifelis guigna* (Molina). Dorsal view.  $\frac{1}{2}$ . Same skull as Figs. 4c, 7a, 12a.  
 Fig. 10b. *Oncifelis geoffroyi* (D'Orbigny and Gervais). Dorsal view.  $\frac{1}{2}$ . Same skull as Figs. 5a, 7b, 13a.

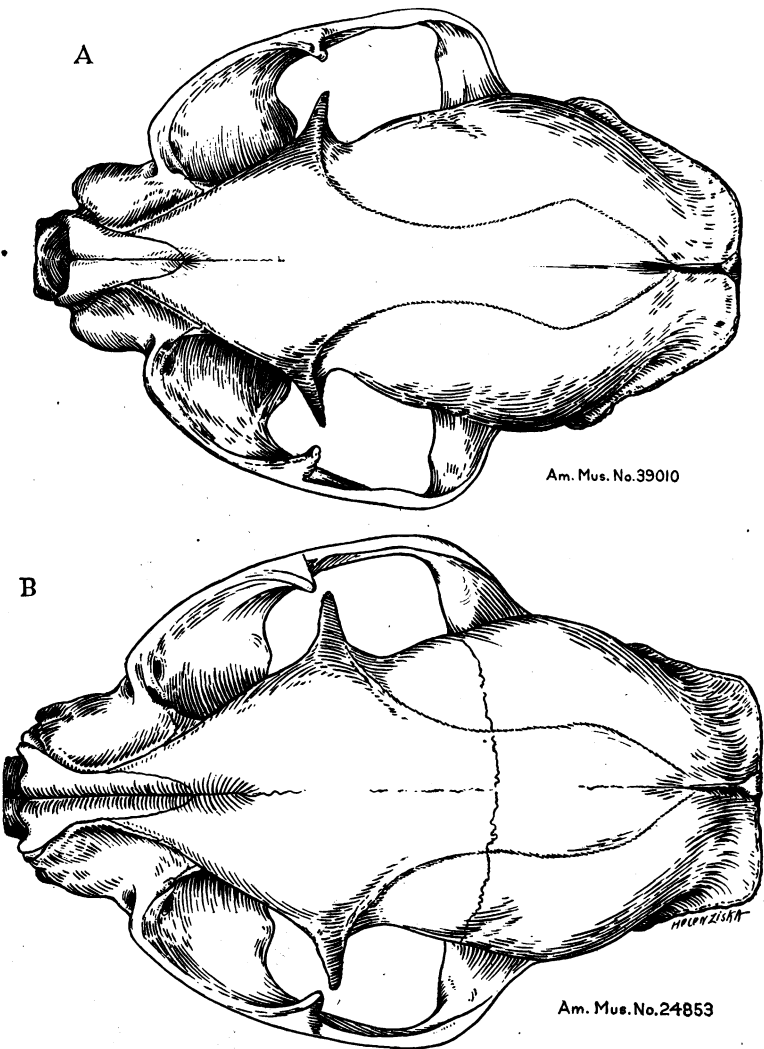


Fig. 11a. *Oncifelis salinarum* (Thomas). Dorsal view.  $\frac{1}{4}$ . Same skull as Figs. 5b, 8a, 13b.  
Fig. 11b. *Herpailurus yaguarondi cacomitli* (Berlandier). Dorsal view.  $\frac{1}{4}$ . Same skull as Figs. 5c, 8b, 13c.

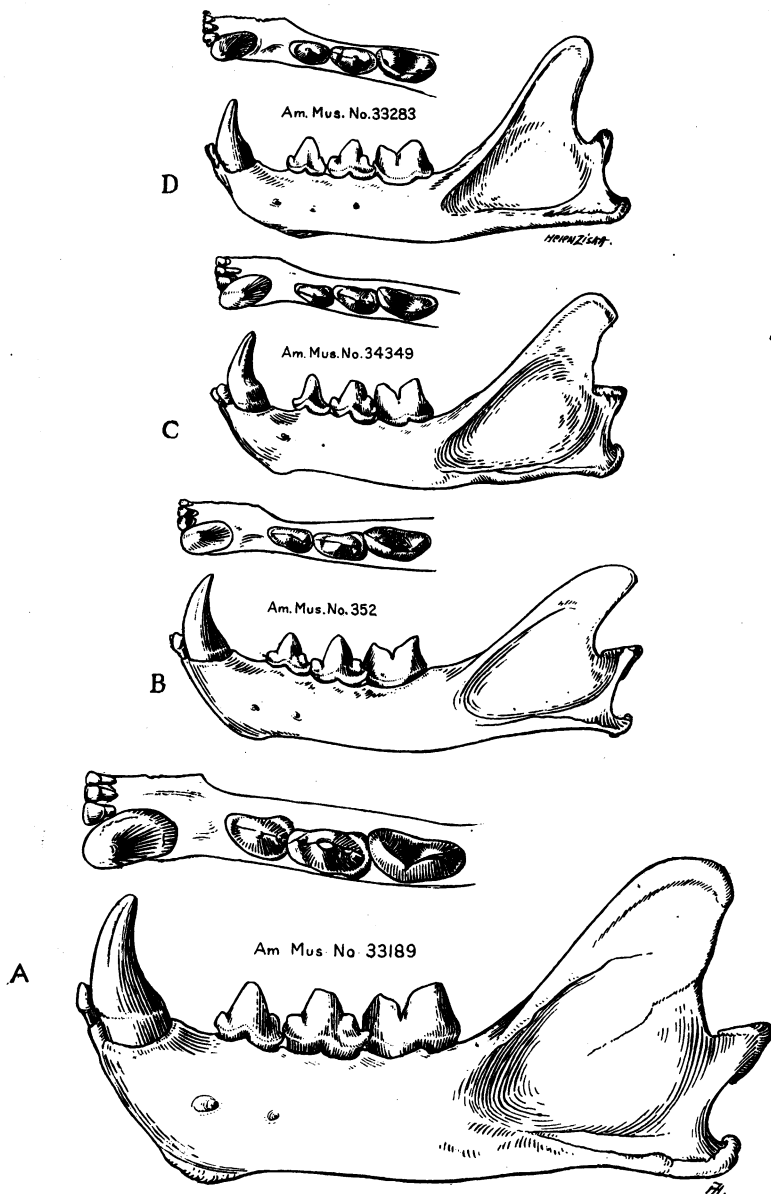


Fig. 12a. *Leopardus pardalis mearnsi* (Allen).  $\frac{1}{2}$ . Same skull as Figs. 1-3.  
 Fig. 12b. *Margay tigrina wiedii* (Schinz).  $\frac{1}{2}$ . Same skull as Figs. 4a, 6a, 9a.  
 Fig. 12c. *Oncilla pardinoides emerita* (Thomas).  $\frac{1}{2}$ . Same skull as Figs. 4b, 6b, 9b.  
 Fig. 12d. *Noctifelis guigna* (Molina).  $\frac{1}{2}$ . Same skull as Figs. 4c, 7a, 10a.



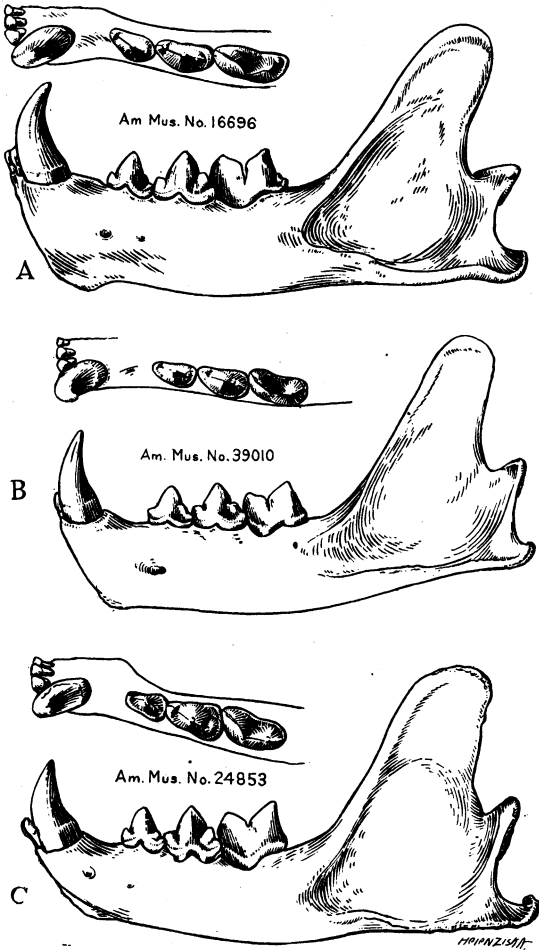


Fig. 13a. *Oncifelis geoffroyi* (Gervais and D'Orbigny).  $\frac{1}{2}$ . Same skull as Figs. 5a, 7b, 10b.  
 Fig. 13b. *Oncifelis salinarum* (Thomas).  $\frac{1}{2}$ . Same skull as Figs. 5b, 8a, 11a.  
 Fig. 13c. *Herpailurus yaguarondi cacomilli* (Berlandier).  $\frac{1}{2}$ . Same skull as Figs. 5c, 8b, 11b.

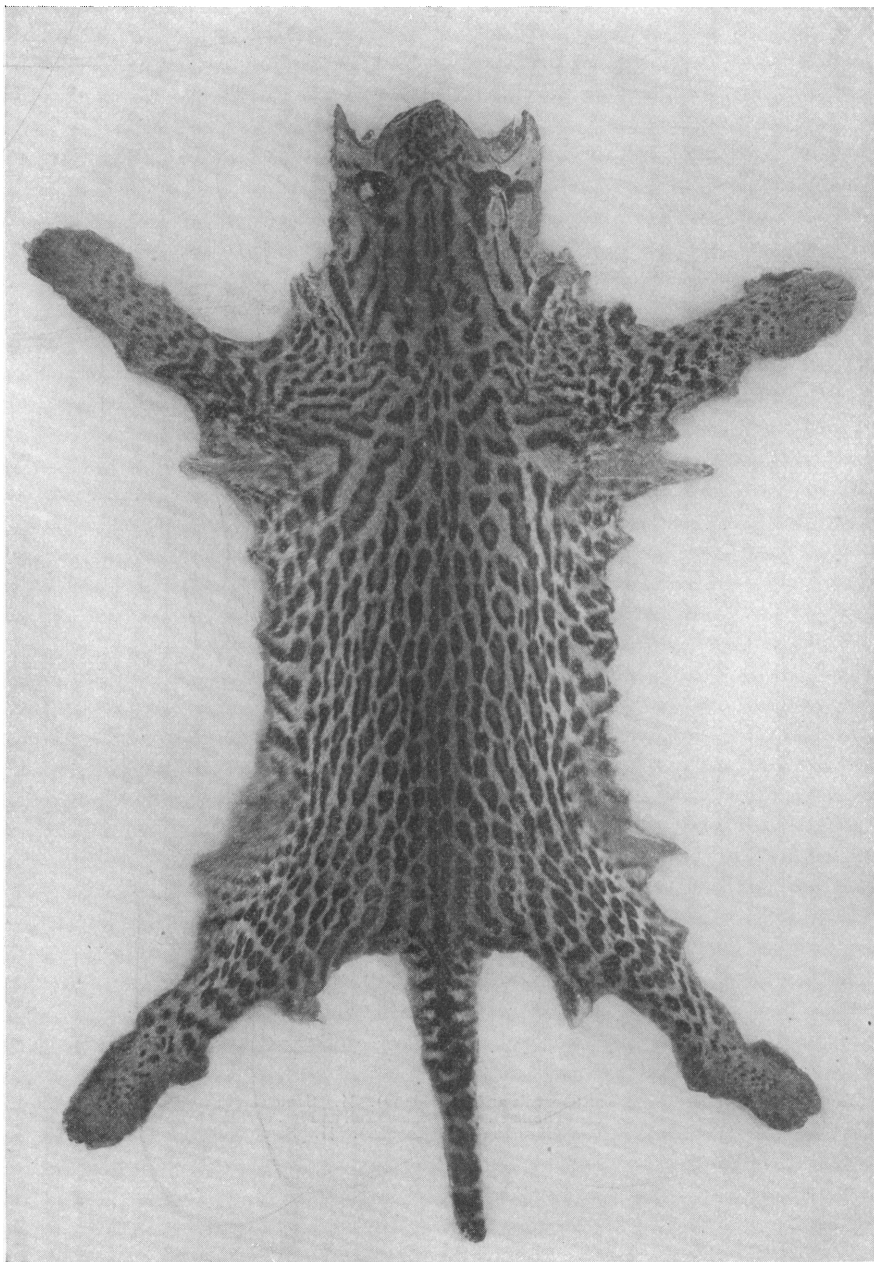


Fig. 14. *Leopardus pardalis chibigouazou* (Griffith). No. 41303, Descalvados, Matto Grosso, Brazil. George K. Cherrie, Roosevelt South American Expedition. Ground color of upperparts ochraceous buff.  $\frac{1}{8}$ .

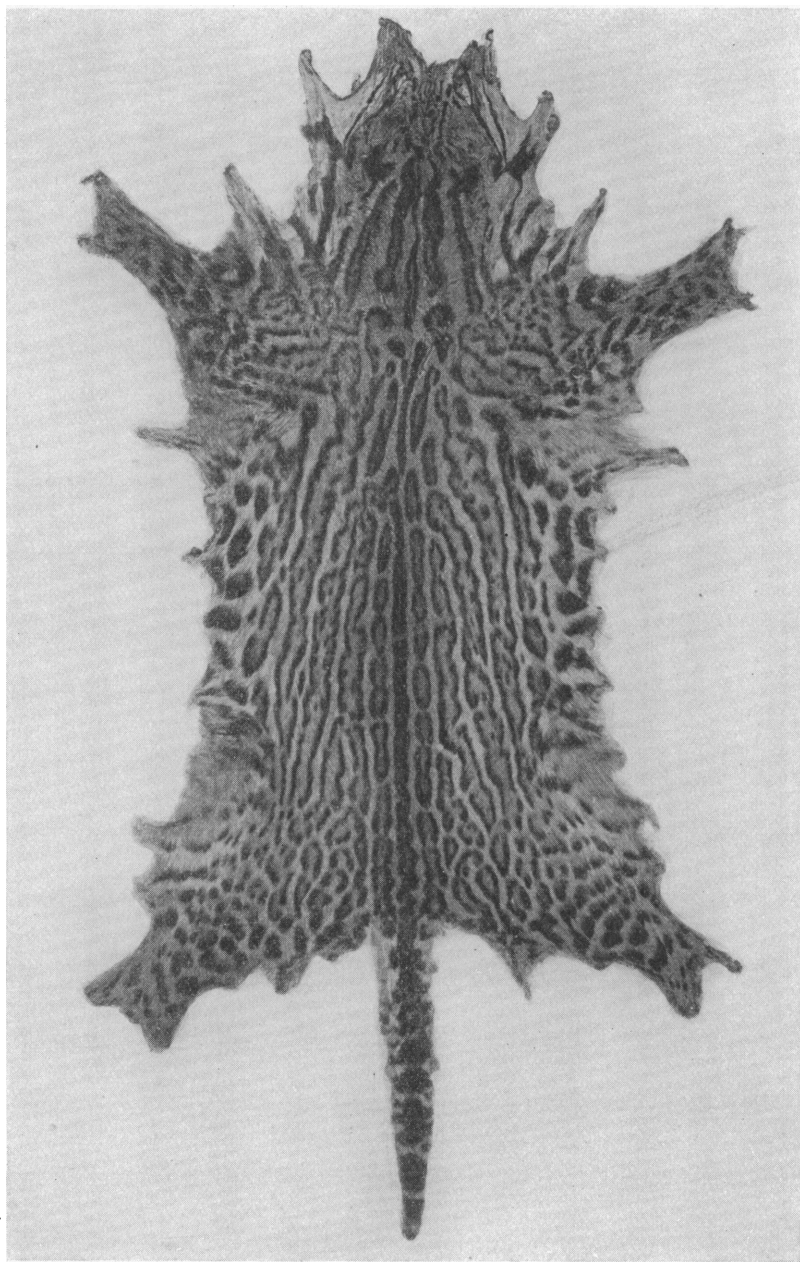


Fig. 15. *Leopardus pardalis chibigouazou* (Griffith). No. 41309, Descalvados, Matto Grosso, Brazil. George K. Cherrie, Roosevelt South American Expedition. Ground color of upperparts ochraceous buff, a little paler than in No. 41303.  $\frac{1}{10}$ .

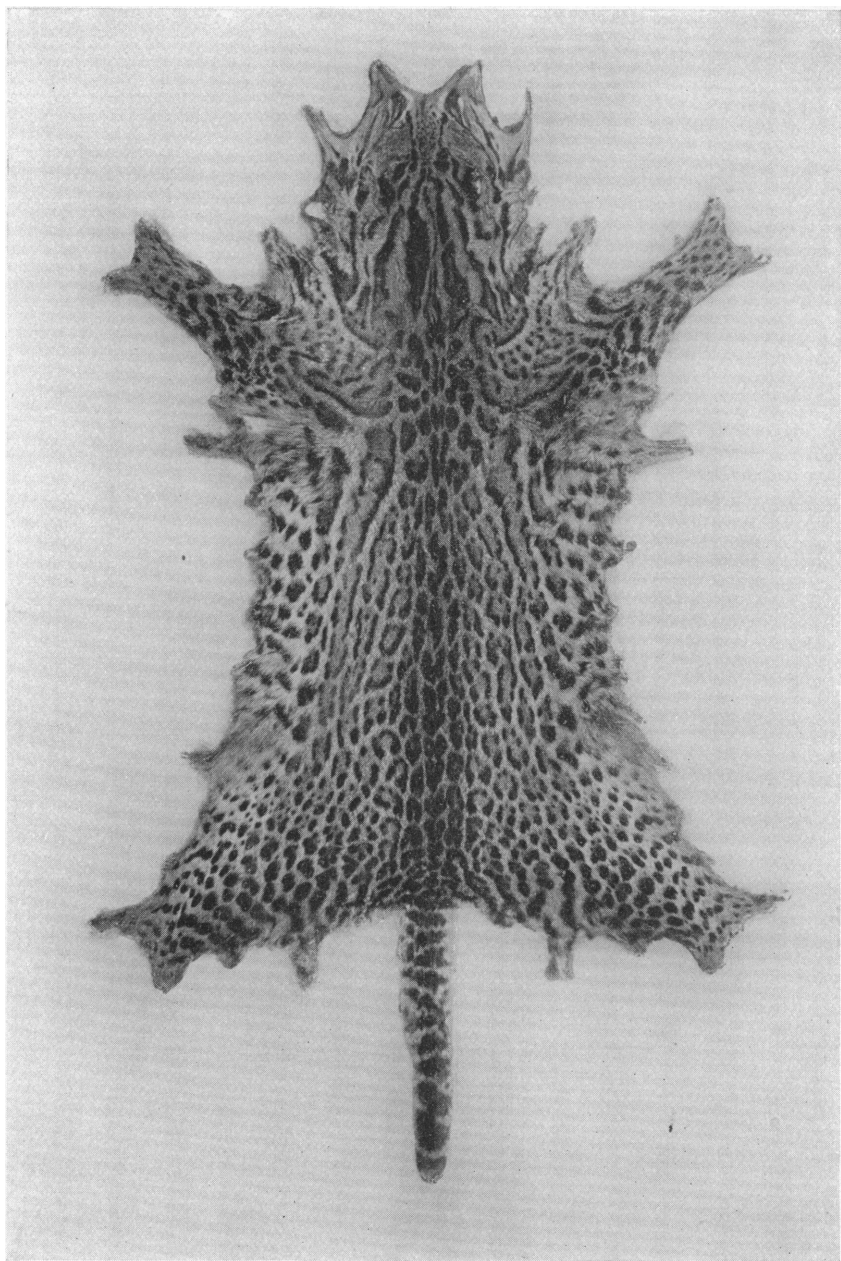


Fig. 16. *Leopardus pardalis chibigouazou* (Griffith). No. 41308, Descalvados, Matto Grosso, Brazil. George K. Cherrie, Roosevelt South American Expedition. Ground color of upperparts light ochraceous buff.  $\frac{1}{8}$ .

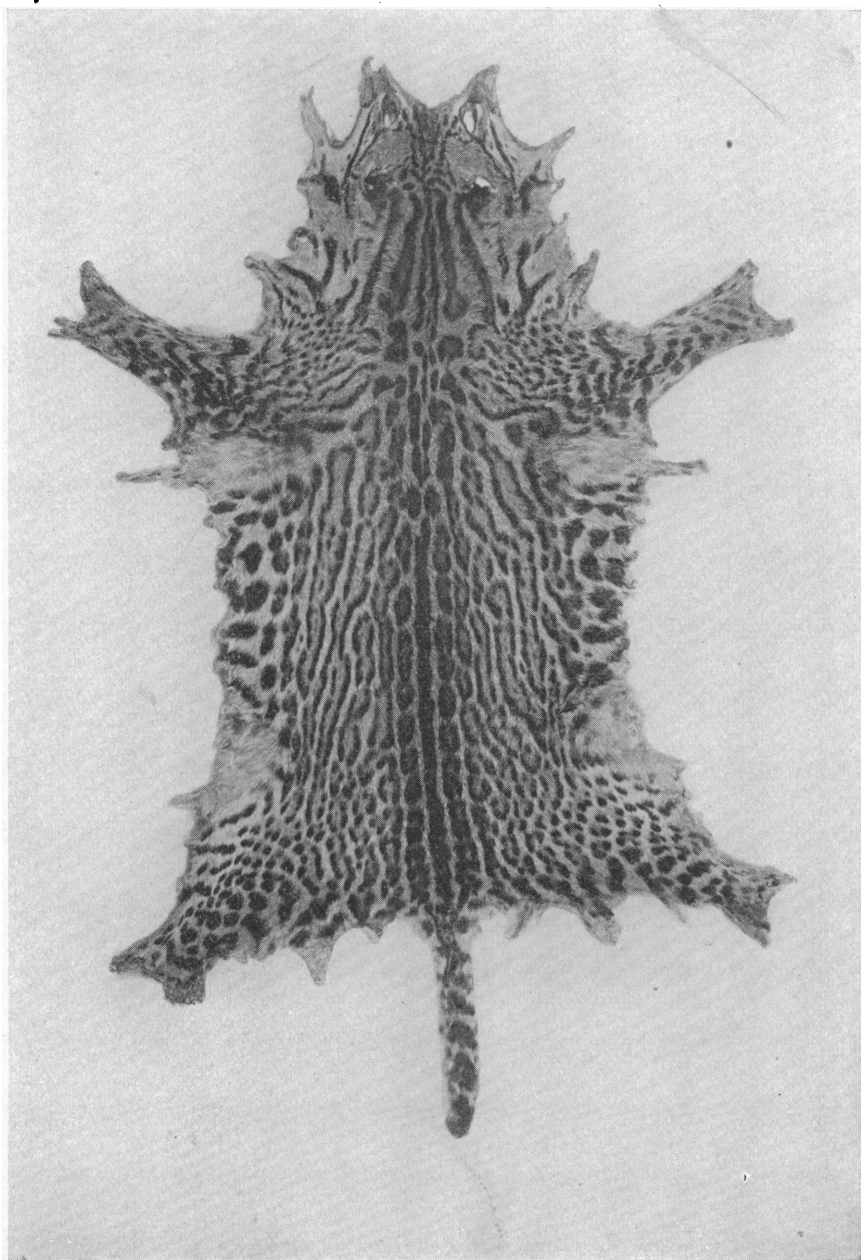


Fig. 17. *Leopardus pardalis chibigouazou* (Griffith). No. 41307. Descalvados, Matto Grosso, Brazil. George K. Cherrie, Roosevelt South American Expedition. Ground color of upperparts light ochraceous buff. 1/4.

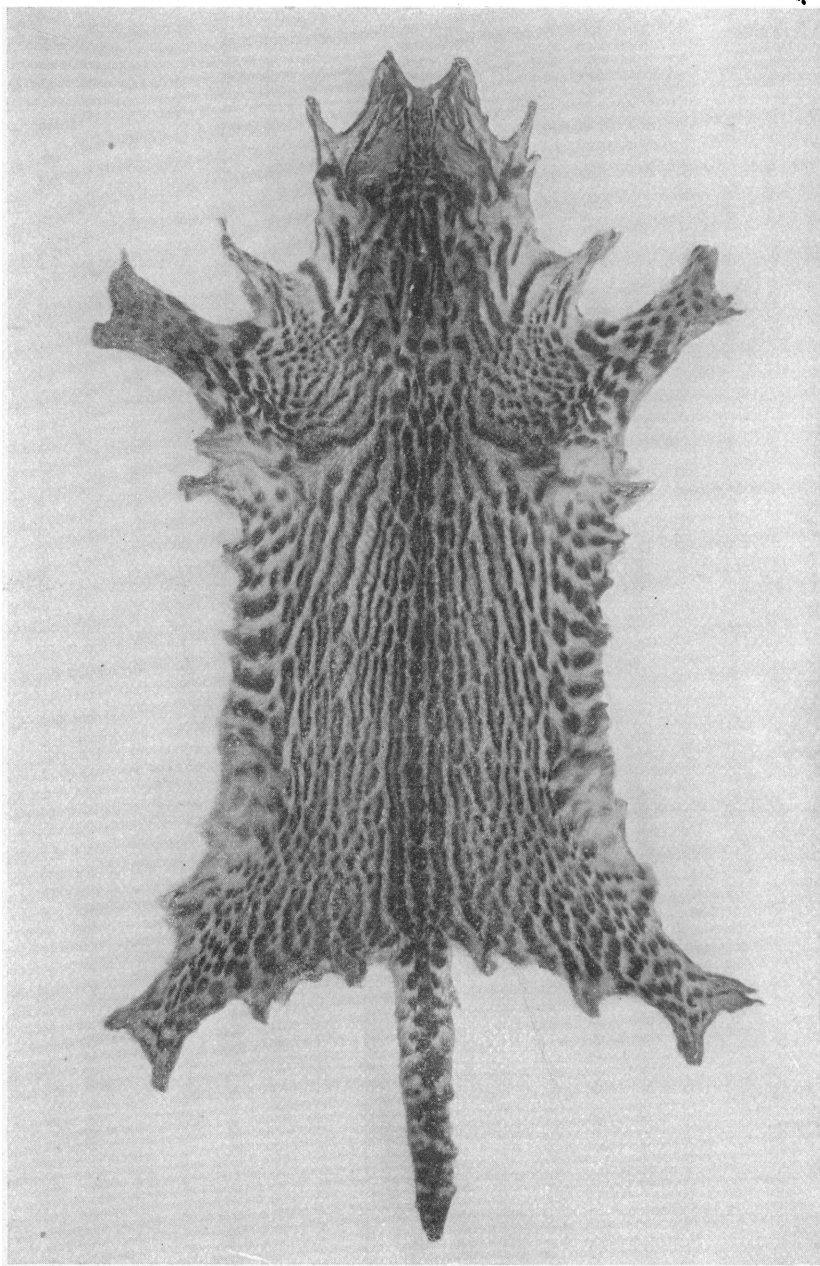


Fig. 18. *Leopardus pardalis chibigouazou* (Griffith). No. 41306, Descalvados, Matto Grosso, Brazil. George K. Cherrie, Roosevelt South American Expedition. Ground color of upperparts light buff.  $\frac{3}{8}$ .



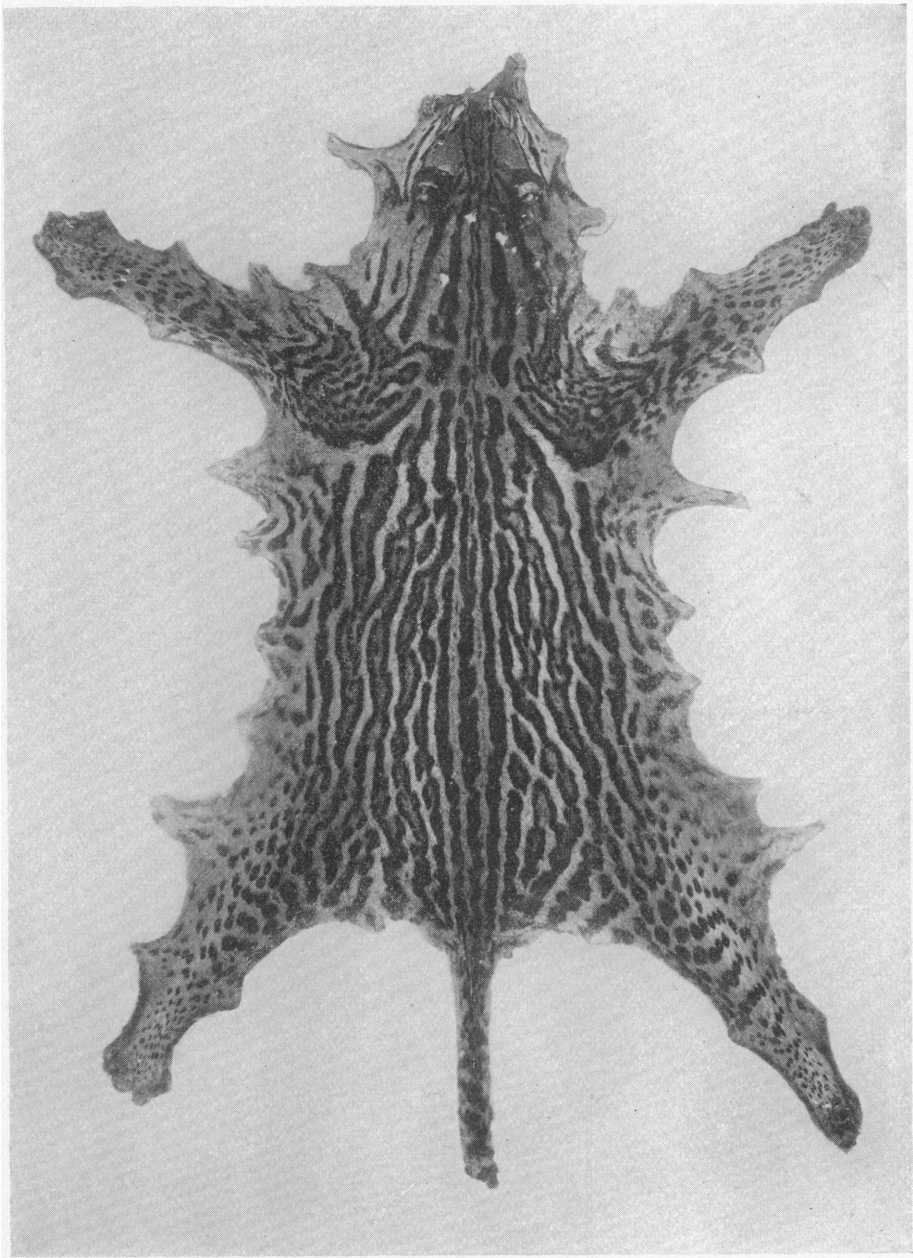


Fig. 19. *Leopardus pardalis tumatumari* (Allen). No. 40837, near Santarem, Brazil. George K. Cherrie, Collins-Day South American Expedition. Ground color tawny and white.  $\frac{1}{4}$

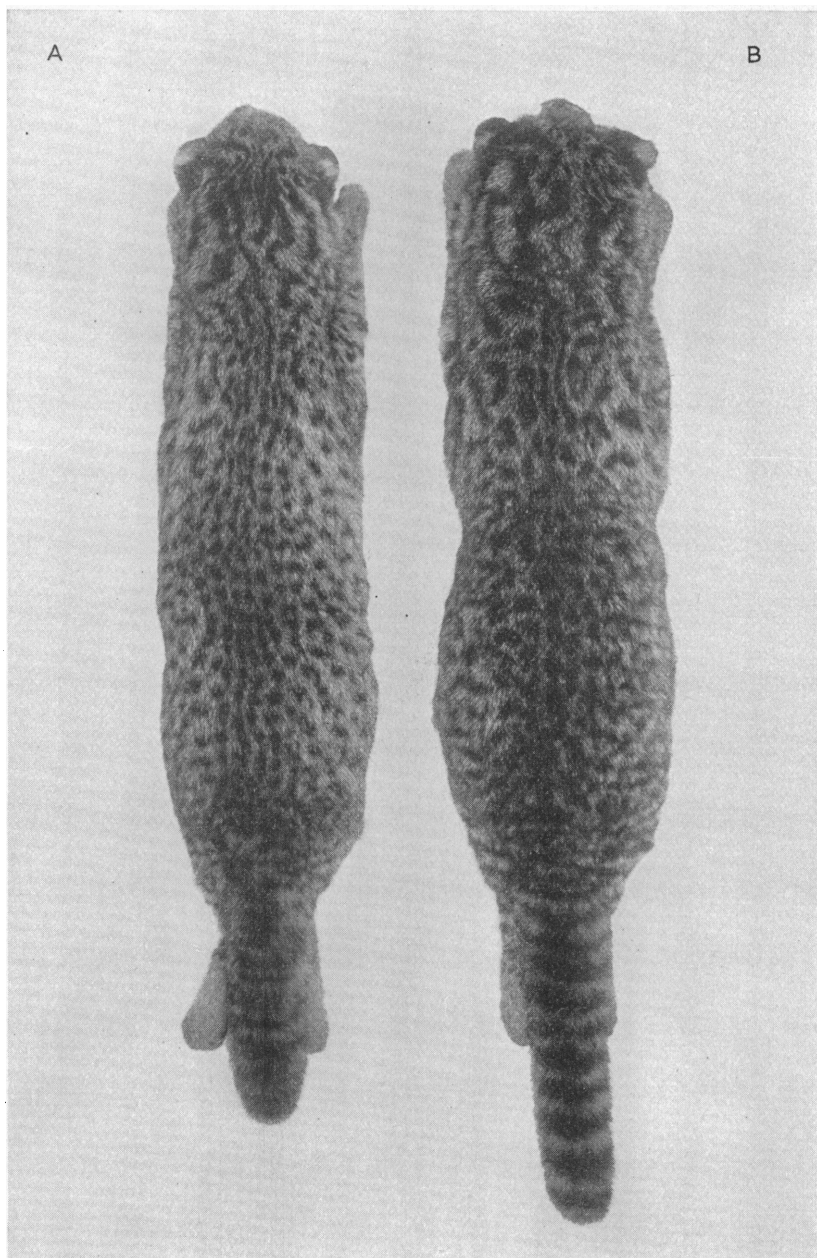


Fig. 20a. *Noctifelis guigna* (Molina). No. 33287, ♀, Marquhue, Temuco, Cautin, Chili, July 19, 1910. D. S. Bullock. Dorsal view. Ground color ochraceous buff, markings deep black.  $\frac{1}{2}$ .  
Fig. 20b. *Noctifelis guigna* (Molina). No. 33283, ♂, Marquhue, Temuco, Cautin, Chili, June 8, 1911. D. S. Bullock. Dorsal view. Ground color slightly lighter than in No. 32287 and black markings coarser, giving a much darker general effect.  $\frac{1}{2}$ .



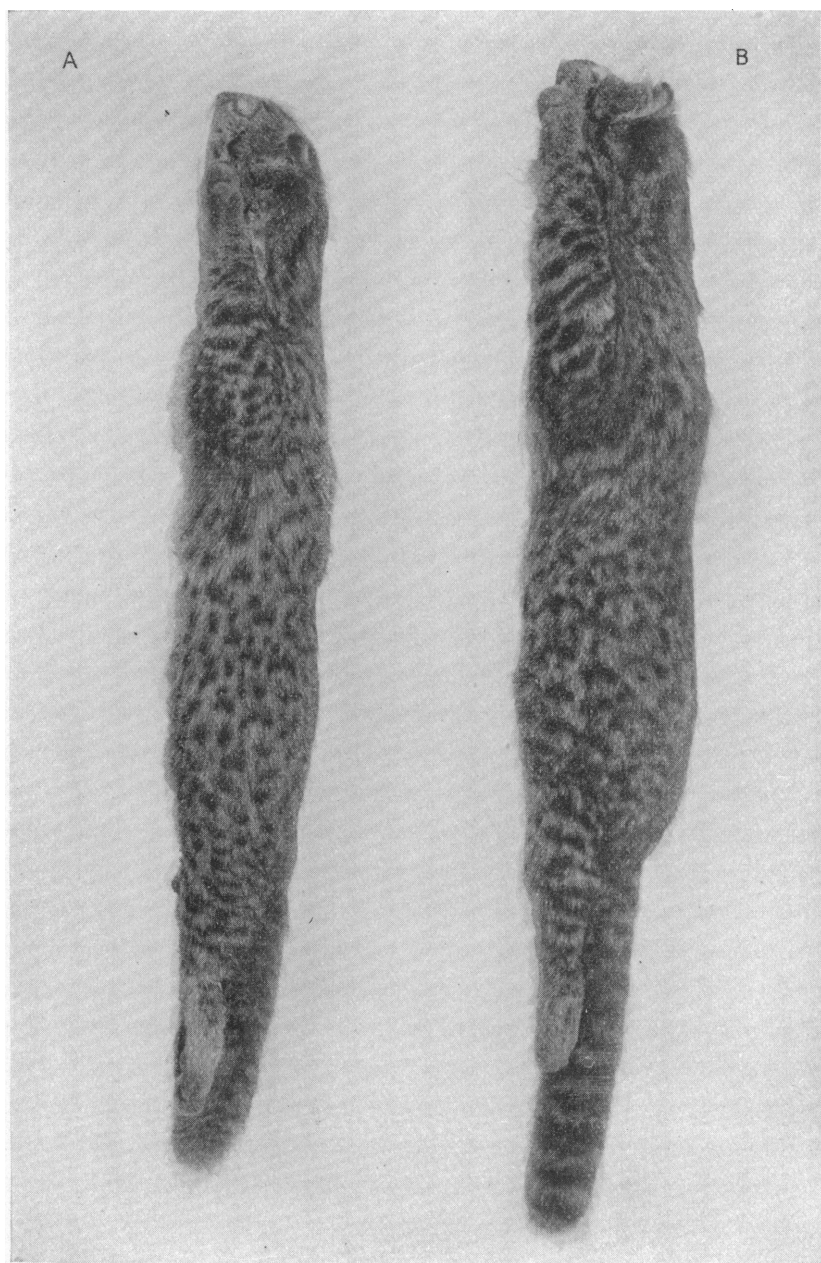


Fig. 21a and b. *Noctifelis guigna* (Molina). Same specimens as Figs. 20a and 20b. Side view.



Figs. 22a and b. *Noctifelis guigna* (Molina). Same specimens as Figs. 20a and 20b. Ventral view. Ground color of foreneck and underside of tail light buff, rest of underparts clear white.

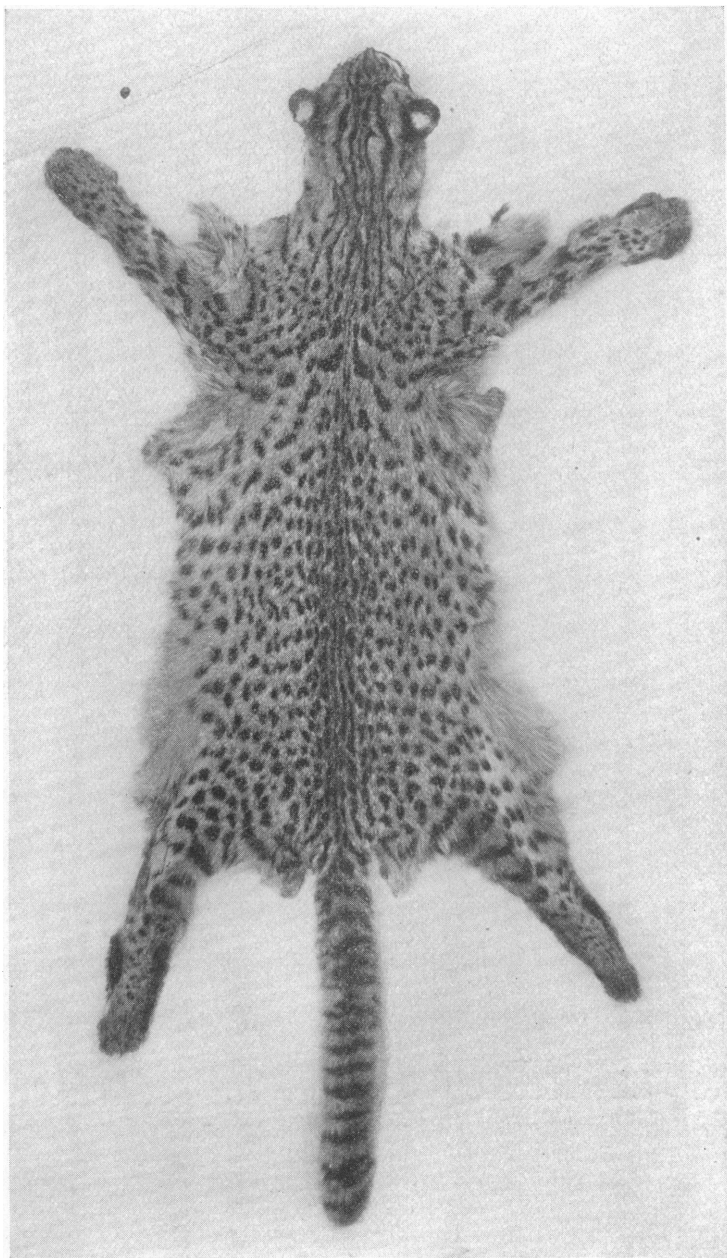


Fig. 23. *Oncifelis geoffroyi* (D'Orbigny and Gervais). No. 16696, ♂, Cañada las Vacas, Patagonia (S. lat. 51°), July 26, 1899. Barnum Brown. The markings are black, the ground color light gray faintly toned with pale buff. 77.

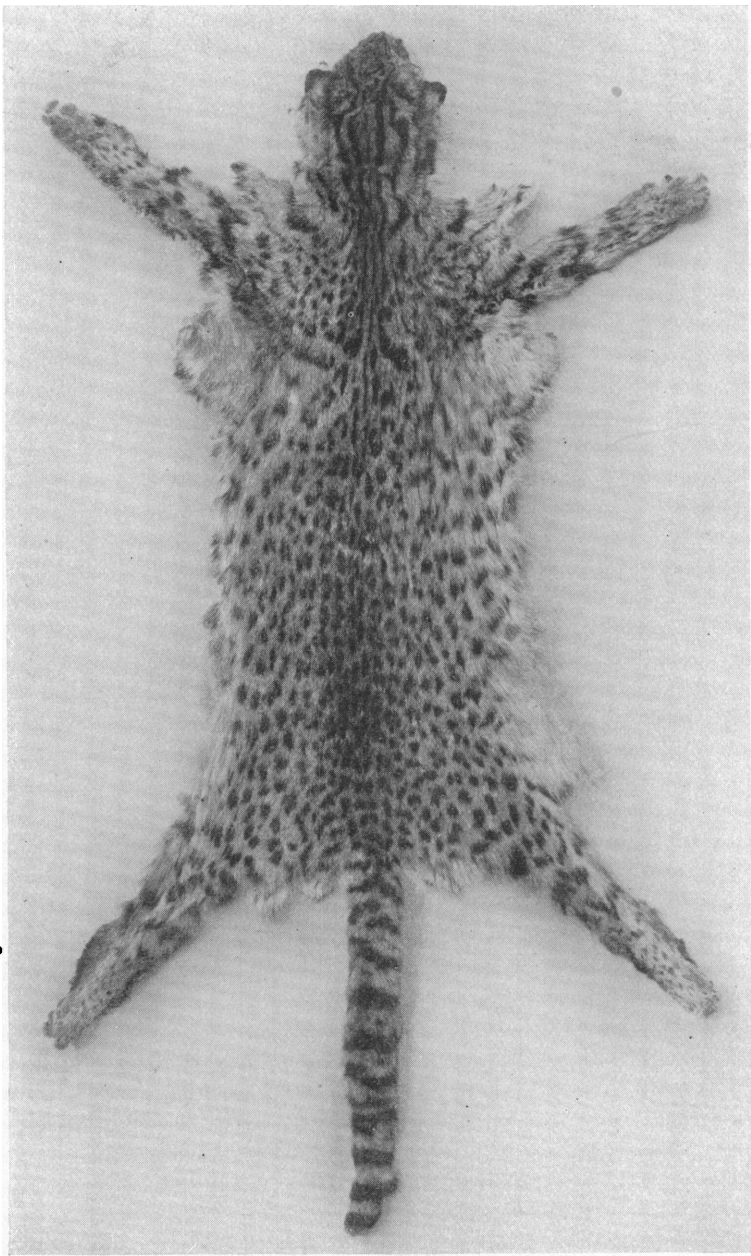


Fig. 24. *Oncifelis salinarum* (Thomas). No. 39010 ♂, Pulque, Sucre, Bolivia, alt. 9400 feet, Nov. 25, 1915. Leo. E. Miller and H. S. Boyle. Markings black, ground color buff.  $\frac{1}{4}$ .

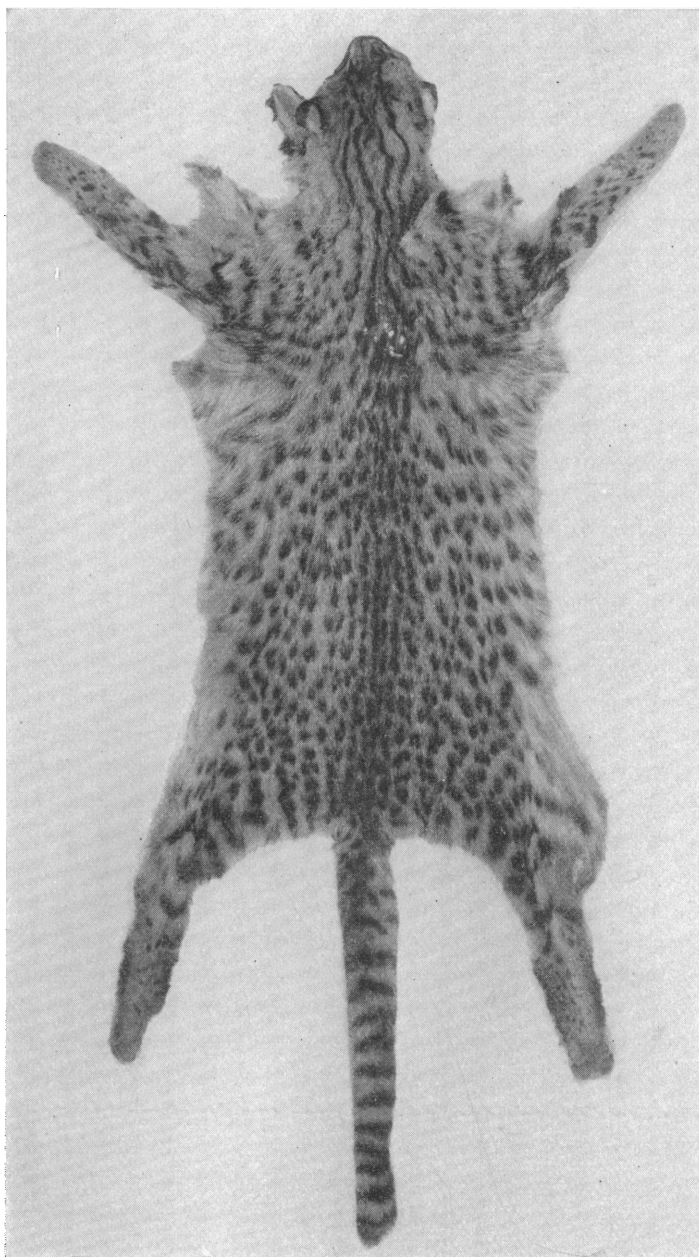


Fig. 25. *Oncifelis salinarum* (Thomas). No. 39004, ♂, Rio Cachimayo, Sucre, Bolivia, alt. 8700 feet, Dec. 9 1915. Miller and Boyle. Markings black, ground color deep buff, a little deeper than in No. 39010.  $\frac{1}{4}$

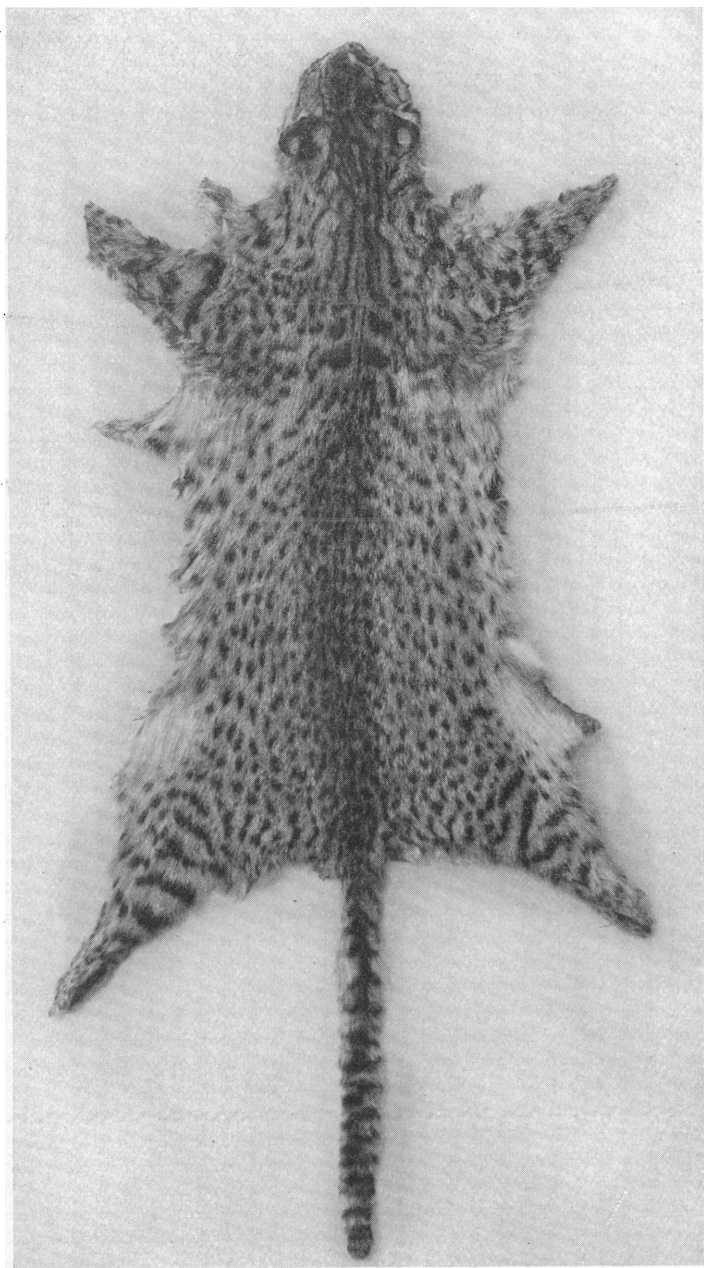


Fig. 26. *Oncifelis salinarum* (Thomas). No. 41550, ♂?, Lavalle, Santiago del Estero, Argentina, alt. 1800 feet, July 8, 1916. Miller and Boyle. Ground color buff, indistinguishable in tone from that of No. 39010.  $\frac{1}{6}$



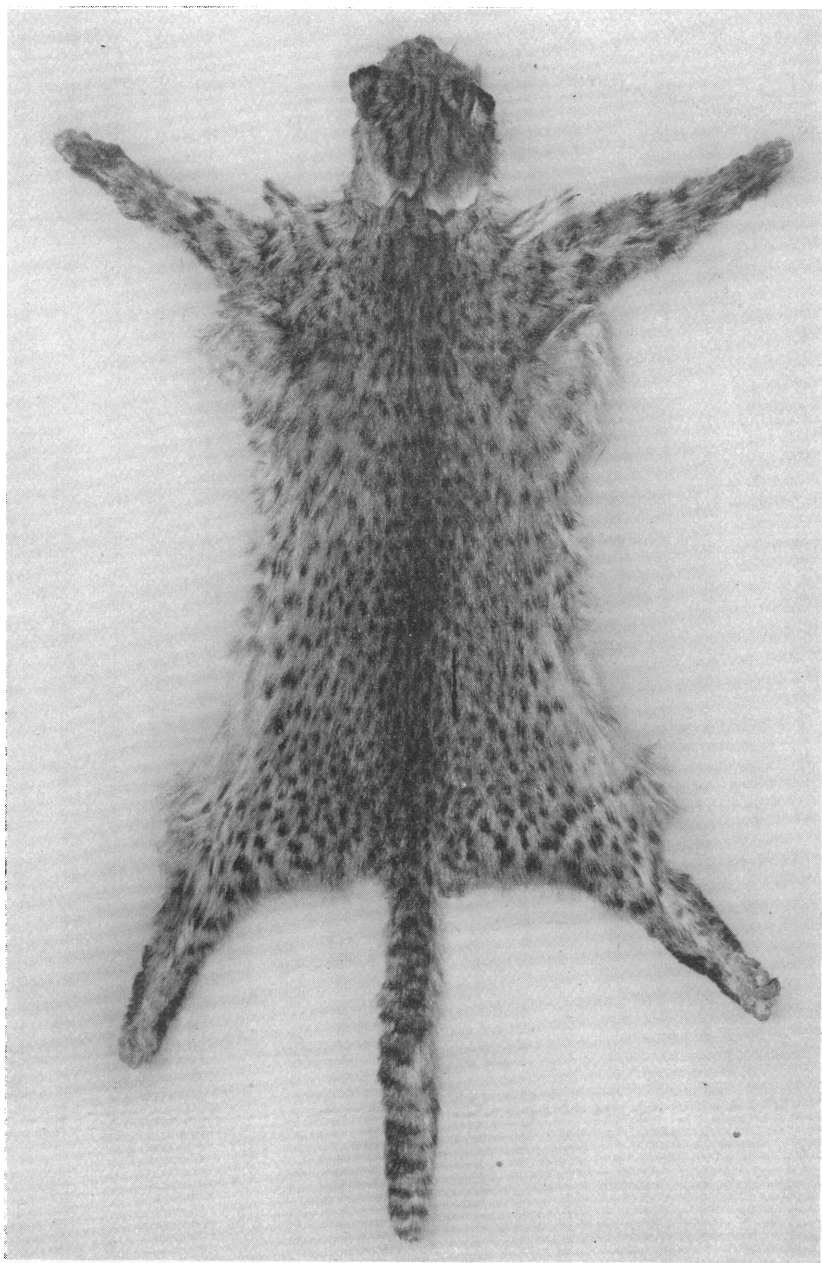


Fig. 27. *Oncifelis salinarum* (Thomas). No. 41553, ♀, Lavalle, Santiago del Estero, Argentina, alt. 1800 feet, June 30, 1916. Miller and Boyle. Ground color pale buff. The white patch on the neck is due to bare skin, the hair having been lost through imperfect preservation.  $\frac{1}{2}$

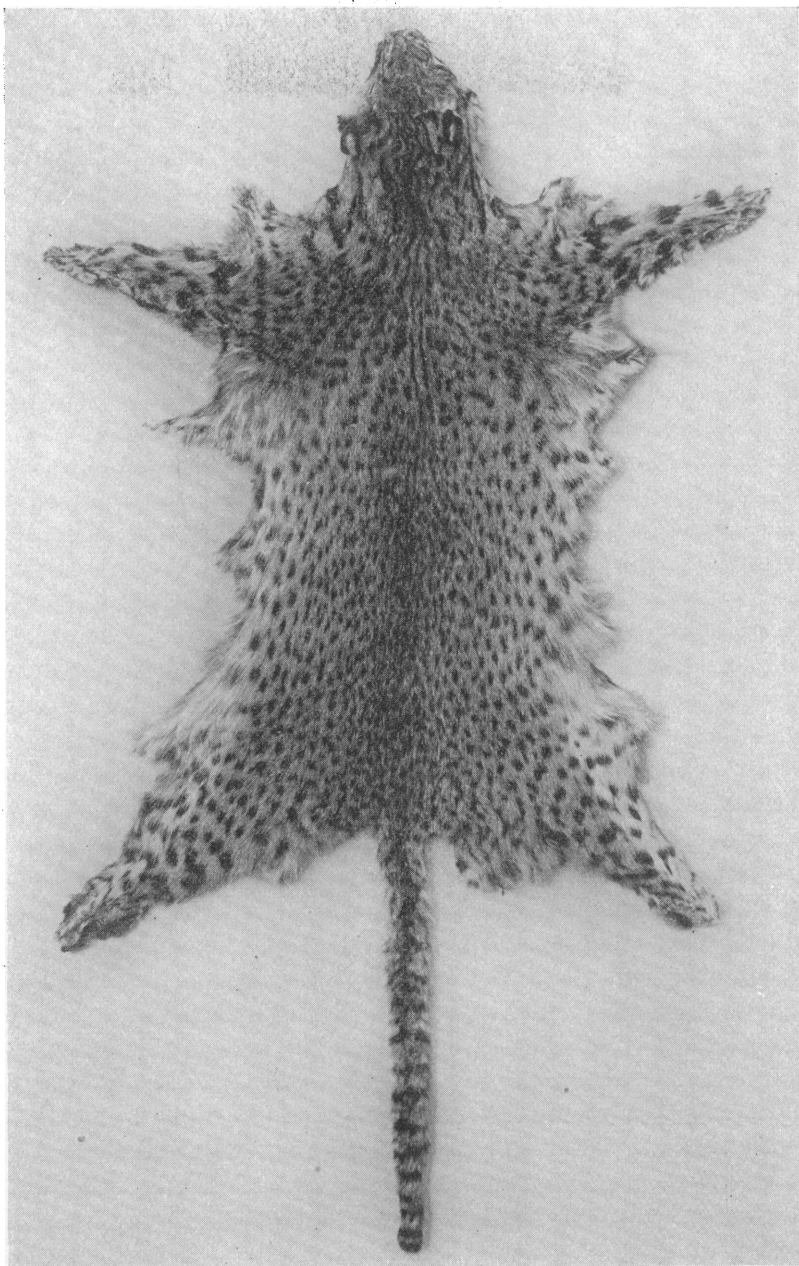


Fig. 28. *Oncifelis salinarum* (Thomas). No. 41554, ♂, Lavalle, Santiago del Estro, Argentina, alt. 1800 feet, July 8, 1916. Miller and Boyle. Ground color pale buff, indistinguishable from that of No. 39010. ♀1.



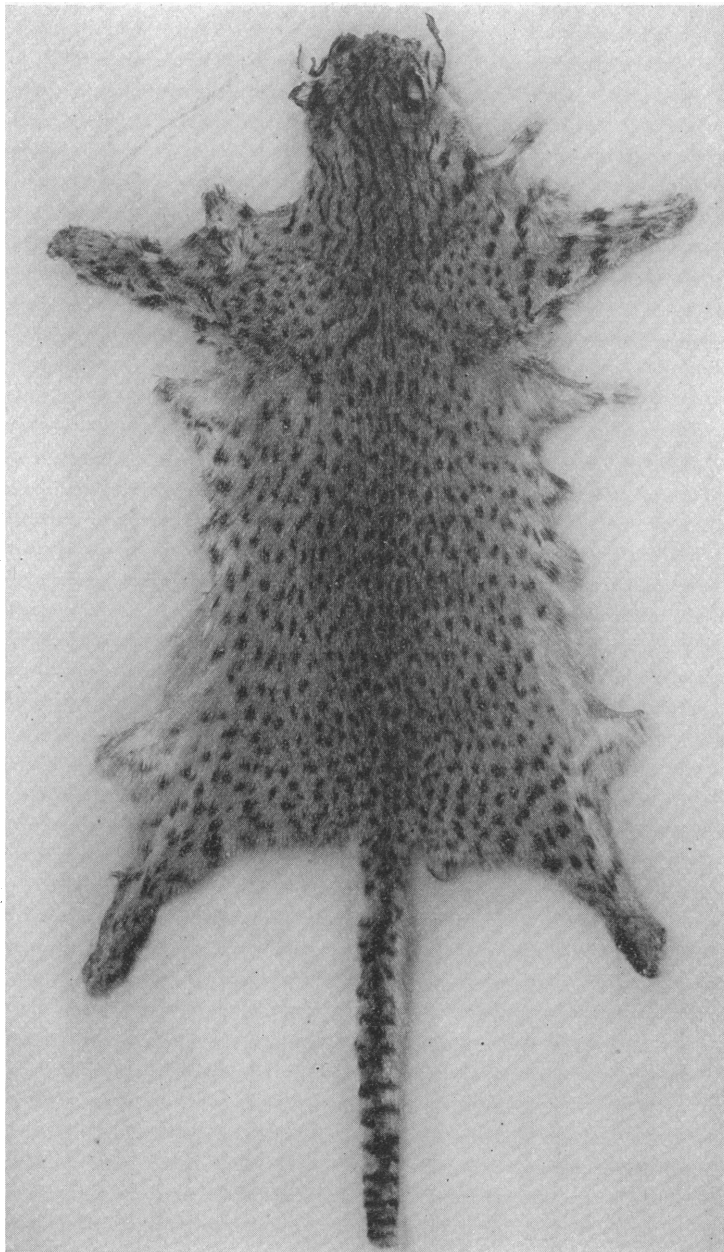


Fig. 29. *Oncifelis salinarum* (Thomas). No. 41555, ♂?, Lavalle, Santiago del Estro, Argentina, alt. 1800 feet, July 8, 1916. Miller and Boyle. Ground color with a faint gray buffy tone.  $\frac{3}{4}$ .

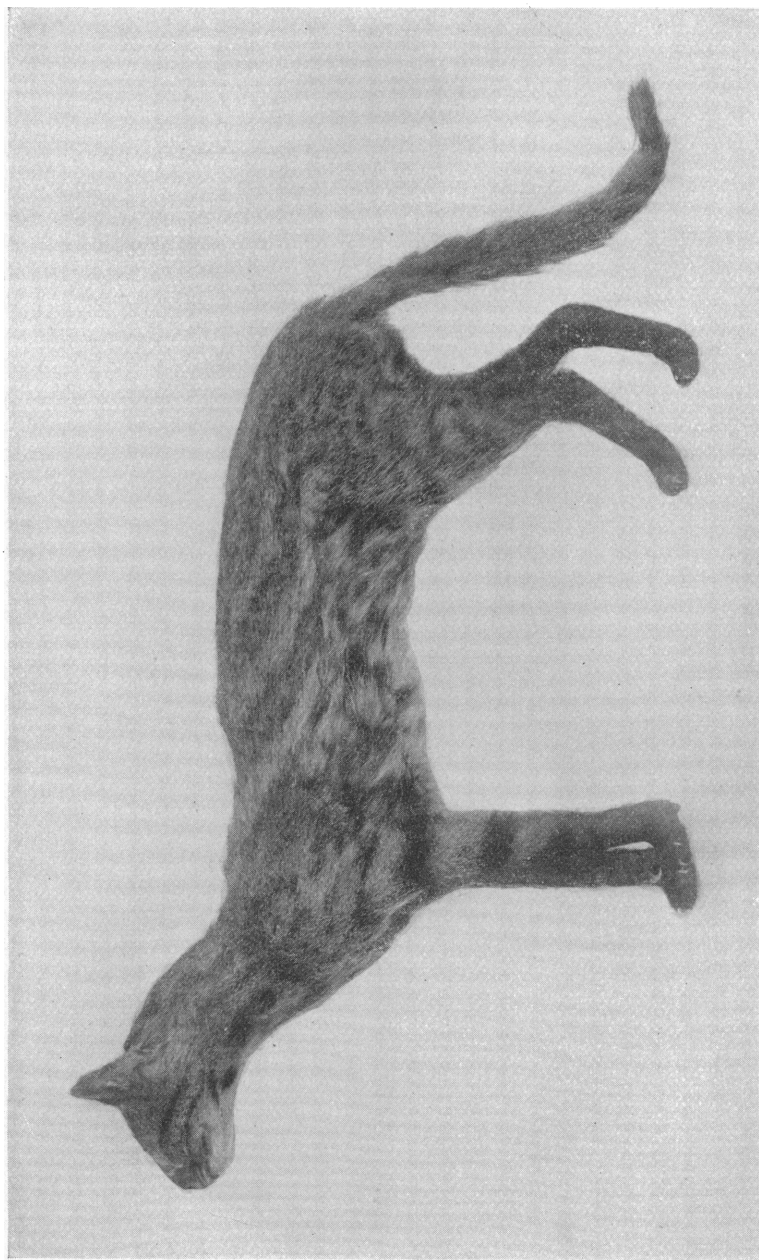


Fig. 30. *Lynchaoturus pojeiros braccata* (Cope). Type specimen, Museum of Philadelphia Academy of Natural Sciences. Chapada, Matto Grosso, Brazil. Side view.  $\frac{1}{4}$ .

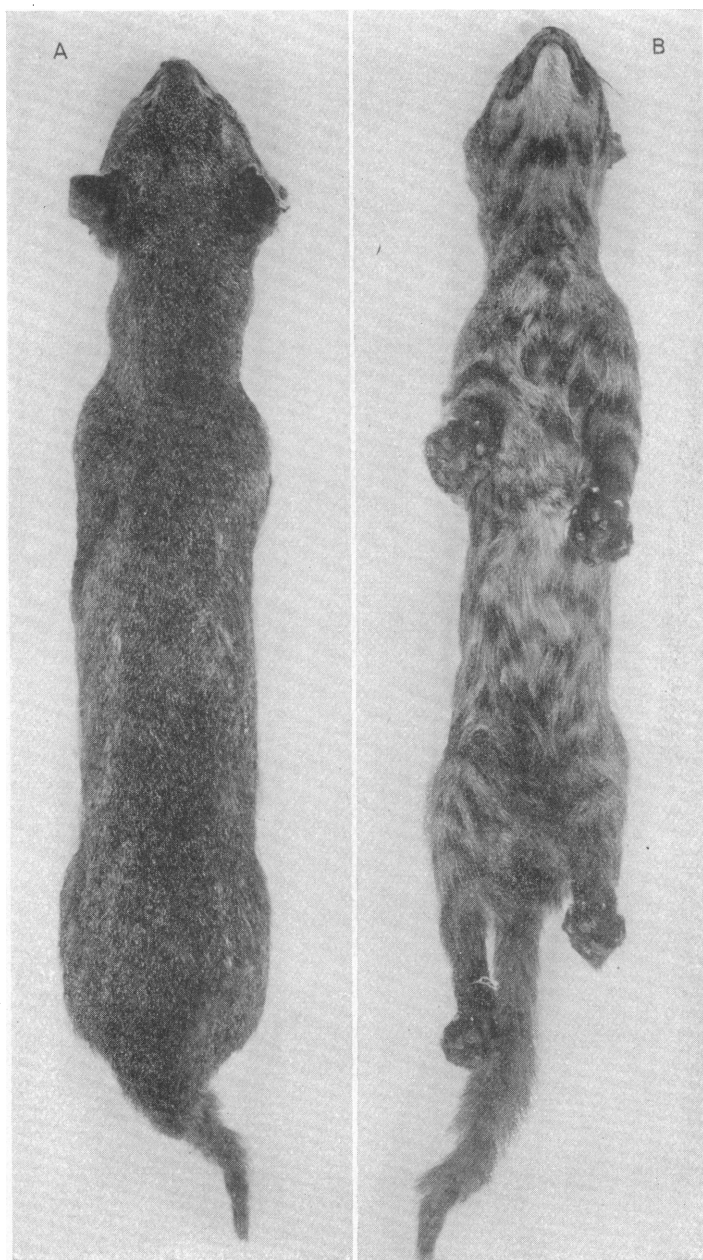


Fig. 31. *Lynchailurus pajeros braccata* Cope. Same specimen as Fig. 30. Dorsal and ventral views.  $\frac{1}{4}$ .

