Nat Hist

# THE MAMMALS OF CHILE

BY

WILFRED H. OSGOOD

CURATOR EMERITUS, DEPARTMENT OF ZOOLOGY


ZOOLOGICAL SERIES

FIELD MUSEUM OF NATURAL HISTORY

VOLUME 30

DECEMBER 28, 1943

PUBLICATION 542

PUBLICATIONS

OF

# FIELD MUSEUM OF NATURAL HISTORY

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ZOOLOGICAL SERIES

VOLUME 30

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CHICAGO, U.S.A.
1943

PRINTED IN THE UNITED STATES OF AMERICA
BY FIELD MUSEUM PRESS

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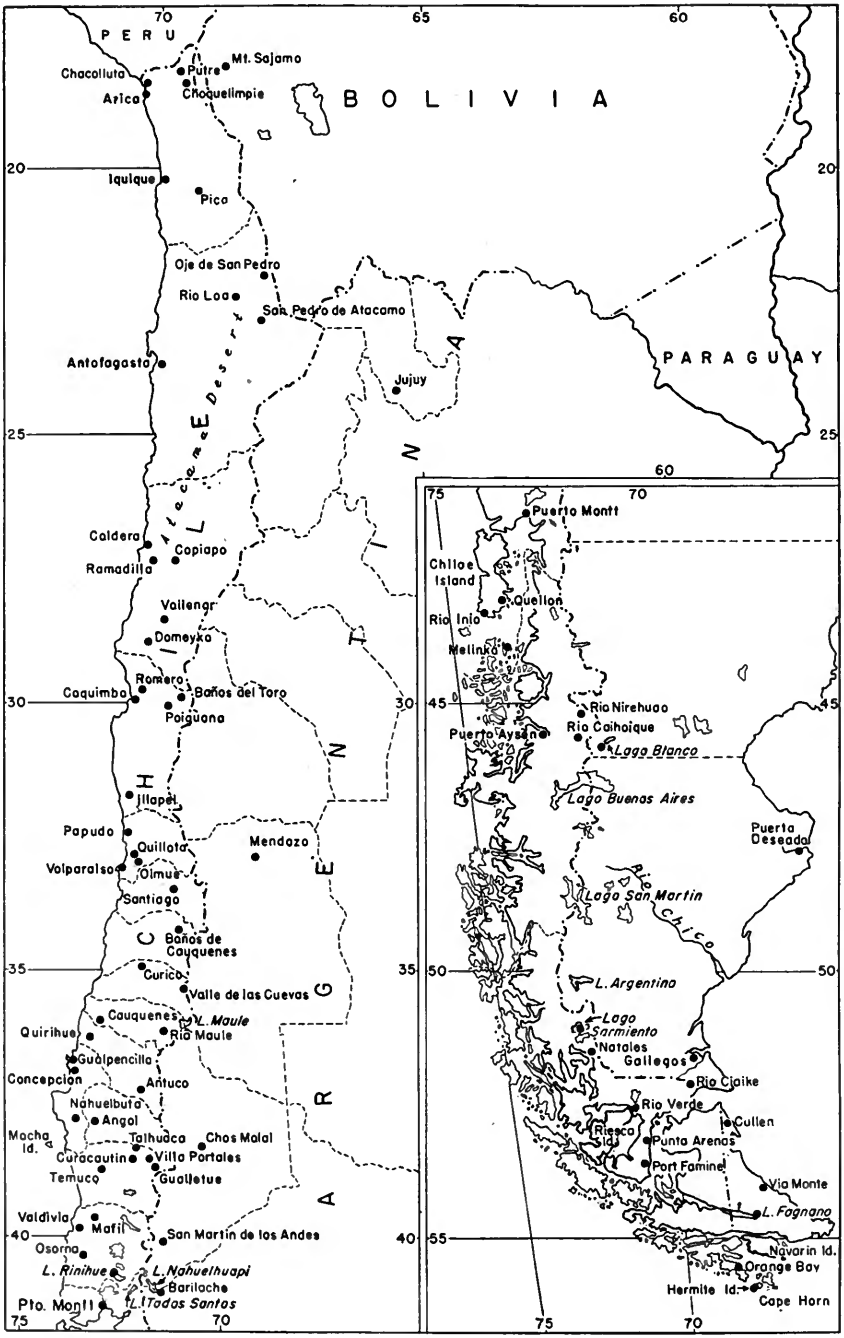
# CONTENTS

# LIST OF ILLUSTRATIONS

## MAPS



## FIGURES OF SKULLS




MAP 1. Map of Chile showing principal localities mentioned in text.

# THE MAMMALS OF CHILE

## INTRODUCTION

In December, 1922, accompanied by Mr. Colin C. Sanborn and Mr. Boardman Conover, of Field Museum, I sailed for Chile with the intention of making a survey of the vertebrate fauna of that country. Mr. Conover and I, after working mainly in the southern Province of Llanquihue, came north to Santiago and left for Argentina in May, 1923, returning to the United States in July of the same year. Mr. Sanborn continued in Chile until July, 1924, covering various localities from the Province of Valdivia northward to Tacna and Arica. The collection of birds obtained by this expedition formed the basis of a general work on the birds of Chile, by C. E. Hellmayr, published in 1932.[1] Following this, it had been hoped to issue a similar work on the mammals, but these proved more difficult to deal with and other responsibilities for a number of years interfered with the prosecution of their study.

Important material was still lacking from several parts of central Chile and from the extreme south in the vicinity of the Straits of Magellan; therefore a second expedition was made in 1939–40 during which Mr. Sanborn and myself were again associated in the field. On this trip we had the assistance of Mr. John M. Schmidt, and after making brief stops in the provinces of Angol, Maule, and Llanquihue, proceeded directly to Punta Arenas to work in that vicinity during the months of December, January, and February.

The mammals obtained by these two expeditions form a collection vastly larger and more varied than anything previously existing. Aside from a very limited collection in the British Museum, from the mostly old and imperfect mounted mammals in the National Museum of Chile, and from scattered specimens in other institutions, there is, in fact, no other collection of Chilean mammals of any consequence. This collection is still deficient in many respects, but it covers the principal faunal areas of Chile and probably furnishes a fairly accurate and nearly complete picture of the

[1] Field Mus. Nat. Hist., Zool. Ser., **19**, 472 pp., 1932.

whole mammal fauna. This may seem to be a rash statement, not justified by experience in other fields, but the conditions in Chile are unusual. The mammal fauna is a small one and the presumption of many little-known species promoted by the large number of names given by R. A. Philippi proves not to be justified. Many details remain to be worked out, and these offer a promising field for the local student, but the main facts seem to be already in hand.

Besides the collections of Field Museum, I have been able to examine with considerable care all material in the Museo Nacional at Santiago, including Philippi's types so far as they exist. I have also reviewed material in the British Museum, including the Darwin types, now more than one hundred years old.

In the following treatment, cetaceans have been omitted, since material is lacking for any critical study of them, and historical accounts of them are to be found elsewhere. To record the cetaceans of the Chilean coast would be to deal with practically all those of the south Pacific and Antarctic regions.

For the convenience of local naturalists in Chile and in the hope that they may be stimulated to further research on their own fauna, identification keys and brief descriptions have been included as well as illustrations of skulls of most of the species.

## ACKNOWLEDGMENTS

During the field work of two fairly extensive expeditions many courtesies were extended by Chilean officials and by private individuals. Without the cordial co-operation of residents within the country the work scarcely would have been possible. In 1923 and 1924 we were indebted especially to Mr. Alan Digby Murray and Mr. Anderson, of the Cia Industrial del Aysen, who facilitated our trip from Puerto Aysen across the mountains to Rio Nirehuao. Later, Mr. Sanborn received many courtesies in passing northward through the country. Among those to whom he is especially grateful are Mr. Alexander Morrison, of Concepcion; Sr. Juan Churgwin, of Romero, Province of Coquimbo; Dr. Enrique Gigoux, of Caldera; Mr. Thomas H. Foulkes, of Putre and Choquelimpie; and officials of the DuPont-Nobel Dynamite Plant at Rio Loa, Province of Antofagasta. The late John A. Wolffsohn, of Papudo, also co-operated with Mr. Sanborn in many helpful ways.

In 1939 and 1940 a preliminary trip to the Sierra Nahuelbuta was made possible through the cordial assistance of Dr. D. S.

Bullock and Mr. E. E. Reed, of El Vergel, Angol, and the hospitality of Sr. Angel Martinez, Administrador of the Parque Nacional de Nahuelbuta.

Field work in Magallanes in 1940, with Punta Arenas as a base, owed much of its success to Mr. P. F. Griffin, manager for Swift and Company at Rio Gallegos, Argentina, and Mr. John Dick, of Punta Arenas. Through the cordiality and intelligent interest of Mr. Dick a series of excursions was successfully organized to various points within two hundred miles of the Straits of Magellan. On Tierra del Fuego our generous hosts were Mr. John Goodall, of Rio Grande; Mr. Percy Reynolds and family, of Via Monte; and Mr. A. W. Spooner, of Cullen Station. Not only their indispensable hospitality was greatly appreciated, but perhaps even more their obviously sincere interest in the work we were doing. On the mainland we were similarly indebted to Messrs. William and John Fell, of North Arm Station; Mr. McLean, of Rio Verde; Mr. Kusanovich, of Mina Rica; and Mr. Greer, of Castillo.

Chilean officials received us with uniform courtesy during both expeditions, and American diplomatic representatives in Santiago met with full co-operation when they presented our requests for free entry of equipment and other privileges. We were especially indebted to former American Ambassador William M. Collier, to Ambassador Claude G. Bowers, and to Secretary Edward Trueblood.

Chilean naturalists with whom we had cordial relations include Dr. Carlos Porter, editor of the "Revista Chilena"; Director Ricardo E. Latcham, of Chile's Museo Nacional; Dr. Rodulfo Philippi, ornithologist; Mr. Carlos Reed, Director of the Santiago zoological garden; Dr. Kurt Wolfhügel, of Cayetue, Lake Todos Santos; and Dr. Dillman S. Bullock, of Angol.

As stated elsewhere, the privilege of studying specimens in the Museo Nacional of Santiago, Chile, was freely granted. Chilean material has also been examined in the British Museum through the courtesy of Mr. A. C. Hinton, Keeper of Zoology; in the American Museum of Natural History through Dr. H. E. Anthony, Curator of Mammals; and in the United States National Museum through Mr. Gerrit S. Miller, Jr., Curator of Mammals.

## HISTORY

*Molina.*—A few notes on the mammals of Chile, especially the larger marine forms, may be found in the accounts of voyages to

the southern coast during the sixteenth and early seventeenth centuries. Early writers, such as Buffon, appear to have had no information on the region, and except the elephant seal, the domesticated llama, and the guinea pig, no Chilean species is included in the "Systemas" of Linnaeus, published in 1758 and 1766. This practically complete lack of knowledge was suddenly changed with the publication in 1782 of an extensive work on the entire fauna and flora of Chile. This was the "Saggio sulla storia naturale del Chili" of Molina, which was soon translated into German and Spanish, then into French and later into English, and became widely quoted in zoological literature. Molina credited Chile with thirty-six species of mammals of which he gave formal descriptions of twenty-five and of these he provided new names for twenty-three. Of the thirty-six, there are five extra-limital, two domesticated, and six unidentifiable. Fifteen of the names he proposed are now recognized and cover nearly half the specific types found in the country. His contribution to knowledge, therefore, was a very large one which quite justifies calling him the father of Chilean natural history.

However, Molina worked under many disadvantages, and the accounts he published, although obviously sincere and containing much first-hand knowledge, were frequently mixed with hearsay which has caused subsequent authors considerable difficulty in dealing with the names proposed. He was interested in all branches of natural history, botany as well as zoology, and, all things considered, it is rather remarkable that he covered the field as well as he did.

Juan Ignacio Molina was born in Talca, Province of Maule, Chile, June 23, 1737, and died at Bologna, Italy, September 12, 1829. He was educated for the Jesuit order and within it attained to a post as librarian of the Jesuit College in Santiago. When his order was expelled from Chile in 1767 he went to Italy and in 1774 settled in Bologna. Therefore, when he left Chile he was only thirty years of age, and all his collecting and direct observation of Chilean natural history must have been made before that time. His writing for publication was done in Italy, apparently based only on notes and even all these may not have been available to him. In the preface to his principal work, he states (translation): "At an early period of life I began to turn my attention to both the natural and the political history of Chile, with the view of publishing at some future time the results of my inquiries. Some untoward circumstances, however, interrupted my progress, and I had even relin-

quished the hope of having it in my power to carry my plan into effect, when a fortunate accident put me into the possession of the requisite materials, and enabled me to offer the present work to the public." It seems probable that the "fortunate accident" may have referred to the recovery of his notes,[1] but that he had any actual material before him when writing his descriptions seems doubtful. Evidently he did preserve some specimens, but these probably never left Chile and have long since been destroyed. He mentions having collected no less than three thousand plants and in the second edition of the "Saggio," under *Mus maulinus*, he says: "I investigated it as soon as I killed it, and preserved the skin for some time in straw." Nevertheless, the description of *Mus maulinus* is wholly unidentifiable and cannot be applied to any animal known from Chile.

Molina's descriptions are accompanied by very brief Latin diagnoses that appear as footnotes and are evidently intended to cover technical requirements. He says of them (translation): "In describing objects of natural history I have avoided the use of technical terms, as being difficult to be understood by those not conversant with the study; but for the gratification of such as are familiar with that science, I have given, at the bottom of the page, the Linnaean characters in Latin, both of the known species and of those that are new which I have discovered." In most cases, however, these Latin diagnoses would be quite insufficient were it not for the popular accounts which accompany them. On the other hand, having given the Latin diagnoses, it is not impossible that he then felt free to be somewhat unrestrained in his popular accounts. These are frequently quite extensive, with accounts of habits of the animals and much material obviously derived from hearsay. In some cases he begins with a good account of one well-known animal and continues with matter applying to quite a different one. The result makes the application of some of his names very difficult or even impossible by any modern standards.

He confesses to having received many stories of animals which were probably fanciful but, in his own opinion, at least, he was able to separate the true from the false. This is evident in the following quotation from his preface: "In confining the number of

[1] It is reported that he had his notes with him as he was about to embark from Valparaiso, but that they were taken from him by a soldier at that time. A witness to the seizure, a young man of means, Don Ignacio Garcia Huidobro, bought the notes from the soldier and later during a trip to Europe delivered them to Molina in Bologna.

quadrupeds in Chili to thirty-six species, I have reference only to those that are well known; but I am fully persuaded that there is a much greater number, especially in the interior of the Andes, that are as yet undiscovered or very imperfectly known. This opinion is confirmed by the common traditions of the country; and I have been informed of eight new species that have been discovered at various times; but as the descriptions I have received of them have been very imperfect, and the animals have been seen but by few, I have thought them not sufficiently characterized to merit a place among those whose economy is well known. Such, for instance, is the *piguchen*, a winged quadruped or species of large bat which, if its existence is real, forms a very important link between birds and quadrupeds. This animal is said to be of the size and shape of a tame rabbit and to be covered with a fine hair of a cinnamon color; the nose sharp, the eyes round and shining, the ears almost invisible, the wings membranaceous, the paws short and like those of a lizard, the tail round at the root and ending like that of a fish. It inhabits holes in trees, which it leaves only at night and does no injury to anything but insects, which serve it for food.

"Of this kind is likewise the hippopotamus of the rivers and lakes of Arauco, which is different from that of Africa, and in its form and stature resembles a horse, but the feet are palmated like those of the seal. The existence of this animal is universally credited throughout the country, and there are some persons who pretend to have seen the skin which, they say, is covered with a very soft and sleek hair, resembling in color that of the sea-wolf."

Molina did not provide names for the hippopotamus or the winged *piguchen* with a tail like a fish, but it is clear that much of his information was received from others, and some of the names he proposed must be regarded as undeterminable. It is interesting to note, also, that in the second edition of his book, published in 1810, there is evidence that in regard to some names even his own faith may have been shaken. Many of the accounts are altered, and in two cases, at least, the Latin names are omitted. These are his *Castor huidobrius*, the description of which is hopelessly composite, and *Equus bisulcus*, about which his information was obviously scanty.

Adding further to uncertainty in regard to the sources of Molina's information are several curious discrepancies. Hellmayr has noted that among the numerous birds named by him there is no mention whatever of those of the family Pteroptochidae, which includes

several very common and highly characteristic Chilean birds well known to every native. Similarly, such an important mammal as the chinchilla receives no clear-cut distinction and under its vernacular name appears such a combination of the characters of several animals as defies disentanglement.

Usage has established a large proportion of Molina's names and with few exceptions it seems best not to subject them now to analysis bordering on the hypercritical. Where there is no doubt as to the animal principally concerned, his names should be accepted even though the descriptions may contain some contradictory matter. Where several animals, either real or fanciful, are inextricably confused, the names cannot be allocated and must be discarded. A list of Molina's names exactly as proposed and numbered by him and their present disposition follows:

1. L'Urigne, *Phoca Lupina?=Arctocephalus.*
2. Il Porco marino, *Phoca Porcina.* Unidentifiable.
3. Il Lame, *Phoca Elephantina=Mirounga leonina* Linnaeus 1758.
4. Il Leon marino, *Phoca Leonina=Otaria flavescens* Shaw 1800.
5. Il Chinchimen, *Mustela Felina=Lutra felina* Molina 1782.
   Il Guillino, *Castor Huidobrius.* Composite and unidentifiable.
   Il Coypu, *Mus Coypus=Myocastor coypus* Molina 1782.
1. Il Chinghe, *Viverra Chinga=Conepatus chinga* Molina 1782.
2. La Cuya, *Mustela Cuja=Grison cuja* Molina 1782.
3. Il Quiqui, *Mustela Quiqui=Grison cuja* Molina 1782.
5. L'istrici, o sia il Porco-spino Chilesesi. No technical name.
5. Il Culpeu, *Canis Culpaeus=Dusicyon culpaeus* Molina 1782.
6. La Guigna, *Felis Guigna=Felis guigna* Molina 1782.
7. Il Colocolo, *Felis Colocola=Felis pajeros colocolo* Molina 1782.
8. Il Pagi, *Felis Puma=Felis concolor puma* Molina 1782.
1. Il Guanque, *Mus Cyanus=Spalacopus cyanus* Molina 1782.
2. La Chinchilla, *Mus Laniger.* Composite and unidentifiable.
3. Il gran topo boschereccio, *Mus Maulinus.* Unidentifiable.
4. Il Degu, *Sciurus Degus=Octodon degus* Molina 1782.
5. Il Covur. Mentions four species of armadillos found in Cujo (=present Province of Mendoza, Argentina).
1. Il Cuy, *Lepus Minimus=Cavia porcellus* Linnaeus 1782.
1. La Viscaccia, *Lepus Viscacia=Lagidium viscacia* Molina 1782.
1. Il Pudu, *Capra Pudu=Pudu pudu* Molina 1782.
2. La Vicogna, *Camellus Vicugna=Vicugna vicugna* Molina 1782.
3. Chilihueque, *Camelus Araucanus.* Doubtfully identifiable; probably *Lama glama* Linnaeus 1758.
4. Il Guanaco, *Camelus Huanacus=Lama guanicoe* Müller 1776.
5. Il Guemul, or Huemul, *Equus Bisulcus= Hippocamelus bisulcus* Molina 1782.

*Poeppig, Cuming, and King.*—Following Molina, nothing further was learned of Chilean mammals for several decades. From 1826

to 1829, the German botanist Edward Poeppig made an extensive journey in South America during which he spent considerable time in Chile. Various notes on mammals are found in his "Reise" and he gave names to several, only one of which is now recognized—a bat, *Histiotus macrotus*. He also gave a name to *Spalacopus cyanus*, already described by Molina, and published a special account of its habits. At about the same time (1827–30), a British traveler, H. Cuming, made large zoological collections, principally invertebrates, on the west coast of South America, and several mammals which he brought back to the Zoological Society of London were described by E. T. Bennett. A few other species, also described by Bennett, were discovered and preserved by Captain Philip Parker King, a British naval officer engaged in surveying, principally around the Straits of Magellan, from 1826 to 1830.

*Darwin and Waterhouse.*—During the famous voyage of the *Beagle*, from 1831 to 1836, a great deal of time was spent in Chilean waters, and Charles Darwin, the naturalist of the expedition, was able to make several excursions inland. He made large additions to knowledge of Chilean mammals. Until his time, most of the species described had been those of medium or large size and conspicuous habits. Darwin, however, was obviously interested in the small rodents and prepared to obtain them. He did not depend upon natives but trapped them himself, as indicated by the frequent occurrence in his notes of the phrase "caught in traps baited with cheese." He discovered at least ten new species which include most of the well-marked forms now known from the region and represent seven different modern genera. His specimens were presented to the Zoological Society of London, and most of the new forms were described by George R. Waterhouse in a preliminary paper in the "Proceedings of the Zoological Society" in 1837. Later, the same author published full accounts of them with many colored plates, in the section on Mammalia in the "Zoology of the Voyage of the *Beagle*."

Some of Darwin's specimens were preserved "in spirit" and are now in poor condition, but most of them evidently were prepared in the field as skins carefully formed and laid on the side. They are now in the British Museum and in practically all cases readily identifiable. Types were not especially designated by Waterhouse, but in cases where more than one specimen of a species were involved Oldfield Thomas (1927) has carefully selected and designated a single one as lectotype.

*Bridges.*—Large collections of birds and a considerable number of mammals were sent from Chile to the British Museum by Thomas Bridges from about 1840 to 1846. The mammals were described by Waterhouse and include such important species as *Aconaemys fuscus*, *Notiomys megalonyx*, and *Octodon bridgesi*. Bridges worked in the provinces of Colchagua and Valparaiso. He also made an excursion to Mendoza and another to Bolivia. In a number of cases he contributed valuable notes on the habits and occurrence of little-known mammals.

*Gay.*—From 1828 to 1842, the French naturalist and traveler Claudio Gay was engaged in an extensive study of the zoology, botany, topography, and history of Chile. He returned to France for a short time in 1832 but altogether spent some eleven or twelve years in Chile, during which he is said to have visited all parts of the country, much of the time subsidized or employed by the government. The results of his investigations were published in Paris in a monumental work, "Historia fisica y politica de Chile," comprising twenty-three small octavo volumes of text and two quarto volumes of plates, mostly colored. Eight volumes of the text and one volume of plates are devoted to zoology, Volume I covering mammals and birds. Various authors contributed to the series, but the section on mammals may have been written by Gay himself, possibly with the assistance of Paul Gervais. It is a comprehensive account, with full descriptions of higher groups, genera, and species, citations of literature, and notes on distribution and habits. It presents an excellent summary of knowledge at the time and is not wholly a compilation, but it does not contribute much in the way of actual addition to knowledge. Three supposed new species of mammals are described, all now regarded as synonyms. Sixty-seven species are listed, including eight domesticated or introduced forms, two fossils, and several now known to be extralimital.

Gay was the founder of the Museo Nacional at Santiago (1830). Some of his collections were deposited there, but many others are known to have been taken to Paris. After leaving Chile in 1842, he traveled extensively in other parts of the world. He made a further brief visit to Chile in 1863. He died in Paris in 1873.

*Philippi.*—From 1853 to 1900, the study of natural history in Chile was dominated and greatly promoted by the German-born naturalist Rodolfo Amando Philippi, who arrived in Chile December 4, 1851, at the age of forty-three, a refugee from European militarism. His education (in medicine) at the University of Berlin

had been followed by experience as a teacher of zoology and botany in Kassel and by independent zoological research in Italy and Switzerland. After a voyage of 136 days, from Hamburg to Valparaiso, he went by sea a further twenty-one days to Valdivia where he purchased a farm called San Juan de Bellavista, on the banks of the Rio Bueno, near the present city of La Union. His attainments and ability were soon recognized and on October 20, 1853, he was called to become Director of the Museo Nacional in Santiago, which had been sadly neglected since the departure of Gay in 1842.

With the assistance of a young French entomologist, Filiberto Germain, Philippi immediately began to amass collections for the museum, and thereafter for more than forty years he pursued a life of great activity and devotion to study and travel. His interests were practically all-inclusive, and he wrote on geology, geography, and anthropology, as well as all branches of zoology and botany. In Europe he had worked principally in conchology, but in Chile he found a practically virgin field in all directions. If he had any leading interest perhaps it was botany, to which his contributions were enormous.

During the period from 1858 to 1900, Philippi from time to time published papers on mammals and described a number of new species, most of which are now recognizable. In his bibliography of more than four hundred titles not less than thirty are devoted to mammals. Among these were many that were evidently prepared with care and conservatism, forming definite additions to knowledge. In 1900, however, he issued a large work entitled "Figuras i descripciones de los murideos de Chile," which is one of the most extraordinary publications ever to find its way into print. In it he describes and figures in color a total of sixty-three Chilean rodents and proposes sixty-three new names of which no less than fifty-nine are synonyms or quite unidentifiable. The common *Akodon olivaceus* of central Chile was given fourteen different names. At this time he had reached the advanced age of ninety-two and, according to his biographers, was still active mentally, but his hearing had failed and his sight was so impaired that he was obliged to depend almost wholly upon a secretary for reading and writing. Nevertheless, the seventy-six colored figures were drawn by himself. Most of his supposed species were placed in the genus *Mus* and since there were no collections elsewhere and since his figures and descriptions indicated considerable variety, mammalogists in Europe and the United States who received his paper were quite at a loss as to how to dis-

pose of his names. As late as 1932, Gyldenstolpe, in his list of South American rodents, was obliged to place most of Philippi's names in a separate list entitled "Incertae Sedis."

In producing this remarkable paper, perhaps Philippi was influenced by the large number of rodents being described at the time by American and British zoologists, but it is quite evident that the infirmities of age were chiefly responsible. The specimens, many of which are still existing, had evidently been accumulated during his own travels or sent to him by friends throughout the country. In nearly all cases they were mounted for exhibition in the museum, and many of the distinctions he drew between them were due to the distortions of bad taxidermy, to the use of unsuitable preservatives, to immaturity and, in some cases, to false information maliciously given him as to their sources.

Philippi died in Santiago, Chile, in July, 1904, at the age of 96. He was succeeded as Director of the museum by his son Federico Philippi, who had published a few short papers on mammals, notably the description of *Dromiciops australis*. A grandson, Dr. Rodulfo Philippi, is now practicing medicine in Santiago and is associated with the Museo Nacional as ornithologist.

*Magellanic and Cape Horn Expeditions.*—At various times a few mammals were obtained, chiefly from the Straits of Magellan and vicinity, by expeditions organized under different national auspices mostly for other than zoological exploration. Most important was the French "Mission scientifique du Cap Horn" in 1882–83, primarily an astronomical expedition. Members of this expedition spent considerable time encamped at the Bay of Orange on the Hardy Peninsula, Island of Hoste, south of Tierra del Fuego, where they collected numerous common mammals now in the Paris Museum and reported on by Milne-Edwards and Thomas in 1891.

A German expedition, "Hamburger Magalhaensische Sammelreise," obtained on Tierra del Fuego and on the Straits of Magellan scattered specimens belonging to eight species which were reported on by Matschie in 1898.

At a much earlier date a very few Chilean mammals were collected by R. O. Cunningham, naturalist of the British surveying vessel *Nassau* from 1866 to 1869. Small collections of mammals were also made by Charles H. Townsend during the visit of the United States Fish Commission Steamer *Albatross* to the Straits in 1887–88. These specimens are preserved in the United States National Museum at Washington.

*Wolffsohn and Thomas.*—Soon after the death of Philippi, Chilean mammals began to receive attention from John A. Wolffsohn, an English-speaking resident of Chile who had sent a few specimens to the British Museum and later, through the encouragement of Oldfield Thomas, became an active collector. Although not a man of means or special training, Wolffsohn not only collected but studied Chilean mammals, publishing a number of valuable papers in the "Revista Chilena" over a period of some twenty years, from 1908 to 1927. During this period Thomas was active in describing South American mammals from various sources, and among them were more than twenty now attributed to the Chilean fauna, a considerable number having been collected by E. Budin at localities in Argentina near the Chilean boundary.

Meanwhile, from time to time, various Chilean authors contributed notes and short articles mainly on the habits and distribution of Chilean mammals to the "Revista Chilena," published in Santiago by Dr. Carlos Porter.

*Expeditions of Field Museum.*—As stated on another page, Field Museum has sent two expeditions to Chile, the first in 1922 and 1924 and the second in 1939 and 1940. The most interesting result of the first expedition was the discovery of the caenolestid marsupial *Rhyncholestes raphanurus* (Osgood, 1924). Of more importance, however, was the accumulation of series of well-prepared modern specimens of all the common mammals from selected localities representing the principal areas of the country. This material furnishes the basis for evaluation of previous work, and it is now supplemented by collections made by the second expedition about the Straits of Magellan. Altogether, there are now available in Field Museum nearly two thousand specimens of mammals from a wide range of localities in Chile and immediately adjoining regions. Even these collections would present many difficulties for study had it not been possible while they were being made to visit the Chilean Museo Nacional at Santiago and examine carefully the numerous types of mammals described by Philippi. So far, very little has been published since Field Museum's expeditions were made and most of their results are incorporated in the present work.

## PHYSIOGRAPHY AND CLIMATE

Chile is entirely south of the equator and essentially a temperate country. In contrast to Peru, Ecuador, and Colombia, it includes only one slope of the Andes and no very complicated systems of

ranges and valleys. Its physical diversity, therefore, is mainly correlated with its great longitudinal extent. From its northern boundary with Peru to its southern limit at Cape Horn, it covers nearly forty degrees of latitude, a distance of more than 2,500 miles or as much as the distance from central Mexico to western Alaska. Throughout this great length it is relatively very narrow. In the northern province of Antofagasta it is about 250 miles in width but elsewhere, except at the Straits of Magellan, it is scarcely half that and in its narrowest parts its span from west to east is no more than seventy-five miles. At the Straits of Magellan its boundary turns east and extends to the Atlantic Ocean, setting off a very narrow area only a few miles wide on the northern shore of the Straits. South of the Straits its line cuts south through the island of Tierra del Fuego which it divides nearly in half, the western part and the Cape Horn Islands being Chilean and the eastern part Argentinian.

Except in the extreme south, therefore, the eastern boundary of Chile follows the highest peaks of the Andes, which divide eastern and western drainage. In its northern and central parts the mountains are very high and continuous, so only western slopes are included. Farther south the same is generally true, but the average elevation is much reduced and the higher peaks are frequently detached, so that some of the streams which drain to the Pacific may in their windings, for at least a short distance, traverse territory that is east of the main mountain mass. Thus a few small areas within Chilean boundaries offer opportunity for minor invasions of some elements of the Patagonian fauna.

In the northern provinces of Antofagasta and Atacama, in the nitrate district, the mountains rise almost directly from the sea and extend inland as a high plateau, much of it well over 10,000 feet in height. Eastern and western ranges inclosing a central valley are indicated in some parts but are not well defined. Elevated deserts in this region occupy large areas, so arid that animal and plant life are non-existent. South of this, in the Province of Coquimbo, the higher elevations are farther from the coast and narrow transverse valleys are characteristic, with a few spurs of the mountains reaching the coast.

Thence southward from the vicinity of lat. 33° S., near the principal cities of Valparaiso and Santiago, the typical topography of central Chile begins, with the high wall of the Andes on the east and a fairly defined low range or scattered hill masses following the coast, with a somewhat elevated and fairly wide valley between them

and the Andes. This central valley forms the heart of agricultural Chile. It extends approximately from lat. 32° S. to 38° S., that is, from the Province of Santiago to the Province of Malleco, roughly from Santiago to Angol. With a temperate climate, abundance of water from the neighboring Andes, and generally good soil conditions, it is a highly productive region adapted to dairying, stock-raising, and both large- and small-scale cultivation of a wide variety of cereals, vegetables, and fruits. For about four hundred miles the valley is fairly defined but it seldom exceeds twenty-five or thirty miles in width and in some parts is much narrower, although it often leads into smaller valleys, especially to the westward. The numerous watercourses drain to the westward. Along these there is some tree growth of native species, but open fields and low bush growth predominate, now divided by long rows of Lombardy poplars, willows, and other introductions. Adjacent slopes of the Andes rise rather abruptly, with scattered, mixed forest and bush, reminding much of that found in the foothills of the Sierra Nevada of California. Above this the forest rapidly thins out, and until the more southern latitudes are reached the higher parts of the Andes are mostly rough and rocky, with scant vegetation and limited fauna. West of the valley the so-called coast range consists of a series of groups of low mountains rather than a continuous chain, since it is cut at frequent intervals by good-sized rivers flowing through very narrow valleys to the Pacific. Light deciduous forest and bush are characteristic, and elevations seldom exceed 2,500 feet.

Although there is gradual slight increase in humidity as we proceed southward, conditions are relatively uniform down to the vicinity of lat. 37° S., at a point corresponding roughly to the first southern incidence of the Humboldt Current on the coast. Here there is a rather abrupt change both in climate and in topography. The Bio Bio River, which was long the frontier between the early colonists and the Araucanian natives, offers a convenient natural boundary for the beginning of this change, although it is by no means an exact one. South of this river the central valley is no longer evident, and open fields or bushy slopes are replaced by thickly forested hills and cool swamps. With increased rainfall there is a greater abundance of small streams, and the higher mountains both near the coast and inland are bathed in mist much of the time. Just south of Concepcion, between the Bio Bio and the Bueno rivers and adjacent to the coast, the Sierra Nahuelbuta forms a fairly defined range rising to some six thousand feet. Meanwhile in the same

latitude there is change in the character of the Andes, which no longer present a solid front but are cut by the canyons of large rivers and flanked by outlying volcanic peaks individually sharply distinguished. This leads to the famous lake region in which the Andes are broken by deep narrow valleys holding beautiful lakes and surrounded by snow-capped mountains. Low passes in several cases lead to the eastern side of the divide into Argentina, the best-known being that via Lake Llanquihue and Lake Todos Santos to Lake Nahuelhuapi. Small lakes are numerous, and the larger ones are often connected by torrential streams. The topography is complicated, and considerable areas are unexplored. Some of the more southern lakes are but little removed from arms of the sea, and it is plain that their present condition is due to gradual elevation of the land. In lat. 42° S. the Andes actually reach the sea, with the wide Bay of Ancud and the Gulf of Corcovado separating them from the large island of Chiloe which occupies the same position relative to them as the coastal region farther north, with water intervening instead of an open valley or broken hills. Thence southward the heavily forested mountains stand but a short distance from the coast and send down numerous streams, many of which debouch into narrow fiords. Small islands form a protection from the open Pacific but much of the country is inhospitable and difficult of access. In recent years, at favorable points, a few hardy settlers have pushed in, notably at Rio Aysen where there is passage to Argentina, but most of the region is in a state of nature. As far south as lat. 47° there is mixed forest including many of the trees found farther north. Individual volcanic peaks, such as the great Corcovado and Mount Mako, are heavily blanketed with snow and furnish impressive views when weather permits.

From the vicinity of lat. 47° S. (Gulf of Penas) to the Straits of Magellan similar physiographic conditions continue, but average temperatures are lower, soil conditions are poor, and forest trees are markedly reduced in size and number of species. In the extreme south, small glaciers occasionally reach the sea, and mountains of only moderate height carry perpetual snow. Timberline varies according to local conditions, in many cases being not more than a thousand feet above the sea or sometimes even less. Often the trees form but a narrow fringe at the edge of the water and above them are only open rocks among which even procumbent vegetation is limited in amount. Although there is heavy rainfall, running streams are few, not only on most of the islands but also for long

stretches on the mainland. The region is quite uninhabited, and the few aborigines who formerly hunted marine animals along the shores have practically disappeared.

On the mainland and on some of the islands near the western entrance to the Straits of Magellan local conditions favor a somewhat better forest growth, and even along the Beagle Channel on the south side of Tierra del Fuego the forests are heavier and the climate is milder than somewhat farther north. Except for the extreme south, on the Cape Horn Islands, the region of conditions most forbidding for life lies mainly on the coast and islands between the Gulf of Penas and the Straits of Magellan, where practically no zoological collecting has been done.

At the southern end of the continent and on Tierra del Fuego general conditions are similar to those farther north, with the humid forest of the west coast extending to the east of the mountains somewhat diminished in species and rapidly tapering to low bush and finally to open grassy plains. On the west coast the forest is composed mainly of three species of trees, the Antarctic beech (*Nothofagus antarctica*) or *ñire*, the evergreen beech (*Nothofagus betuloides*) or *coihue*, and the winter's bark (*Drimys winteri*). Of these *N. betuloides* predominates on the coast and in colder, more elevated parts eastward. The winter's bark also is mainly a coast tree, less numerous than the others, and the *ñire*, *N. antarctica*, is the only one that ranges far to the eastward beyond the coast mountains. On the Straits of Magellan, trees extend slightly beyond Punta Arenas, specifically to a point (Cabo Negro) about fifteen miles north. On Tierra del Fuego the same conditions prevail, the northern and eastern parts being open grassland, changing on the northern slopes of the mountains to forest which becomes more dense and humid on the southern or Pacific side and the neighboring islets. Where soil and other conditions are favorable, the trees reach good size, with maximum diameters exceeding four feet, but as they approach their eastern limits they assume small, rounded and wind-blown shapes and reach a height of no more than ten or fifteen feet.

At a few points the grasslands of southern Patagonia or at least treeless areas actually extend to salt water on the Pacific coast through breaks in the mountains. A conspicuous case of this kind is on Ultima Esperanza or Last Hope Inlet, in the vicinity of Puerto Natales. Some of the larger islands, as, for example, Riesco Island, are also treeless on their inner or northern sides, becoming heavily forested on the seaward sides.

Thus the general climatic and physiographic conditions of Chile present a slightly blurred mirror image of those found in the north on the Pacific coast from Mexico to Alaska. The resemblance is far from exact, but there are many parallels. Someone has said that Chile is "California upside down," and this carries a considerable measure of truth. The coastal deserts of northern Chile are more arid than any on the North American coast; the central valley of Chile is on a considerably smaller scale than the San Joaquin of California; and the fiords of the Magellanic region, while similar to those of Alaska, present a somewhat different appearance due mainly to the absence of coniferous trees.

## ZONES AND FAUNAL AREAS

It is doubtful if an attempt to correlate the distributional provinces of Chile with those of countries north of the equator is justified. Although there are intrusions from the north and east, the fauna is largely autochthonous or part of that assemblage of types which by statistical methods has led to the recognition of a so-called Patagonian Subregion. This fauna diminishes to the northward and also to the southward and no broad distinctions can be drawn except between the temperate regions and the alpine or puna. Excluding the puna, therefore, practically all of Chile belongs to what probably should be called the South Temperate zone.

### TROPICAL ZONE

Hellmayr[1] has regarded as tropical a narrow strip of desert coast in the north adjoining Peru and extending into the provinces of Tacna and Tarapaca south to the Rio Loa. This is because of the occurrence there of certain birds characteristic of the coast of Ecuador and Peru. Among these are *Volatinia j. peruviensis*, *Pyrocephalus r. obscurus*, *Crotophaga sulcirostris*, and *Melopelia asiatica meloda*, all of which are identical with or only subspecifically separable from forms ranging southward from Panama. It cannot be denied, therefore, that they are truly tropical types, but it is to be noted that they occur in company with such southern and temperate forms as *Geositta* and *Leptasthenura*, which range still farther north on the coast of Peru. The effect of the Humboldt Current in carrying marine forms northward is well known and, although its influence on the terrestrial fauna is less marked, it is not inconsiderable.

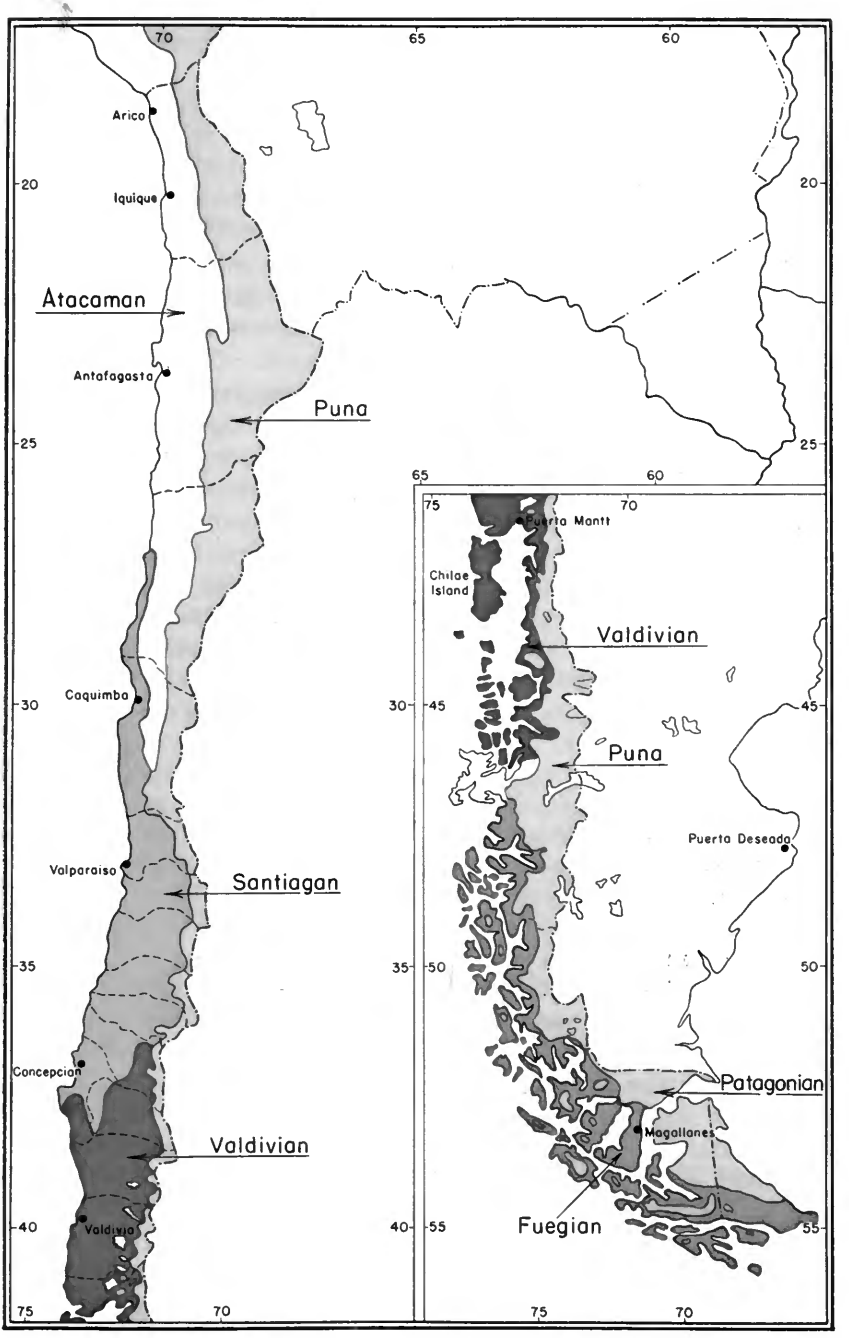
[1] Birds of Chile, Field Mus. Nat. Hist., Zool. Ser., **19**, p. 21, 1932.

Access to this region for tropical forms is mainly or wholly from the north, since the continuous high range of the western Andes is an effective barrier on the east. An undiluted tropical fauna including mammals and other vertebrates as well as birds extends from Ecuador to the coast of northern Peru only to the vicinity of Trujillo or some six degrees south of the equator. Here, for example, are still found opossums of the genus *Didelphis*, and here or just north of here many tropical birds and reptiles find their southern limit. Beyond this the fauna is definitely reduced, with some mixture of both northern and southern types, with Andean derivatives, and with subspecies, species, and even genera regionally differentiated. Extreme northwestern Chile falls within this region of transition between temperate and tropical but it is not truly tropical. A careful study of the entire fauna of the coast from southern Ecuador to northern Chile is needed.

Aside from a few bats (e.g. *Desmodus* and *Tadarida*) there are no truly tropical mammals in Chile. These bats which, like birds, have powers of flight, are of little or no significance in evaluating the faunal position of the region. Although belonging to tropical groups, they have invaded a temperate region and adapted themselves to it, in a sense being comparable to the parrots and humming birds which are found throughout Chile even south to Tierra del Fuego. Somewhat comparable to these is the mouse opossum, of which one species reaches Chile. Although belonging to a genus which is mainly tropical, the Chilean species falls into a section now adapted to a temperate climate.

### PUNA ZONE

The puna zone is not well-marked and detailed information in regard to it is lacking. Actual or theoretical timberline becomes progressively lower from the north, where it may be about 13,000 feet, to the extreme south, where it is only 1,000–1,500 feet. Excessive aridity in the northern provinces is combined with relatively high altitudes and a greatly reduced fauna, making the delimitation of a puna zona somewhat arbitrary. The paramos or punas of Colombia, Ecuador, and Peru have their counterparts in limited areas in northern and north-central Chile, but southward in the central provinces the mountains are often so rough and rocky or so steep that there is but little life between the upper limit of trees and the lower snow line. Farther south, below lat. 36°, the Andean chain is not continuous and puna conditions are found only on isolated peaks or limited ranges. Moreover, in southern latitudes




MAP 2. Principal faunal districts of Chile. Boundaries are only approximate, especially those of the puna district, the exact limits of which are either unknown or too complicated to be shown on a map of this size.

the puna fauna tends to range into arborescent vegetation more extensively. Even on Tierra del Fuego, however, at least one bird (*Attagis*) breeds only above timberline, even though this may be at an altitude of no more than 1,200 feet. So far as known, the only mammals ranging into the higher treeless parts of Tierra del Fuego are also well distributed down to sea level. In recent years, a considerable proportion of the guanacos left on Tierra del Fuego have resorted to the open highlands to breed, but this is largely because of persecution elsewhere.

The only mammal definitely characteristic of the puna zone is the mountain viscacha (*Lagidium*). This ranges through the highest parts of the Andes from the most elevated plateaus of the provinces of Tarapaca and Antofagasta south to the district of Ultima Esperanza in Patagonia, at about lat. 52° S. Other mammals that range into this zone from the vicinity of timberline are *Akodon andinus, Phyllotis, Aconaemys, Chinchilla, Dusicyon culpaeus, Hippocamelus, Lama guanicoe,* and *Vicugna vicugna.* That the fauna of Bolivia extends at least for a short distance into Chile is indicated by the record of *Phyllotis boliviensis* at Choquelimpie, Tacna, at 15,000 feet. A Bolivian tuco tuco, *Ctenomys opimus,* also is reported from this locality.

### SOUTH TEMPERATE ZONE

Excluding the puna and a few coast valleys in the extreme northwest, the remainder and by far the greater part of Chile has a temperate climate and a temperate although largely peculiar fauna. In the north, the political boundaries of the country extend far enough to include a small area where there is contact with the highland fauna of southern Peru[1] and Bolivia. Likewise, in the south on the north side of Tierra del Fuego and the Straits of Magellan as well as in small discontinuous areas at the eastern base of the Andes, the Patagonian fauna crosses the boundary and extends for a very short distance into Chile. Aside from these intrusions of extralimital faunas, the temperate of Chile is divisible into three well-marked areas characterized by the differentiation of related forms and by the presence or absence of certain generic or well-marked specific types. These areas have a climatic basis and, except in detail, are latitudinal. Their general extent seems fairly clear but exact boundaries for them await further study and much more information than is available at present. From north to south,

[1] The occurrence of *Phyllotis arenarius* at Putre, Province of Tacna, at 11,000 feet, is perhaps an example of the intrusion of a temperate form from Peru.

therefore, we have the following subdivisions of the temperate: Northern Desert or *Atacaman*, Central or *Santiagan*, Humid Forest or *Valdivian*, and Littoral Forest or *Fuegian*. The Treeless Plain or *Patagonian* may be added to these, although if political boundaries were slightly different it would not figure.

*Northern Desert or Atacaman.*—This district includes the arid northern part of Chile below 10,000 feet, from the Province of Tacna nearly to Coquimbo. It is wholly arid and treeless with many areas quite devoid of life. Some of it is still unexplored. Scattered through the higher parts are occasional intermittent streams and saline reservoirs promoting the existence of limited plant and animal life, some of which is temperate. Although fairly extensive, this district has scarcely any mammal fauna of its own. Here and there certain species of the puna zone may be found in it, as, for example, the chinchilla and the guanaco, which formerly ranged to the sea, at least at times. A few rodents, as *Akodon* and *Oryzomys*, enter the edges but have not become well established. *Phyllotis*, which is common in the next district southward, may be found but tends to the higher parts where it is slightly differentiated (*P. darwini rupestris*). Not improbably some forms of the Peruvian coast may also reach it, but records at present are lacking. The scattered areas that are suitable for any mammalian life have been settled and, in most cases, infested with house rats and mice, so whatever native life may have existed has now disappeared.

One bat, *Myotis chiloensis atacamensis*, stands as a well-marked race allied to southern forms, but it appears to range through the highlands into Argentina and is not wholly peculiar to this district. So far as mammals are concerned, therefore, the district has mainly negative characteristics.

*Central or Santiagan.*—Occupying the most populous part of the country, this district extends from the southern edge of the desert in the Province of Coquimbo to the forests of Valdivia and from the Pacific Ocean to timberline in the Andes. The majority of Chilean mammals are found within it, and although a large proportion of the species extends southward into the humid forest district, practically all of these are subspecifically differentiated. Actually confined to it are the two genera *Octodon* and *Spalacopus*, as well as a few species such as *Abrocoma bennetti* and *Felis pajeros* (*colocolo*) or the bats of tropical origin, *Desmodus* and *Tadarida*.

Representative subspecies of this district as compared with those of the adjoining humid district are as follows:

| Santiagan | Valdivian |
|---|---|
| *Marmosa elegans elegans* | *Marmosa elegans soricina* |
| *Myotis chiloensis arescens* | *Myotis chiloensis chiloensis* |
| *Dusicyon griseus domeykoanus* | *Dusicyon griseus maullinicus* |
| *Felis concolor puma* | *Felis concolor araucanus* |
| *Felis guigna molinae* | *Felis guigna guigna* |
| *Myocastor coypus coypus* | *Myocastor coypus melanops* |
| *Notiomys megalonyx megalonyx* | *Notiomys megalonyx microtis* |
| *Abrothrix longipilis longipilis* | *Abrothrix longipilis apta* |
| *Akodon olivaceus olivaceus* | *Akodon olivaceus brachiotis* |
| *Oryzomys longicaudatus longicaudatus* | *Oryzomys longicaudatus philippii* |

*Humid Forest or Valdivian.*—South of the Santiagan the Valdivian district extends along the coast and through the mountains to the vicinity of the Gulf of Penas, about lat. 47° S. There is some interdigitation at the northern boundary where humidity increases with altitude, but the change is fairly abrupt from a region of moderate rainfall and relatively light vegetation to one of great humidity and dense forest.[1] In the heart of this district, vegetation is widely varied and highly exuberant. Heavy forest growth is combined with dense undergrowth and the numerous cryptogams that go with an atmosphere constantly charged with moisture. As indicated above, a considerable proportion of the specific types of mammals of the Santiagan district continue into the Valdivian, but in every instance there is subspecific differentiation. A better example of climatic and faunal correlation could scarcely be desired. The characters displayed by the subspecies of small rodents are, as might be suspected, much the same as those shown under similar conditions in the forests of Oregon and Washington. Saturate colors, thickened pelage, and lengthened tails prevail.

Several generic types of mammals are wholly or almost wholly confined to this district. These are the marsupials *Rhyncholestes* and *Dromiciops*, the cricetine rodent *Irenomys*, and the ungulate *Pudu*. The last-named is reported as extending southward into the Fuegian district, and it may locally overlap into the southern part of the Santiagan; but its center of abundance is the Valdivian, and any deviation is not significant. The small highly adapted rodent *Notiomys valdivianus* also characterizes this district, although it has slight subspecies in Argentina. Another species is *Akodon* (*Abrothrix*) *sanborni*, a dark-colored mouse of uncertain relationships.

*Littoral Forest or Fuegian.*—This includes the forested coast region from the vicinity of the Gulf of Penas to the Straits of Magel-

[1] Rainfall at Valparaiso 20–40 inches; at Valdivia 80–200 inches.

lan and the southern or Pacific shore of Tierra del Fuego. It is characterized by a reduced fauna and flora. The forest trees, although often in luxuriant solid stands, are few in species, not more than three in fact, and other vegetation is correspondingly lacking in the diversity that prevails in the Valdivian district. Mammals and birds are few in species and even insects and fresh-water invertebrates are scarce. The most characteristic small mammal is *Akodon xanthorhinus*, which is excessively abundant on Tierra del Fuego and continues northward along the coast for an undetermined distance. At Last Hope Inlet it is still abundant and it doubtless ranges considerably farther north. Less common, but occupying the same region, is *Akodon (Abrothrix) lanosus*. Only one of the small rodents of northern Chile has a subspecific representative here. This is the *Oryzomys*, which is substantially differentiated in each of the principal faunal districts, as below.

| Santiagan | Valdivian | Fuegian |
|---|---|---|
| *O. l. longicaudatus* | *O. l. philippii* | *O. l. magellanicus* |

Aside from amphibious forms, there is one carnivore, *Dusicyon culpaeus magellanicus*, only subspecifically distinguishable from a northern form *D. c. culpaeus*, and on Tierra del Fuego a closely allied insular form, *D. c. lycoides*.

Typically, therefore, we have in this district only three small rodents, *Akodon*, *Abrothrix*, and *Oryzomys*, with one terrestrial carnivore, *Dusicyon*. Several forms from the Patagonian may occasionally penetrate short distances into the forests of this district, but they are essentially interlopers not properly part of this fauna. Such are *Reithrodon* and *Euneomys* on Tierra del Fuego and *Notiomys* on the mainland.

*Treeless Plain or Patagonian.*—As stated elsewhere, the political boundaries of Chile in the south include various eastern slopes and tongues of pampa which, although scattered and of small extent, provide access for a considerable number of mammals not otherwise found in Chile. These include species mainly of the eastern foothills and others of the open plains. Among them are *Dusicyon griseus, Conepatus humboldti, Lyncodon patagonica, Ctenomys magellanicus, Reithrodon auritus cuniculoides, Euneomys chinchilloides, Phyllotis micropus, Phyllotis xanthopygus*, and *Akodon (Abrothrix) longipilis suffusa*. On Tierra del Fuego the open plain is largely within the boundaries of Argentina, but enough of it extends into Chile to make it certain that all species of the island occur on both sides of the line.

## DERIVATION OF CHILEAN MAMMALS

Geologists and paleontologists are mostly agreed that South America received a primitive mammalian fauna from the north at a very early date. The oldest fossils now found there are regarded as Paleocene, indicating an established fauna at least as early as the beginning of the Tertiary, and it is not impossible that forerunners of this fauna entered during the latter part of the Cretaceous. Following this introduction from the north, the South American continent was cut off from the rest of the world for a long period, for many millions of years in fact, and during this time its mammals became differentiated into an extraordinary number of widely varying types so different from their contemporaries elsewhere that it became necessary to erect innumerable new genera, many new families, and even five or six new orders to accommodate them. No less than forty different families were represented and it was perhaps the largest and most peculiar mammalian fauna that ever existed.

This fauna was flourishing in the Miocene some twenty to thirty million years ago, but in later periods most of it disappeared. All the larger forms became extinct and many of the smaller ones also, but a few descendants of the latter have continued into the present. These include only the marsupials (didelphids and caenolestids) and the sloths, anteaters, and armadillos. Late in the Miocene, while the large fauna was still well represented, there suddenly appeared a whole group of rodents, the Hystricomorpha, many of which in only slightly modified form have continued into the present. These include the American porcupines, cavies, chinchillas, viscachas, and various octodonts of ratlike form. How and where they originated is not certain, but a few members of the same group are now found in Africa with some evidence of a possible ancestry in Europe. Nothing closely resembling them has been discovered so far in the North American Tertiary. At about this time the antecedents of the platyrrhine monkeys also appeared, and their origin, like that of the hystricomorphs, is still uncertain. Obviously, the record is far from complete.

Meanwhile, just before the extinction of the great South American fauna, important physical changes took place, the general nature of which is quite certain. In Pliocene times, South America and North America again became connected at Panama and the isthmus was then probably higher and wider than it is now, furnishing a bridge for the interchange of northern and southern faunas. Cats,

dogs, deer, cricetine rodents, and other familiar northern forms poured into South America and spread over the entire continent, perhaps having some part in the extinction of the southern types, although doubtless other factors were involved. Southern forms also invaded the north but in smaller numbers and mostly to limited areas. Ground sloths and glyptodonts reached Ohio, Kentucky, California, Nevada, and similar latitudes and there became extinct. Opossums and armadillos now extend to the southern United States, and in tropical Mexico there are anteaters, sloths, monkeys, and several representatives of the hystricomorph rodents. The only form of southern derivation which has attained a very wide range in the north is the porcupine now covering a great part of the United States, Canada, and Alaska.

These general features of the history of South American mammals are well known, especially to paleontologists, and of course they are responsible for the broader aspects of present-day distributions, but they cover such vast periods of time and so many elements are lacking that interpretation of details cannot be entirely free of speculation. When applied to Chile they furnish the basis for an immediate division of its modern fauna into one series of southern origin and one of northern.

Those of undoubted southern origin are the following, belonging to two orders and eleven genera:

Order Marsupialia: *Rhyncholestes, Marmosa, Dromiciops.*
Order Rodentia: *Chinchilla, Octodon, Aconaemys, Spalacopus, Lagidium, Ctenomys, Myocastor, Abrocoma.*

Of these, three are marsupials and the remainder hystricomorph rodents. *Rhyncholestes* and perhaps also *Dromiciops* are directly derived from ancient stocks which may have occupied the same region as these their descendants now do. Both are peculiar to Chile and do not occur east of the Andean chain. The third marsupial, *Marmosa,* although a primitive type, probably reached Chile at a much later date by secondary invasion from northern and central South America. Two genera of bats, *Desmodus* and *Tadarida,* are doubtfully of southern origin, but like the *Marmosa* they are obviously recent introductions from tropical regions to the northward.

Among the hystricomorphs of Chile, the majority are peculiar to the region and only two, *Ctenomys* and *Myocastor,* have extensive distribution east of the Andes. Moreover, although tropical types of hystricomorphs are numerous (*Proechimys, Dasyprocta, Hydro-*

*chaerus*, etc.), none of them have reached Chile. It is evident, therefore, that at some period in the history of the ancient southern types, both among the marsupials and the rodents, they became divided, by migration or differentiation, into two groups, one occupying tropical parts of South America and the other the temperate. In Chile only the temperate forms are found among the hystricomorphs and it is easily seen that among the much fewer marsupials the one form closely allied to tropical types is a recent invader. The northward distribution of these temperate forms is very limited. Although climatic conditions are favorable for them in the Andes of northern Ecuador, Colombia, and even Venezuela, only the caenolestids have reached to these limits and their northern representatives are well differentiated from the southern. *Lagidium* goes no farther than southern Ecuador, *Chinchilla* reaches central Peru, while *Dromiciops, Octodon, Aconaemys, Spalacopus,* and *Abrocoma* are practically confined to Chile. *Abrocoma* is recorded from Bolivia just beyond the political boundaries of Chile, and in adjoining parts of Argentina are the very local allied genera *Octodontomys* and *Octomys.*

The following mammals reached Chile from the north:

Order Chiroptera: *Myotis, Histiotus, Lasiurus.*
Order Carnivora: *Felis, Grison, Lutra, Dusicyon, Conepatus.*
Order Rodentia: *Akodon, Eligmodontia, Euneomys, Irenomys, Reithrodon, Phyllotis, Notiomys, Oryzomys.*
Order Artiodactyla: *Hippocamelus, Lama, Vicugna, Pudu.*

These, therefore, include four orders and twenty genera, a much larger and more varied assemblage than those of southern origin. The proportion of endemic forms, however, is much smaller. All the bats and all the carnivores belong to wide-ranging genera. Among the rodents, all of which are cricetines, only *Irenomys* is strictly confined to Chile, although *Notiomys* is essentially Chilean. The ungulates *Hippocamelus, Lama,* and *Vicugna* extend into Bolivia and Peru, while *Pudu* is supposed to be represented in Ecuador by a rare allied form *Pudella.*

Of the eight genera of cricetine rodents, only one, *Oryzomys,* now has continuous distribution from the north southward. All the others, although obviously of northern origin, have become well differentiated and are now confined to southern South America; their immediate northern ancestors are either extinct or unrecognizable among living forms. It is probable, therefore, that all or most of these are the result of a relatively early invasion from the north, while the *Oryzomys* may have come at a much later date,

probably in the Pleistocene. The *Oryzomys*, in fact, can be traced northward from Tierra del Fuego, where it is quite common, through Chile, Peru, and Ecuador to Colombia and from there by forms scarcely more than subspecifically different to Panama and Central America. It has also spread somewhat into the tropics in Brazil and elsewhere. Its distribution and relationships are not yet fully worked out but perhaps it may offer some clue as to the route into the south followed by the other cricetines.

Excluding bats and pinnipeds, the significance of which is doubtful, there are thirty genera of mammals now found in Chile. Of this number, seventeen are of northern origin. This high percentage of northern forms is interesting not only in its relation to their past history, but is significant of the present condition, for the process of extinction is still going on and, at least among the rodents, it appears that the northern forms are rapidly gaining supremacy. Among the hystricomorphs or southern forms, several of the families and most of the genera are now monotypic, while nearly all of them occupy very restricted areas. Already the chinchilla is practically gone and none of the octodont rats is generally distributed. In order to obtain specimens of all the genera of these octodonts it is necessary to travel over most of central Chile and to visit isolated areas, sometimes only a few square miles in extent, where they are found in limited numbers and under conditions where slight disturbance might easily wipe them out. On the other hand, the northern forms, especially the cricetine rodents, are mostly of general distribution and differentiated into various subspecies occupying adjoining areas. Except where they are crowded out by the introduced murines, they are abundant and flourishing. That they will eventually have complete ascendancy over the small octodonts seems highly probable.

Purely Palearctic or Nearctic forms are very few in South America and none of them have reached the far south. They include only the weasels, which extend to Ecuador and Peru, the shrews, which extend to Ecuador, and possibly some of the squirrels, with a slightly wider range. All the southern cricetines and at least most of the carnivores of Chile appear to have been derived from the so-called Sonoran Region or Subregion of central and south-central North America. In this area certain well-differentiated groups, as the Antilocapridae and Geomyidae, have never reached South America, but the majority of the mammals of the southern United States and northern Mexico have their representatives in the south

and, at the present time, various groups are more highly developed in the south than in the north. Such a genus as *Oryzomys*, for example, must have spread southward from the Sonoran, although now more restricted there than in the invaded regions. The significance of the Sonoran as a zoogeographic province is thus increased by considering its relation to South America. Besides family and generic types peculiar to it, there are certain specific ones such as the puma, which despite its very wide range in the south is to be regarded as a purely Sonoran type.

The present-day mammal fauna of Chile, therefore, consists of two major elements and two minor ones. By far the majority of the mammals are either hystricomorph rodents of long standing in South America or invaders belonging to several families from North America. The minor elements are (1) the caenolestid marsupials directly descended from the early Patagonian fauna and (2) the mouse opossum and several bats that are doubtless recent intrusions from tropical South America.

## ENDEMISM

No less than eight genera of mammals are peculiar to Chile. These are two marsupials, four octodont rodents, one cricetine rodent, and one ungulate, as follows:

Order Marsupialia: *Rhyncholestes, Dromiciops.*[1]
Order Rodentia (octodont): *Octodon, Abrocoma,*[1] *Spalacopus, Aconaemys.*
Order Rodentia (cricetine): *Irenomys.*
Order Artiodactyla: *Pudu.*

This is a high percentage of the total mammal fauna. If we exclude the pinnipeds and the five genera of bats, as well as the genera that barely pass Chilean political boundaries and do not properly belong to its fauna, the total number of genera is reduced to twenty-six. Nearly one-third of these, therefore, are confined to the region, practically all of them to middle Chile where the high wall of the Andes most effectively shuts them in. The area in which they live is a very small one as compared to the continent of which it is a part and it is scarcely to be supposed that they have developed within it. More probably they or their ancestors became isolated at a time when physical conditions forced them into a limited area and exterminated their near relatives elsewhere. At some time

[1] Records of these genera from Argentina are such a short distance beyond Chilean territory that their inclusion in this list seems justifiable.

during the Pliocene much of Patagonia was under the sea, with the Andes of the west lower than now and more limited in extent. The marine inundation and the gradual elevation of the Andes necessarily produced profound climatic disturbances the exact nature of which cannot be traced. There was some glaciation in the southern Andes and there are a few small glaciers there now, but there were no great intermittent glacial periods as there were in the north. There must have been some selective climatic influence, however, which may have been at least partially responsible for present distributions.

## INSULAR FAUNAS

The Juan Fernandez Islands, lying some four hundred miles west of the mainland and under Chilean sovereignty, are quite devoid of land mammals. Otherwise, Chilean islands are strictly continental, and the mammals found on them are only slightly or not at all differentiated.

Off the northern and central coast there are no islands large enough to support a mammal fauna with the exception of Santa Maria Island, in the Gulf of Arauco near Concepcion, and Mocha Island, a short distance farther south. No information is available about Santa Maria, but Mocha is known to be inhabited by several rodents, including representatives of practically all the common forms of the neighboring mainland. Apparently all are very slightly differentiated and their isolation is obviously of not very long standing. Mocha is about eight miles in length and is situated about twenty-five miles offshore. It has a varied topography and supports an extensive flora with considerable forest.

Southward from Puerto Montt to Cape Horn many islands are scattered along the entire coast. Most of them are small in size and only a few have been visited by naturalists. As a rule they are heavily wooded and provided with conditions favorable for small mammals, but the limited evidence available indicates that their faunas are small and scarcely or not at all differentiated. The large island of Chiloe has an extensive fauna including practically all the mammals of the Valdivian district. A few forms, as *Dromiciops australis gliroides*, *Notiomys valdivianus chiloensis*, and *Dusicyon fulvipes*, seem to be differentiated, but so far they have been compared only with material from the northeast, mainly from the Province of Valdivia. Museum specimens from the coast directly opposite Chiloe are still lacking and when they are forthcoming it

is not unlikely that they will bridge the distinctions now drawn between island and mainland forms. Chiloe Island, therefore, has only slight faunal peculiarity.

The great island of Tierra del Fuego, which is separated from the mainland by the Straits of Magellan, is characterized more by the absence of certain forms than by the peculiarity of those that are present. The Straits exceed twenty miles in width throughout much of their extent, but the narrows near the Atlantic entrance, for about twelve miles, although some fifty fathoms deep, are less than five miles in width, and at low tide, in places, perhaps no more than three. It is not strange, therefore, that the majority of the mammals of Tierra del Fuego are identical with those of the nearby mainland. Among the small rodents, those that are common to both sides of the Straits are the following:

*Akodon xanthorhinus xanthorhinus*
*Akodon (Abrothrix) lanosus*
*Reithrodon auritus pachycephalus*
*Akodon xanthorhinus canescens*
*Euneomys chinchilloides chinchilloides*
*Oryzomys longicaudatus magellanicus*

Rodents possibly peculiar to the island include only *Ctenomys magellanicus fueginus* and *Akodon (Abrothrix) longipilis francei.* In both cases the distinction is doubtful, since the supposed characters are very slight and based on inadequate material. Their recognition is quite provisional and better information than we now have may lead to the conclusion that all the rodents of Tierra del Fuego are identical with those of the mainland.

The larger land mammals of Tierra del Fuego consist only of the guanaco and the wolf (*Dusicyon culpaeus lycoides*). Of these, the wolf appears to be somewhat peculiar in size and cranial characters, but material representing it is scanty and comparisons so far made are with only one or two specimens from the mainland. The guanaco conceivably may have been transported by the aborigines.

Not yet recorded from Tierra del Fuego and doubtless quite absent from it are a number of mammals now or formerly common on the north side of the Straits. These are the puma (*Felis concolor* subsp.), the huemul (*Hippocamelus*), the small fox (*Dusicyon g. griseus*), the skunk (*Conepatus*), and two small rodents (*Notiomys* and *Phyllotis m. micropus*). Apparently the island has been populated from the mainland quite fortuitously and at intervals when chance favored one set of animals rather than another equally suited. This accords well with the evidence that the island has received its fauna at a relatively recent time subsequent to the period of glaciation or elevation. In other words, although a large share of the mainland fauna

has reached the island, sufficient time has not elapsed for all of it to do so. Certain birds of the mainland also are absent from the island, notably the rhea, which is common on the northern shore of the Straits but unknown on the other side. The only reptile of the region, a small lizard (*Liolaemus magellanicus*), is common to both sides of the Straits.

## COLLECTIONS IN CHILEAN NATIONAL MUSEUM

As far back as 1813, when Chilean independence was not yet fully established, the idea of a national museum in connection with the "Universidad de San Felipe" was officially promulgated. Again, in 1822, it was considered by the great leader Bernardo O'Higgins, but it was not until 1830, when Claudio Gay was commissioned to make his explorations, that definite authority for a museum was ordered; and not until 1838, when Gay's collections were placed in a public hall later occupied by the Tribunales de Justicia, that the museum became an objective reality. By 1851, according to report, affairs were in a bad state and some of the collections had mysteriously disappeared, the remainder being located "en los altos" of the Biblioteca Nacional.

In 1853, only two years after his arrival in Chile, Dr. R. A. Philippi was appointed Director of the museum and Professor of Natural History in the University of Chile. Thenceforward until his retirement in 1897, Philippi was very active and the museum grew rapidly. In 1866 it was removed to one of the halls of the university and in the same year was subjected to considerable loss through robbery, certain intrinsically valuable objects being extracted and others damaged or destroyed.

In 1876 a final move was made to an imposing and commodious building in the Quinta Normal de Agricultura, an attractive park, where the museum became one of the show places of the capital city of Santiago. This building had been constructed for an international exposition in 1875 and was so large it could not be fully occupied at once and for some years its main hall was frequently used for public functions. In 1879, during the war between Peru and Bolivia, it served as a hospital, and in 1888 it housed the mineral display of another exposition. By the early part of the present century, however, its natural history exhibits were sufficient to require all or nearly all available space. These exhibits covered zoology, botany, geology, ethnology, and archaeology. In later years the building suffered somewhat from earthquakes, requiring

considerable reconstruction, but most of the collections remain intact.

In 1922, when Field Museum's first expedition was working in Chile, full access to the zoological collections of the Museo Nacional was courteously accorded by the then Director, Dr. Eduardo Moore. Apparently they had been changed but little since the days of Philippi. The representation of mammals and birds was large and comprehensive, mainly Chilean, but with many important species from other parts of the world. As was customary, especially in European museums, all specimens were mounted and displayed, often including many duplicates. The workmanship from the contemporary standpoint was most creditable. Each specimen was attached to a wooden stand or perch, on the under side of which was a paper label giving essential data, handwritten or, in some cases, typewritten.

Most important were the types of new species first described by Philippi. None of these were designated as such, but it was soon evident that the majority of them could be identified with certainty by the labels or more especially by the postures in which they had been mounted by the taxidermist. These postures were in so many cases identical with those of the figures published by Philippi that there could be no doubt the figures were drawn from the mounted specimens. Not all the types were found, however, and it is clear that some of them have been extracted from the collection or lost. Philippi, himself, appears to have sent at least a part of them to other institutions, perhaps in exchange, and according to local report others have found their way elsewhere in Chile.

In 1939, when a party from Field Museum was again in Santiago, Dr. Ricardo E. Latcham, present Director of the museum, and Dr. Rodulfo Philippi, Curator of Birds, were most courteous and demonstrated convincingly that every care is now being taken for the allocation and preservation of the valuable types.

## METHODS

In the present account of the mammalian fauna of Chile an effort has been made to cover the whole field, but it has proved impractical to carry out a uniform treatment for all species. In many cases the accounts are quite complete, but in others it is probable there may be more existing knowledge than is presented. This is especially true of the larger forms, which the progress of settlement has rendered scarce and difficult to obtain. The work

has been subject to many interruptions, so it has been done piecemeal from time to time over a number of years, and this has caused some irregularity of method.

Owing to the confused state of knowledge of South American mammals in general and the especial problems due to the loose work of several early Chilean naturalists, it has been necessary to devote considerable space to discussion of generic relationships, to nomenclature, and to the identification of old types—matters which it is hoped may clear the way for a future in which they will no longer trouble. Although principally of interest to professional mammalogists they are unavoidable at this time.

On the other hand, it has seemed desirable to introduce at least some of the features of a manual such as simple keys and very brief diagnoses, which may be helpful to anyone entering the field, and more especially to Chilean naturalists on the ground, whose desire to pursue the subject is unquestioned. The skulls of most but not all species are illustrated by drawings made by Mr. John J. Janecek from specimens in Field Museum. Distribution maps, also drawn by Mr. Janecek, are given for certain species for which there are sufficient data to make them significant. In other cases records are so few and indefinite that maps are not practical.

The bibliography is perhaps not far from complete but it has not been pursued very systematically and some omissions may be found. As it is, there are many references of little importance save historical exhaustiveness. With a very few exceptions, all references have been checked with original sources.

Despite the large number of names existing, it has proved necessary to add fifteen, mostly for slightly characterized forms heretofore unrecognized. These are enumerated in the historical list at the conclusion of the report (p. 242).

# LIST OF THE MAMMALS OF CHILE

## Order **MARSUPIALIA**

*Marmosa elegans elegans* Waterhouse
*Marmosa elegans coquimbensis* Tate
*Marmosa elegans soricina* F. Philippi
*Dromiciops australis australis* F. Philippi
*Dromiciops australis gliroides* Thomas
*Rhyncholestes raphanurus* Osgood

## Order **CHIROPTERA**

*Lasiurus borealis bonariensis* Lesson and Garnot
*Lasiurus cinereus villosissimus* Geoffroy
*Myotis chiloensis chiloensis* Waterhouse
*Myotis chiloensis arescens* Osgood
*Myotis chiloensis atacamensis* Lataste
*Histiotus macrotus* Poeppig
*Histiotus montanus montanus* Philippi and Landbeck
*Histiotus montanus magellanicus* Philippi
*Desmodus rotundus d'orbignyi* Waterhouse
*Tadarida brasiliensis* Geoffroy

## Order **CARNIVORA**

*Dusicyon culpaeus culpaeus* Molina
*Dusicyon culpaeus andinus* Thomas
*Dusicyon culpaeus magellanicus* Gray
*Dusicyon culpaeus lycoides* Philippi
*Dusicyon griseus griseus* Gray
*Dusicyon griseus domeykoanus* Philippi
*Dusicyon griseus maullinicus* Philippi
*Dusicyon fulvipes* Martin
*Felis concolor puma* Molina
*Felis concolor patagonica* Merriam
*Felis concolor araucanus* Osgood
*Felis pajeros colocolo* Molina
*Felis guigna guigna* Molina
*Felis guigna molinae* Osgood
*Felis jacobita* Cornalia
*Lutra provocax* Thomas
*Lutra felina* Molina
*Grison cuja* Molina
*Lyncodon patagonica* Blainville
*Conepatus chinga chinga* Molina
*Conepatus chinga mendosus* Thomas
*Conepatus humboldti* Gray
*Conepatus rex* Thomas
*Leptonychotes weddelli* Lesson
*Hydrurga leptonyx* Blainville
*Mirounga leonina* Linnaeus
*Otaria flavescens* Shaw
*Arctocephalus australis* Zimmermann

## Order **RODENTIA**

*Abrocoma bennetti bennetti* Waterhouse
*Abrocoma bennetti murrayi* Wolffsohn
*Octodon degus* Molina
*Octodon bridgesi* Waterhouse
*Octodon lunatus* Osgood
*Aconaemys fuscus fuscus* Waterhouse
*Aconaemys fuscus porteri* Thomas
*Spalacopus cyanus cyanus* Molina
*Spalacopus cyanus maulinus* Osgood
*Spalacopus cyanus tabanus* Thomas
*Ctenomys magellanicus magellanicus* Bennett
*Ctenomys magellanicus fueginus* Philippi
*Ctenomys magellanicus osgoodi* Allen
*Ctenomys magellanicus dicki* Osgood
*Ctenomys maulinus maulinus* Philippi
*Ctenomys maulinus brunneus* Osgood
*Ctenomys fulvus* Philippi
*Ctenomys robustus* Philippi
*Ctenomys opimus* Wagner
*Myocastor coypus coypus* Molina
*Myocastor coypus melanops* Osgood
*Chinchilla chinchilla velligera* Prell
*Lagidium viscacia viscacia* Molina
*Lagidium viscacia cuvieri* Bennett
*Lagidium viscacia famatinae* Thomas
*Lagidium viscacia boxi* Thomas

*Lagidium viscacia sarae* Thomas and St. Leger
*Lagidium viscacia moreni* Thomas
*Lagidium viscacia wolffsohni* Thomas
*Cavia australis* Geoffroy and d'Orbigny
*Oryzomys longicaudatus longicaudatus* Bennett
*Oryzomys longicaudatus philippii* Landbeck
*Oryzomys longicaudatus magellanicus* Bennett
*Notiomys valdivianus valdivianus* Philippi
*Notiomys valdivianus chiloensis* Osgood
*Notiomys valdivianus bullocki* Osgood
*Notiomys valdivianus bicolor* Osgood
*Notiomys valdivianus michaelseni* Matschie
*Notiomys megalonyx megalonyx* Waterhouse
*Notiomys megalonyx microtis* Philippi
*Notiomys macronyx macronyx* Thomas
*Notiomys macronyx vestitus* Thomas
*Notiomys macronyx alleni* Osgood
*Notiomys delfini* Cabrera
*Akodon olivaceus olivaceus* Waterhouse
*Akodon olivaceus pencanus* Philippi
*Akodon olivaceus mochae* Philippi
*Akodon olivaceus brachiotis* Waterhouse
*Akodon olivaceus beatus* Thomas
*Akodon andinus andinus* Philippi
*Akodon andinus dolichonyx* Philippi
*Akodon xanthorhinus xanthorhinus* Waterhouse
*Akodon xanthorhinus canescens* Waterhouse
*Akodon (Abrothrix) longipilis longipilis* Waterhouse
*Akodon (Abrothrix) longipilis apta* Osgood
*Akodon (Abrothrix) longipilis castaneus* Osgood
*Akodon (Abrothrix) longipilis moerens* Thomas
*Akodon (Abrothrix) longipilis hirta* Thomas
*Akodon (Abrothrix) longipilis suffusa* Thomas
*Akodon (Abrothrix) longipilis nubila* Thomas
*Akodon (Abrothrix) longipilis francei* Thomas
*Akodon (Abrothrix) sanborni* Osgood
*Akodon (Abrothrix) lanosus* Thomas
*Eligmodontia puerulus* Philippi
*Eligmodontia elegans morgani* Allen
*Phyllotis darwini darwini* Waterhouse
*Phyllotis darwini boedeckeri* Philippi
*Phyllotis darwini fulvescens* Osgood
*Phyllotis darwini vaccarum* Thomas
*Phyllotis darwini rupestris* Gervais
*Phyllotis darwini xanthopygus* Waterhouse
*Phyllotis (Auliscomys) boliviensis* Waterhouse
*Phyllotis (Auliscomys) micropus micropus* Waterhouse
*Phyllotis (Auliscomys) micropus fumipes* Osgood
*Euneomys chinchilloides chinchilloides* Waterhouse
*Euneomys chinchilloides ultimus* Thomas
*Euneomys petersoni* Allen
*Irenomys tarsalis tarsalis* Philippi
*Irenomys tarsalis longicaudatus* Philippi
*Reithrodon auritus cuniculoides* Waterhouse
*Reithrodon auritus pachycephalus* Philippi

## Order **ARTIODACTYLA**

*Hippocamelus bisulcus* Molina
*Pudu pudu* Molina
*Lama guanicoe* Müller
*Vicugna vicugna* Molina

## KEY TO ORDERS OF CHILEAN MAMMALS

Feet furnished with hoofs; upper jaw without front or middle incisor teeth. ARTIODACTYLA (Hoofed mammals), p. 224.

Feet furnished with claws; front or middle incisor teeth present in upper jaw.

Anterior limbs with membranous adaptation for flying. CHIROPTERA (Bats), p. 53.

Anterior limbs normal for walking or running.

Canine (corner) teeth absent; a marked space between front or incisor teeth and molariform or hinder teeth, which are adapted for grinding. RODENTIA (Gnawing mammals), p. 105.

Canine teeth present; no marked space between front teeth and the others, which are adapted for cutting or tearing.

No more than three pairs of incisor teeth in front of canines. CARNIVORA (Flesh-eating mammals), p. 63.

At least four pairs of incisor teeth in front of canines. MARSUPIALIA (Pouched mammals), p. 44.

### ORDER MARSUPIALIA

#### KEY TO CHILEAN GENERA

Middle pair of lower front teeth very long and procumbent, very unlike adjoining pairs; under parts colored like upper parts..... *Rhyncholestes.*

Middle pair of lower front teeth essentially like adjoining pairs; under parts much paler in color than upper parts.

Middle pair of upper incisors or front teeth in contact with next pair; auditory capsules large and completely closed..... *Dromiciops.*

Middle pair of upper incisors separated from next pair by a slight space; auditory capsules small and not completely closed..... *Marmosa.*

## LIST OF SPECIES

**Marmosa elegans elegans** Waterhouse. MOUSE OPOSSUM; LLACA.

*Didelphis hortensis* Reid, Proc. Zool. Soc. Lond., p. 4, 1837—Valparaiso, Chile; nomen nudum.

*Didelphis elegans* Waterhouse, Zool. Voy. Beagle, Mamm., pp. 95–96, pls. 31, 35, fig. 5, *a–e*, 1839—Valparaiso, Chile.

*Marmosa elegans* Thomas, Ann. Mag. Nat. Hist., (6), **14**, p. 188, 1894; (7), **10**, p. 158, 1902.

*Thylamys elegans* Gray, List Mamm. Brit. Mus., p. 101, 1843; Matschie, Sitzungsber. Ges. Naturf. Freunde, Berlin, p. 271, 1916.

*Marmosa (Thylamys) elegans* Cabrera, Gen. Mamm., p. 40, 1919.

*Marmosa elegans elegans* Tate, Bull. Amer. Mus. Nat. Hist., **66**, p. 214, 1933.

A medium-sized mouse opossum of generally grayish or light brownish coloration with pure white or creamy under parts and a conspicuous blackish facial marking through the eyes. Tail finely haired throughout and frequently incrassated or thickened. Total length 270; tail 137; hind foot 17.

*Range.*—Central Chile, probably from Coquimbo to Concepcion; at present known mainly from the coast ranges in the provinces of Aconcagua and Valparaiso.

Although apparently abundant in the vicinity of Valparaiso, records of this species from other parts of Chile are very few. It would not be surprising, however, to find it throughout much of the region from Valdivia northward to Coquimbo and thence northeastward through the mountains to connect with the very closely related forms of northwestern Argentina and Bolivia. The treatment of several of these Argentine and Bolivian forms as species

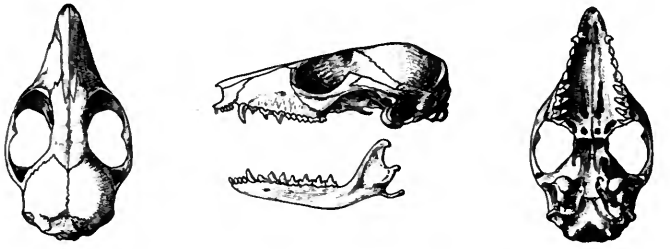


FIG. 1. *Marmosa elegans elegans.* F.M. No. 23869. × 1.

fully distinct from *elegans* and from each other, as proposed by Tate (op. cit., pp. 209–235), is hard to accept in view of their strong similarity in general characters and the high probability that further collections will fill gaps in distribution. Even Thomas, whose standards of species and subspecies were anything but conservative, never intimated more than subspecific status for most of these forms. Their general features, including coloration, approximate actual identity, and separation must be based upon slight differences in size and cranial peculiarities of a kind commonly useful for drawing average distinctions between subspecies rather than species. That such characters exist in these cases need not be doubted, but that they signify sharp lines of differentiation seems open to question.

The mountains of northeastern Chile have not been visited by collectors but their character is so similar to that of adjoining parts of Bolivia and Argentina that close affinity of faunas is to be expected. The case of *Marmosa elegans* in this region corresponds closely to that of *Phyllotis darwini* and *Oryzomys longicaudatus*, both of which are represented in Bolivia and Argentina by closely related subspecies the connections of which are somewhat better indicated than in *Marmosa* although there are considerable gaps to be filled in.

The unusually large series of *elegans* in Field Museum, consisting of thirty-four specimens from a very limited area, demonstrates the wide range of size due to age and sex. The summer pelage is shown by at least one specimen taken by Sanborn on December 6, in which the color of the upper parts is practically identical with that of a specimen of *janetta* from Bolivia and very close to that of a topotype of *venusta*. No such series of the northern forms exists, and it is extremely difficult to ascertain whether or not a few given specimens are comparable. As a group, the northern forms seem to have smaller audital bullae than *elegans* and there can be scarcely any question that this character is of taxonomic importance. However, it is by no means too much to be bridged by gradations and it is almost covered by individual variations. Among themselves, the characters of the northern forms are very difficult to evaluate and especially difficult to correlate with logical areas of distribution. In a broad way it seems possible to make a primary division of the forms in northwestern Argentina and Bolivia resulting in one series of fairly large size and dark color and another of somewhat smaller size and pale color. The names *cinderella* and *sponsoria* apply to the first series, while *pallidior*, and probably *pusilla*, apply to the second. Apparently intermediate between them are *venusta* and *janetta*. If it happens that *venusta* is intermediate in both size and color while *janetta* is only intermediate in color, it only shows that all sorts of combinations are possible and a few specimens from very restricted areas need not be taken very seriously. That they are all closely related to the Paraguayan *marmota* is evident, but they seem much closer to *pusilla* and *verax* and, although *marmota* and *pusilla* appear quite distinct in Paraguay, the evidence that both have representatives in the west leaves much to be desired. Material is far too scanty to deal satisfactorily with the eastern forms, but intergradation among the western ones is demonstrable. This may be illustrated by reference to one specimen (B.M. 21.1.2.17) from Caimancita, Jujuy, which Tate (op. cit., pp. 227–228) listed twice, once under *cinderella* and once under *sponsoria*. This is no especial criticism of Mr. Tate, for it only perpetuates in print what has occurred in the mind of everyone who works with closely related subspecies. A specimen from this same locality, now in Field Museum and not examined by Tate, appears in every respect exactly intermediate between *cinderella* and *janetta*, and this is exactly what should be expected on geographic grounds. Of further interest is the fact that it agrees minutely with a topotype of *venusta*, being much nearer to that than to either *cinderella* or *janetta*. If *venusta*

is intermediate, then *sponsoria* and *janetta* are, also, and recognition of *venusta* seems far enough to go. There is little except color to distinguish such closely related animals and a much clearer view of present knowledge appears if *sponsoria* and *janetta* are dropped. For the present, also, it may be preferable to write *Marmosa elegans venusta, M. e. cinderella,* and *M. e. pallidior* with the reservation that future collections may easily show that all are connected with *pusilla,* which was the first of the group to receive a name.[1]

*Specimens examined.*—Total 35: Near Calera, Aconcagua, 5; Limache, Valparaiso, 4; Longotoma, Aconcagua, 1; Olmue, Valparaiso, 8; Palmilla, La Cruz, Valparaiso, 5; Palos Quemados, Valparaiso, 4; Papudo, Aconcagua, 7; Santiago, 1 (B.M.).

**Marmosa elegans coquimbensis** Tate.

*Marmosa elegans coquimbensis* Tate, Amer. Mus. Nov., No. 493, p. 14, 1931 —Paiguano, Province of Coquimbo, Chile. Alt. 3,300 feet.

This form, so far known only from the type specimen, is noticeably paler than *elegans.* It is also paler than *pallidior,* with which its intergradation is highly probable. The name chosen for it is unfortunate, since it may be found to inhabit only a small part of the Province of Coquimbo, and it may range northward even to Peru. In the southern and coastal part of the province, including the city of Coquimbo, typical *elegans* is to be expected.

The occurrence of a mouse opossum at Cobija, Province of Antofagasta, mentioned by Waterhouse (Nat. Hist. Mamm., **1,** p. 518, 1846) on the authority of Bridges, is significant of the probable

[1] The work of Thomas on this group is perhaps responsible for the presumption of a greater number of species and subspecies than time will justify. It was his practice to interpret almost any observable morphological difference as worthy of recognition. His criterion of species and subspecies was mainly that of "degree of difference" and, never having worked with large series covering wide areas, he was unwilling to admit that fairly marked characters might be connected by gradations. Since he dominated the South American field for so long, and since he was such a careful observer and keen analyst, subsequent workers may be influenced to do greater justice to his opinions than they deserve. In effect, he seems to have tried to adopt standards of distinction such, for example, as are applied now to California mammals, but with the tremendous disadvantage of having only a handful of specimens from scattered localities, whereas the Californians have not only thousands of specimens in connected geographic series, but they also have intimate knowledge of physical conditions. When Chilean and Argentine mammals are as well known as those of California, doubtless more names for them will be in use than now, but some of the present ones will have disappeared. In working toward this condition, mistakes of commission seem more likely than those of omission, and at any given time synthesis is probably less harmful than ultra-analysis.

connection between typical *elegans* and allies now known to inhabit the southwestern part of Peru (Arequipa).

**Marmosa elegans soricina** F. Philippi.

*Didelphys soricina* F. Philippi, Arch. Naturg., **60**, (1), p. 36, pl. 4, fig. 1, 1894—Province of Valdivia, Chile.

*Marmosa elegans* Wolffsohn, Bol. Mus. Nac. Chile, **2**, No. 1, p. 85, 1910; Cabrera, Gen. Mamm., p. 40, 1919.

*Marmosa elegans soricina* Tate, Bull. Amer. Mus. Nat. Hist., **66**, p. 216, 1933.

The original type was examined in Santiago where it is still preserved, although in rather poor condition. The skull is inside the skin. Extensive notes on the specimen were published by Wolffsohn, who found nothing to distinguish it from *elegans*. Careful examination, however, reveals characters of at least subspecific importance. On removing the mounted specimen from its wooden stand, it is seen that the under parts are darker than in *elegans*, with practically all the hairs having extensive dark bases. In *elegans*, the under parts are pure white and only on the sides are there hairs with dark bases, the entire broad central area from the chin to the tail being pure white to the roots of the hairs. In *soricina*, the under parts are buffy, and all the hairs, except possibly a few short ones on the chin, have dark plumbeous bases. It is evident, therefore, that *soricina* should be recognized as a subspecies of *elegans*, and although no specimens except the type are at present known, the form will doubtless be found throughout Valdivia and adjoining provinces in southern Chile. A skull from Angol, Province of Malleco, which may belong here, is mentioned by Tate (l.c.).

**Dromiciops australis australis** F. Philippi. MONITO DEL MONTE; LLACA.

*Didelphys australis* F. Philippi, Verhandl. Deutsch. Wiss. Verein., Santiago, Chile, **2**, pp. 318–319, 1893; Anal. Univ. Chile, 3 pp., 1 pl., author's ed., 1893—near Union, Valdivia, Chile.

*Dromiciops australis* Thomas, Ann. Mag. Nat. Hist., (9), **3**, p. 212, 1919; Cabrera, Gen. Mamm., p. 31, 1919.

A small marsupial with much smaller ears than *Marmosa* and the tail thickened at the base and densely hairy except a narrow naked area on the under side at the tip. Color brownish with alternating light and dark areas on the sides. Females with an abdominal pouch. Mammae four. Skull with audital bullae large and complete posteriorly as well as anteriorly.

*Range.*—Valdivian forest district of south-central Chile from the higher parts of the Sierra Nahuelbuta through the lake region to and slightly beyond the Argentine boundary.

After two expeditions to Chile and much time spent within the range of this interesting animal, Field Museum has accumulated only a very small series of specimens. In 1923–24 it was found only once, at Rio Colorado (alt. 3,000 ft.), Province of Malleco, where Sanborn obtained two adults and four half-grown young, all successively caught in the same trap which chance appears to have placed near a nest or runway. In 1939, four adults were caught in the heavy humid forest on the summit of the Sierra Nahuelbuta and a fifth was taken under similar conditions at Peulla at the eastern end of Lake Todos Santos. Several of these were caught in traps placed off the ground on fallen logs and, in one case, in the fork of a large tree

FIG. 2. *Dromiciops australis australis.* F.M. No. 22672. × 1.

some four feet up. Obviously the species is highly arboreal. Its tail is especially provided with a prehensile adaptation and its pelage although shorter is more dense than that of *Marmosa.*

A character of the genus not previously noted is the presence of a well-developed marsupium. The lining of this pouch is deep Cinnamon-Rufous in color in sharp contrast to the surrounding parts as in *Caluromys,* to which, as suggested by Thomas, *Dromiciops* may be most closely related. The female taken at Peulla, November 24, was carrying three small young in her pouch. The mammae are four, symmetrically placed in two pairs..

The type of the species *australis* is still in the museum at Santiago where it was examined and found in fairly good condition and quite identifiable from its posture, which is reproduced in Philippi's figure. The skull, in 1923, was inside the skin and perhaps nearly or quite entire. Besides the type there are at least three others in the Chilean museum, one adult and two immature. Three specimens in the British Museum have been recorded by Thomas (l.c.), two from Beatriz, Lake Nahuelhuapi, Argentina, and one from Temuco, Chile. Two from Curacautin are recorded by Wolffsohn and Porter (1908) and another from Valdivia by Wolffsohn (1921, p. 512).

In Chile, the names *llaca* and *monito del monte* are in use for this animal, although both are sometimes also applied to *Marmosa*.

*Specimens examined.*—Total 14: Cayetue, Lake Todos Santos, 1 (coll. K. Wolfhügel); Lota, southwest of Concepcion, 1 (coll. D. S. Bullock, Angol); Peulla, Lake Todos Santos, 1; Rio Colorado, Malleco, 6; Sierra Nahuelbuta, 4; Victoria, Malleco, 1.

**Dromiciops australis gliroides** Thomas.

*Dromiciops gliroides* Thomas, Ann. Mag. Nat. Hist., (6), **14**, p. 187, 1894—Huite, near Ancud, Chiloe Island, Chile.

During the fairly intensive trapping pursued by Sanborn and myself on Chiloe Island, this animal was not encountered. One imperfect specimen without skull was secured from a native at the village of Quellon. This is noticeably darker and shorter-tailed than specimens from the mainland, indicating at least subspecific distinction. The under parts especially are darker, and the tail, which in *australis* is usually somewhat lighter below, is wholly dark. The type, apparently the only other preserved specimen, was taken in 1868 by Dr. R. O. Cunningham, who refers to it under the name *Didelphys elegans* (1871, p. 362). It is now in the British Museum.

**Rhyncholestes raphanurus** Osgood. FAT-TAILED CAENOLESTID.

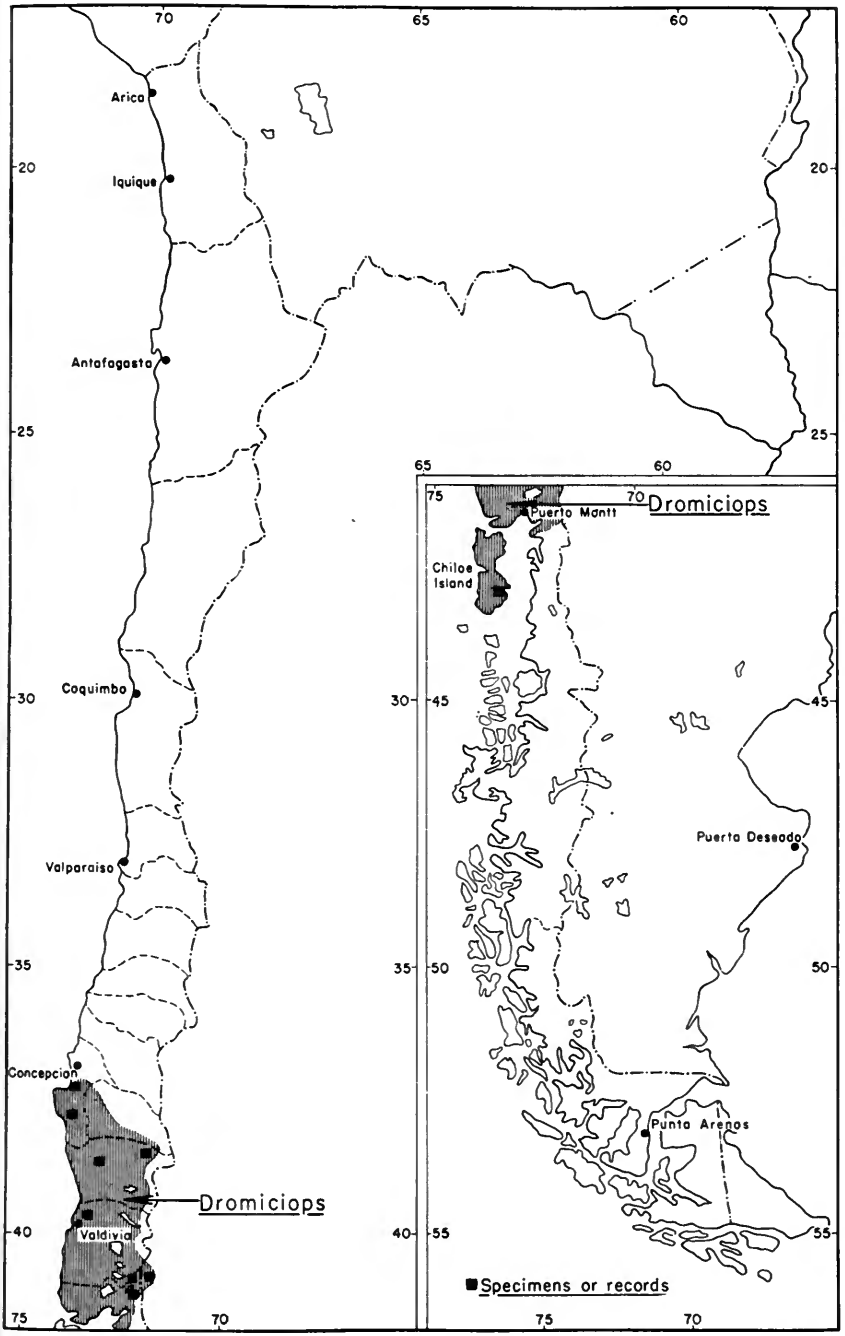
*Rhyncholestes raphanurus* Osgood, Field Mus. Nat. Hist., Zool. Ser., **14**, p. 170, pl. 23, 1924—mouth of Rio Inio, Chiloe Island, Chile.

A small marsupial of uniform dark brown color above and below, loose pelage, and distinctive dentition; two median lower incisors long and slender; rostral part of skull very narrow and elongate; no external pouch or marsupium. Mammae five. Total length 204–215 (male), 175 (female); tail 78–87 (male), 65 (female); hind foot 19.5–23.5.

*Range.*—Heavy forests of the Province of Llanquihue including Chiloe Island. So far known from two localities only.

Although having the plain brown color and external appearance much as in its allies *Caenolestes* and *Lesteros*, this interesting marsupial differs markedly from them in cranial and dental characters. Among these are the very elongate rostrum, the open palate, the double infraorbital foramen, the bifid lateral incisors, and the sexual differentiation of the canines, single-rooted and scalpriform in the male, slightly notched and premolariform in the female.

Since the unexpected discovery of this animal in 1922 in the heavy temperate forests near the southern end of Chiloe Island, it has not been reported again. However, in 1939 Mr. Sanborn succeeded in obtaining a single specimen at Refugio on the northwest




MAP 3. Distribution of the genus *Dromiciops*.

side of Mount Osorno at an altitude of 3,000 feet. It was caught under deep growth in a cool and very moist location. Subsequent trapping in the vicinity was continued for a few nights without further success and the species was not taken in fairly intensive trapping on the south side of Mount Osorno and on the neighboring shores of Lake Todos Santos. This specimen at least demonstrates that it does occur on the mainland as well as on the island of Chiloe. Probably it will be found, at least in suitable spots, throughout the Valdivian forest district.

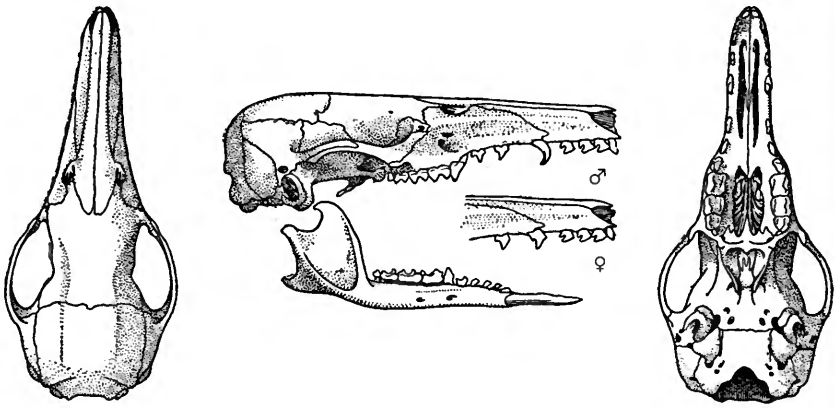



FIG. 3. *Rhyncholestes raphanurus*. F.M. No. 22422, type. × 1½.

Mr. Sanborn's specimen is an adult male in which the tail is not incrassated as it was in the male from Chiloe. Except for slightly larger size, it shows no characters by which it might be distinguished subspecifically from the specimen previously described from Chiloe. Its external measurements are slightly greater, its skull is somewhat larger, and its skeleton is more robust throughout, but when these differences are expressed in figures they are not very impressive and, since the material is so limited, even a provisional distinction of island and mainland forms does not seem justified. The measurements of the mainland specimen in comparison with the one from Chiloe Island are as follows: total length 215 (204); tail 87 (78); hind foot 23.5 (21). Skull: greatest length 34.8 (34); basal length 34.8 (33.3); zygomatic breadth 15 (14.7); mastoid breadth 11.8 (11.1); length of nasals 19.1 (18); greatest breadth of nasals 3.7 (3); least interorbital breadth 6.8 (6.9); length of palate from gnathion 20.7 (20.3); anterior palatine foramina 7.9 (8.7); palatal vacuities 6.6 (6); front of upper canine to back of last molar 13.4 (13.4); com-

bined length of four upper molars 5.5 (5.4); combined length of three lateral incisors 3.8 (3.9); length of bone of mandible from condyle 21.5 (20); exposed length of lower incisor 6.8 (6.8).

*Specimens examined.*—Total 3: mouth of Rio Inio, Chiloe Island, 2 (type and paratype); Refugio, Mount Osorno, Llanquihue, 1.

## ORDER CHIROPTERA

### Key to Chilean Genera

Tail absent.....*Desmodus.*
Tail present.
Tail extending well beyond interfemoral membrane.....*Tadarida.*
Tail extending only slightly or not at all beyond membrane.
Upper surface of interfemoral or tail membrane densely hairy.....*Lasiurus.*
Upper surface of interfemoral membrane naked.
Ears very large, more than 15 mm. long.....*Histiotus.*
Ears moderate, less than 15 mm. long.....*Myotis.*

### **Lasiurus borealis bonariensis** Lesson and Garnot. Red Bat.

*Vespertilio bonariensis* Lesson and Garnot, Voy. Coquille, Zool., **1**, pt. 1, pp. 137–139, pl. 2, fig. 1, 1826—Rio La Plata at Buenos Aires, Argentina.

*Vespertilio blossvillii* Anonymous, Ferussac's Bull. Sci. Nat. Geol., **8**, p. 95, 1826—"Montevideo."

*Nycticeius varius* Poeppig, Reise in Chile, Peru und Amaz., **1**, p. 451, footnote, 1835—Antuco, Chile.

*Nycticeus Poepingii* Lesson, Hist. Nat. Gen. Part. Mamm. Ois. (Suppl. Oeuvr. Buffon), **5**, pp. 119–120, 1836—*N. varius* renamed.

*Lasiurus borealis bonariensis* Thomas, Ann. Mag. Nat. Hist., (7), **8**, p. 435, 1901.

A small bat of bright rufous color with well-developed tail enclosed in the interfemoral membrane, the upper side of which is densely hairy. Distinguished from the other species of the same genus by its smaller size. Forearm 36–42.

The small red bat has been reported from central Chile by Gay, Reed, Wolffsohn, and others. As elsewhere in South America, it appears to be rather uncommon. The name *varius* is available should a Chilean race prove distinguishable.

*Specimens examined.*—Total 16: Angol, 6; Concepcion, 1; Limache, 1; Puente Alto, near Santiago, 1 (B.M.); Santiago, 4 (F.M. 2; B.M. 2); Temuco, 2 (B.M.); Valparaiso, 1 (B.M.).

### **Lasiurus cinereus villosissimus** Geoffroy. Hoary Bat.

*Chauve-souris septieme ou chauve-souris brun-blanchatre* Azara, Quad. Paraguay, **2**, p. 284, 1801.

*Vespertilio villosissimus* Geoffroy, Ann. Mus. Hist. Nat., Paris, 8, p. 204, 1806—Paraguay (based on Azara).

*Lasiurus grayi* Tomes, Proc. Zool. Soc. Lond., pp. 40–42, 1857—Chile.

*Atalapha cinerea* var. *a* Dobson, Cat. Chiropt. Brit. Mus., p. 273, 1878.

*Lasiurus cinereus villosissimus* Thomas, Ann. Mag. Nat. Hist., (7), 8, p. 435, 1901; (7), **9**, p. 238, footnote, 1902.

*Dasypterus villosissimus* Allen, Mamm. Patagonia, p. 191, 1905.

*Nycteris cinerea villosissima* Thomas, supra cit., (8), **5**, p. 240, 1910.

Color reddish brown overlaid with whitish; upper side of interfemoral membrane hairy. Forearm 50–55.

Scattered specimens of this bat, known in northern countries as the hoary bat, have been taken in various parts of central Chile. A female and two young in alcohol from Paiguano, Coquimbo, are in Field Museum. One from Nahuelbuta, west of Angol, is in the American Museum of Natural History. One from Puente Alto, near Santiago, is in the British Museum. If a Chilean form should prove separable from that of Paraguay it would take the name *grayi*.

**Myotis chiloensis chiloensis** Waterhouse. CHILOE BAT.

*Vespertilio chiloensis* Waterhouse, Zool. Voy. Beagle, Mamm., p. 5, pl. 3, 1838; Gervais in Gay, Hist. Chile, **1**, p. 42, Atlas Mamm., pl. 1, figs. 3, 3*a*, 1847—islets on the eastern side of Chiloe Island, Chile.

*Vespertilio gayi* Lataste, Act. Soc. Sci. Chile, **1**, (1891), pp. 79, 81, 1892—Valdivia, Chile.

*Myotis chiloensis* Trouessart, Cat. Mamm., Suppl., p. 94, 1904; Miller and Allen, Bull. U. S. Nat. Mus., No. 144, p. 192, 1928.

A small bat of sooty brownish color above and below; tail long and enclosed in membrane; ears narrow with a slender pointed tragus; upper incisors four. Forearm 36–39; ear 13–15.

*Range.*—Humid forested region of southern Chile from the vicinity of the Province of Valdivia southward along the coast, possibly to the Straits of Magellan.

Typical *Myotis chiloensis* heretofore has been very poorly represented in museums. The small series now available from Chiloe Island agrees fully with specimens from the Province of Valdivia and removes all doubt that the *Vespertilio gayi* of Lataste is a synonym. The color in topotypical specimens is rich dark Vandyke Brown above and below, the bases of the hairs nearly the same. A specimen from Curacautin, in the southeastern Province of Malleco, is more sooty and shows greater contrast between the tips and bases of the hairs of the under parts. Possibly it should be regarded as intermediate between *chiloensis* and the form of central Chile.

Small bats of the genus *Myotis* doubtless are common locally throughout Chile, but in our experience comparatively few were seen. Those obtained on Chiloe Island were taken from a roosting place by Juan Vera, a native in our employ, who made a special trip to get them. In other localities most of the bats seen flying appeared to be *Histiotus*. Darwin's observation of a small bat on Tierra del Fuego may refer also to *Histiotus* or perhaps to this species, but no specimens of *Myotis* have yet been taken farther south than Chiloe Island.

*Specimens examined.*—Total 18: Cucao, west coast of Chiloe Island, 3 skins, 9 alc.; Curacautin, Malleco, 1 skin, 1 alc.; Mafil, Valdivia, 1 skin, 1 alc.; Rinihue, 2 skins.

**Myotis chiloensis arescens** subsp. nov.

*Myotis chiloensis atacamensis* Miller and Allen, Bull. U. S. Nat. Mus., No. 144, p. 192, 1928—not of Lataste.

*Type* from Hacienda Limache, Province of Valparaiso, Chile. No. 24396 (skin) Field Museum of Natural History. Adult male. Collected January 1, 1925, by J. A. Wolffsohn. Paratype (skull) F.M.N.H. No. 23636.

*Range.*—Central Chile between the ranges of *M. c. chiloensis* and *M. c. atacamensis.*

*Diagnosis.*—Similar in color to *M. c. chiloensis,* but paler, with the tips of the hairs in considerable contrast to the bases.

*Color.*—Upper parts light brown about halfway between the pale buffy of *atacamensis* and the deep brown of *chiloensis;* under parts dull broccoli brown, the tips of the hairs grayish.

*Measurements.*—Type specimen: total length 96; tail 43; hind foot 9; forearm (dry) 38; ear from meatus (dry) 13.5. Skull of paratype No. 23636: greatest length 14.8; zygomatic breadth 9.3; interorbital constriction 3.8; breadth of braincase 7.2; maxillary toothrow 5.4.

*Remarks.*—This is the form recognized and described by Miller and Allen under the name *Myotis chiloensis atacamensis.* In the absence of specimens from northern Chile representing typical *atacamensis,* these authors were obliged to assume that the paleness shown by specimens from central Chile was the same as that attributed to *atacamensis.* There are three forms instead of two, however, and although *arescens* is intermediate in color between typical *chiloensis* and *atacamensis,* it is well distinguished from both of them and

probably has a considerable range. Specimens of it are recorded only from the vicinity of Valparaiso and Santiago, but it is not unlikely that it will be found in all of central Chile from Concepcion to Coquimbo.

*Specimens examined.*—Total 18 skins with 35 unmatched skulls, all from Hacienda Limache, Province of Valparaiso.

### Myotis chiloensis atacamensis Lataste.

*Vespertilio atacamensis* "Philippi," Lataste, Act. Soc. Sci. Chile, **1**, (1891), pp. 80–81, 1892; Philippi, Anal. Mus. Nac. Chile, Zool., Ent. 13a, pp. 5–6, pl. 1, fig. 1, 1896—San Pedro de Atacama, Province of Antofagasta, Chile. Alt. 2,436 meters.

(?)*Myotis dinellii* Thomas, Ann. Mag. Nat. Hist., (7), **10**, p. 493, 1902—Tucuman, Argentina.

*Myotis atacamensis* Trouessart, Cat. Mamm., Suppl., p. 94, 1904.

*Myotis chiloensis atacamensis* Miller and Allen, Bull. U. S. Nat. Mus., No. 144, p. 192, 1928—part.

Similar to *M. c. arescens* but paler in color, light ochraceous buff above and below.

*Range.*—Northern provinces of Chile from Coquimbo northward and thence to northwestern Argentina.

The small *Myotis* of northern Chile is a pallid form agreeing in every respect with the description of *M. dinellii* from Tucuman, Argentina. Although no comparison with Argentine specimens has been possible, the inference is strongly indicated that *dinellii* is a synonym of *atacamensis*. In fact, the type locality of *atacamensis* is somewhat farther north than Tucuman and separated from it by a relatively short distance, in the greater part of which physical conditions are similar.

As stated elsewhere, Miller and Allen, who had no Chilean material from the northern provinces, have misapplied the name *atacamensis* to the form of the central provinces. Our specimens from Coquimbo and Tarapaca, the latter quite near the type locality, show very clearly that this course is not justified. Both skins and alcoholics show the very pale color that is characteristic.

Philippi's description and figure of this bat are confused and misleading. In his Latin diagnosis he states that it is "totus nigrescens" and, in the Spanish description following, that it is "un pardo . . . que tira amarillo en la parte superior del cuerpo, siendo aun mas claro en la parte ventral." The colored figure is, of course, wholly unreliable.

Notes on the type specimen made in Santiago in 1923 are as follows: "A specimen is in the museum with an old label on the back of the stand, reading: '62. *Vesp. atacamensis* Ph. Atacama. Febr. 1885.' " Probably this is the type and the basis of Philippi's figure of 1896, although the skull is inside and Philippi gives considerable description of the skull and dentition. It is the only small *Myotis* in the collection at present, but a loose skull without jaws, once fairly clean but now very grimy, is still preserved. It measures: greatest length 12.2; breadth of braincase 6.2; front of canine to last molar 4±. The first premolar is not nearly double the size of the second, but considerably larger and higher. The mounted skin is faded and dirty but entire. There is still great contrast between the tips of the hairs and the under fur, the tips being quite broadly lighter, now pale buffy brown. The under parts are similar to the upper, but paler, now nearly clear buff. The forearm measures roughly 32; tibia 25.5; ear from notch 9.5.

When this type was examined, its pale color was supposed to be due, at least in part, to fading, but since specimens from the northern provinces have become available, it seems more probable that its color is not far from normal.

*Specimens examined.*—Total 36: Paiguano, Coquimbo, 3 skins, 32 alc.; near Pintados, Tarapaca, 1 alc.

**Histiotus macrotus** Poeppig. BIG-EARED BAT; OREJON.

*Nycticeius macrotus* Poeppig, Reise in Chile, Peru und Amaz., **1**, p. 451, footnote, 1835—Antuco, Province of Bio Bio, Chile.

*Nycticeus chilensis* Lesson, Hist. Nat. Gen. Part. Mamm. Ois. (Suppl. Oeuvr. Buffon), **5**, pp. 120–121, 1836—based on Poeppig.

*Vespertilio velatus* Philippi, Arch. Naturg., **27**, (1), p. 289, 1861.

*Plecotus poeppigii* Fitzinger, Sitzungsber. K. Akad. Wiss., Wien, Math.-Naturw. Cl., **66**, pp. 88–89, 1872—renaming of *N. macrotus* Poeppig.

*Histiotus macrotus* Peters, Monatsber. K. Akad. Wiss., Berlin, p. 788, pl., figs. 2–2*e*, (1875), 1876; Thomas, Ann. Mag. Nat. Hist., (8), **17**, p. 273, 1916.

A medium-sized bat with very large ears connected at the base by a membrane; color light brown above, whitish gray below. Total length 120; tail 50; hind foot 12; ear 35; forearm 50.

*Range.*—Central Chile, in the region west of the Andes, from Santiago to Concepcion; exact limits unknown.

The first name applied to a big-eared vespertilionine bat from Chile is Poeppig's *macrotus*, proposed in 1835. His description is as follows:

"*N. macrotus*, n. sp.—N. auriculis externis capite triplo longioribus, ovalibus, transversim rugosis, membrana interna gladiata; membrana interfemorali utrinque nuda; pectore, abdomine, dorsoque concoloribus, flavescenti murinis." This is preceded by his diagnosis of the genus *Nycticeius* in which the upper incisors are said to be only two in number. In applying this name and description to a bat of the genus *Histiotus*, therefore, it is necessary to interpret freely the statement that the ears are three times longer than the head and to assume that he failed to observe the pair of small outer incisors found in *Histiotus*. This is essentially what was done by Peters (l.c.) in 1876 when he referred a single specimen to *macrotus* and distinguished it from *montanus*.

In 1916, Thomas (l.c.) recognized *macrotus* and mentions the specimen recorded by Peters while stating that "we have none that I can assign to it, unless a very large skull, without skin, sent by Mr. Wolffsohn from near Santiago, may be referable to it." Aside from the one specimen examined by Peters, therefore, the species has not been recorded for the more than one hundred years since it was first described. The characters (all of which were recognized by Peters) distinguishing it from *montanus* are its larger size, larger ears, and at least an incipient membranous connection between the inner bases of the ears.

Among Chilean mammals which I was privileged to examine in the British Museum, in June, 1937, is a series of nineteen bats from Santiago that appear to represent this species. They are recorded as collected by Professor J. W. Hislop-Harrison of Armstrong College, Newcastle-upon-Tyne, and are preserved as skins and skulls. It is possible that these specimens from Santiago in central Chile may prove to be at least subspecifically separable from any that may subsequently be taken at the type locality of *macrotus*, which is a considerable distance south of Santiago. However, this locality, Antuco, is not within the very humid region, and general probabilities favor the assumption that its fauna is the same as that of central Chile.

The specimens from Santiago are rather pale in color, the under parts markedly lighter than the upper. Over the entire under parts the hairs are very broadly tipped with whitish gray. The upper parts are pale Buffy Brown. Measurements of the forearm in four dry skins are, respectively, 49.3, 49.8, 51.1, 51.2; ears from notch 31.8, 32.8, 33, 33.3; antitragus from anterior base 11.5, 11.8, 12.8, 13.2; greatest width of tragus 4, 4.2, 4.4, 4.5. The skull, as compared

to that of *montanus*, is generally similar, but larger, with particularly large audital bullae and a somewhat more elevated interorbital region. Measurements of skull (compared with *montanus magellanicus*, F.M. No. 23621, from Mafil, Valdivia): condylo-incisive length 18.9 (17.6); zygomatic width 11.8 (11.5); interorbital constriction 4.9 (4.5); toothrow from front of canine 7.1 (6.7).

In the series of dry skins examined, the existence of a membranous connection between the bases of the ears is evident, but apparently not so well developed as in *H. velatus*. This membrane was noted by Peters in the specimen sent him by Philippi and doubtless largely influenced him to place *macrotus* in the genus *Histiotus* while retaining *montanus* in *Vesperus*.

*Specimens examined.*—Total 19 (B.M.), all from Santiago.

**Histiotus montanus montanus** Philippi and Landbeck.

*Vespertilio montanus* Philippi and Landbeck, Arch. Naturg., **27**, (1), pp. 289–290, 1861—cordillera of Santiago, Chile.

*Vesperus segethii* Peters, Monatsber. K. Akad. Wiss., Berlin, p. 383, 1864—Chile.

*Vesperus montanus* Peters, supra cit., p. 789, pl., fig. 3 (ear), 1875.

*Vesperugo montanus* Dobson, Cat. Chiropt. Brit. Mus., p. 189, 1878.

*Vespertilio* (*Histiotus*) *montanus* Trouessart, Cat. Mamm., Suppl., p. 77, 1904.

*Histiotus montanus* Miller, Bull. U. S. Nat. Mus., No. 57, p. 214, 1907; Thomas, Ann. Mag. Nat. Hist., (8), **17**, p. 274, 1916.

A medium-sized bat with rather large ears not connected with each other by a membrane; color "light grayish brown (wood brown)." Total length 115; tail 50; hind foot 11; ear 26; forearm 46. Upper incisors four.

*Range.*—Central Chile, at least in the vicinity of Santiago, probably northward to the Province of Coquimbo and southward, perhaps, to the Bio Bio River.

A specimen which perhaps may be regarded as Philippi's type of *montanus* is still preserved in the National Museum of Chile. Notes taken from it are as follows: "*Vesperugo montanus* Philippi. Several specimens labeled thus. The oldest one is No. 733 and is labeled '54. *V. montanus* Ph. & L. adult Cordillera de Santiago, Febr. 1861.' This is mounted in flying position, the tail bone removed, but not wired. The skull may be inside but is not evident. The ears are large and measure from meatus about 20 mm. The tragus is fairly large and broad. The color has faded. About all that can be said is that the hairs on the back are long, with broad light tips. Below there is a white inguinal area. Forearm about 43."

Except for the imperfect examples in Santiago, no specimens fully representing this form have been examined. Three specimens in Field Museum from Curacautin and Lake Galletue are doubtfully referred to it since they are slightly paler than *magellanicus*. In 1916 Thomas (l.c.) mentions specimens received from Wolffsohn from the Santiago region in which the color was "light greyish brown (wood-brown), very different from the dark of *H. magellanicus*." It is also to be noted that one of Philippi's original specimens, as mentioned above, has "a white inguinal area." Hence it seems probable that *montanus* is considerably paler than *magellanicus*. Although specimens are now few, probably it is fairly common.

*Specimens examined.*—Total 6: Cordillera of Santiago, 2 (type and topotype in Mus. Nac. Chile); Curacautin, Malleco, 2; Lake Galletue, Cautin, 1; Temuco, 1 (B.M.).

**Histiotus montanus magellanicus** Philippi.

*Vespertilio magellanicus* Philippi, Arch. Naturg., **32**, (1), p. 113, 1866—Straits of Magellan.

*Vespertilio capucinus* Philippi, supra cit., p. 114, 1866—Chile.

*Vesperus magellanicus* Peters, Monatsber. K. Akad. Wiss., Berlin, p. 790, pl., figs. 4–5, (1875), 1876.

*Histiotus magellanicus* Thomas, Ann. Mag. Nat. Hist., (8), **17**, p. 273, 1916.

Similar to *H. montanus*, but darker and more richly colored.

*Range.*—Humid coast of Chile from the Straits of Magellan northward to the Province of Valdivia.

No recently collected specimens from the extreme south are available, but the dark color shown by skins from Chiloe Island and neighboring parts of the mainland makes them separable from *montanus* of central Chile, and it is therefore assumed that they represent *magellanicus*.

The supposed types of *Vespertilio magellanicus* and *V. capucinus* were examined in Santiago and the following notes taken:

"*Vespertilio magellanicus* Philippi. A specimen with an old label '61, *Vespertilio magellanicus*, Magallanes' may be the type. It is still dark brown above with few and narrow light tips, the hairs being brown to the bases. The under parts are the same brown basally with buffy brown tips. The skull is inside and shows the lower incisors well, 3–3, slightly trifid and set close together. Upper incisors seem to be 2–2, the middle pair very much larger than the outer pair. Forearm about 42; tibia about 19; hind foot about 8; ear from meatus about 14."

"*Vespertilio capucinus* Philippi. A specimen with an old label '*Vespertilio capucinus*' and in pencil 'Magallanes' may be the type. The skull is inside. It is closely similar to the supposed type of *magellanicus* above described and doubtless is the same species. Forearm 44; tibia 19; hind foot 8."

In the original description of *capucinus*, Philippi states that he does not know the part of Chile from which it came. Therefore, the penciled locality, "Magallanes," which now appears on the specimen label, was doubtless written there at a later time, and means little. Peters (l.c. 1876) placed it as a synonym of *magellanicus* and, since it cannot be distinguished, this seems the best disposition of it, although Cabrera (1903, p. 286) gave it nominal recognition on the basis of figures supplied him by Matschie and presumably drawn from specimens in the Berlin Museum.

A specimen from Pico Salamanca, Chubut, Argentina, recorded by Thomas (Ann. Mag. Nat. Hist., (10), **4**, p. 36, 1909) as *H. montanus* not improbably will prove referable to *magellanicus*.

Darwin has reported a small bat, presumably of this form, from Tierra del Fuego and during our brief stay on the island in 1939 residents informed us that bats were occasionally seen during the warmest part of the very short summer. We saw none, however, and the paucity of insect life is such that the support of more than a very small population seems improbable. On the southern mainland, reports of bats were somewhat more numerous, but here also it is evident that conditions are not very favorable. At North Arm Station on the open pampa near the Argentine boundary, our friends William and John Fell advised that bats were of fairly regular occurrence each summer during a very short period. The only bats personally observed were several seen flying on two successive evenings (February 23–24) at Lago Lazo near Lake Sarmiento, some 300 miles north of the Straits. They appeared at such a late hour that efforts to shoot them were unsuccessful.

*Specimens examined.*—Total 6: Mafil, Valdivia, 1 skin; Quellon, Chiloe Island, 1 alc.; Rio Inio, Chiloe Island, 2 skins; "Straits of Magellan," 2 skins (types of *magellanicus* and *capucinus* in Mus. Nac. Chile).

**Desmodus rotundus d'orbignyi** Waterhouse. VAMPIRE BAT.

*Desmodus d'orbignyi* Waterhouse, Zool. Voy. Beagle, Mamm., pp. 1–3, pls. 1, 25, fig. 1, 1838—Coquimbo, Chile.

A medium-sized bat having thin coarse pelage, a small rounded nose-leaf and no tail; middle upper incisors and canines very large, projecting and sharp-edged. Forearm 56–60.

*Range.*—Known only from central Chile from Coquimbo to the vicinity of Valparaiso.

This form seems entitled to recognition on the basis of the unusually light color of the under parts shown by the few known specimens. In large series of *Desmodus* from various parts of South America, occasional specimens show rather light color on the under parts but, as a rule, they are much darker than in the Chilean examples. Waterhouse's description and figure indicate a specimen with very light under parts, and a specimen in the Chilean museum examined by the writer was found to be similar. This was especially noted as having the entire under parts pure buffy white to the roots of the hairs. Twenty-two specimens from Curaumilla and Papudo have been recorded by Wolffsohn (1921, p. 523). Five from the latter locality are in the British Museum.

A modern specimen sent by Wolffsohn and now in Field Museum also has light under parts, but the area of self-colored hairs is confined mainly to the throat. The upper parts are very dark brown sharply contrasted with the under parts. The forearm in this specimen measures only 56.5 mm. and the Catapilco specimen is 62, suggesting that the form may be characterized by a short forearm, but this needs confirmation with a larger series of specimens.

*Specimens examined.*—Total 7: Catapilco, Valparaiso, 1 (Mus. Nac. Chile); Papudo, Aconcagua, 6 (F.M. 1; B.M. 5).

**Tadarida brasiliensis** Geoffroy. FREE-TAILED BAT.

*Nyctinomus brasiliensis* Geoffroy, Ann. Sci. Nat., Paris, **1**, pp. 343–347, pl. 22, 1824—Curityba district, Brazil.

*Molossus nasutus* Gay, Hist. Chile, Zool., **1**, p. 35, 1847.

*Tadarida brasiliensis* Thomas, Proc. U. S. Nat. Mus., **58**, p. 222, 1920.

A small brownish or blackish bat with thick leathery ears, heavy jowls, and tail with tip projecting beyond membrane. Forearm 42–45.

This widely distributed, free-tailed bat is perhaps the most common bat of Chile. The record from Valdivia is the southernmost for the genus and carries it into a region of definitely temperate climate. Records from the coast of Chile north of Valparaiso are lacking, but the species is known from Tucuman and Mendoza, Argentina, and it may have reached Chile by crossing the northern Andes.

*Specimens examined.*—Total 7: Paiguano, Coquimbo, 2; Palmilla, north of Quillota, Valparaiso, 1; Papudo, Aconcagua, 1; Rinihue, Valdivia, 1; Temuco, Cautin, 2.

## ORDER CARNIVORA

### Key to Chilean Genera

Hind feet with four toes.
  Head short and rounded; teeth not more than 30 ..... *Felis.*
  Head long and narrow; teeth 42 ..... *Dusicyon.*
Hind feet with five toes.
  Toes webbed for aquatic life; color mainly dark brown ..... *Lutra.*
  Toes not webbed; color grizzled or striped.
    Upper parts black or brownish, striped or mantled with pure white. *Conepatus.*
    Upper parts mainly grizzled grayish or yellowish.
      Larger; head and body about 500 mm.; teeth 34 ..... *Grison.*
      Smaller; head and body about 300 mm.; teeth 28 ..... *Lyncodon.*

### **Dusicyon culpaeus culpaeus** Molina. Andean Wolf; Culpeo.

*canis culpaeus* Molina, Sagg. Stor. Nat. Chili, pp. 293–295, 341, 1782—Chile (Province of Santiago by selection).

(?)*Canis vulpes chilensis* Kerr, Anim. Kingd., p. 144, No. 258, 1792.

*Canis amblyodon* Philippi, Arch. Naturg., **69**, (1), p. 157, 1903—Province of Valparaiso.

*Canis albigula* Philippi, supra cit., p. 159—central provinces of Chile.

*Pseudalopex culpaeus* Thomas, Ann. Mag. Nat. Hist., (8), **13**, p. 357, 1914.

*Pseudalopex culpaeus culpaeus* Cabrera, Journ. Mamm., **12**, p. 62, 1931—type locality selected.

*Dusicyon (Dusicyon) culpaeus* Osgood, Journ. Mamm., **15**, p. 49, 1934.

A good-sized canid with the chin light tawny, not sharply distinguished from other under parts; body and upper side of tail grayish, heavily tipped with black; head mainly tawny; feet and legs bright tawny uninterrupted by black; under side of tail dull tawny unmixed with black. Total length 900–1,150; tail 360–450; hind foot 150–164.

*Range.*—Central Chile from the Province of Coquimbo southward mainly in the mountainous regions, meeting the range of *magellanicus* somewhere in southern Chile and Argentina.

The culpeo is the representative in central Chile of the wolflike canid which ranges from the Straits of Magellan northward through the Andes to Ecuador. It is decidedly larger than the chilla and distinguished from it at a glance by the color of its chin, which is tawny instead of black. The species reaches a length of some three and a half feet and, excepting *Chrysocyon*, is the largest of conti-

nental South American canids. It appears to be fairly common in the coast hills near Valparaiso, but elsewhere is reported mainly from the cordillera. It is not recorded from the coast south of Valdivia. The southern limit of typical *culpaeus* is unknown, but it may extend into Argentina to meet the range of *magellanicus*. A trade skin in Field Museum from "Nahuelhuapi" shows no important differences from typical *culpaeus*.

During my brief visit to the Chilean Museum at Santiago, time did not permit a search for the types of Philippi's *amblyodon* and *albigula*, both of which have been referred to *culpaeus* by Wolffsohn and by Cabrera. That this is correct is scarcely to be doubted. Wolffsohn (1921, p. 528) states that he himself collected the type of *amblyodon* and that he is sure of its identity with *culpaeus*. In the case of *albigula*, the name itself may be taken as sufficient evidence that the culpeo rather than the chilla is concerned.

In Molina's original account of the species it is stated (translation) that "the name appears to be derived from the Chilean word *culpem*, which signifies madness or folly and is strikingly applicable to the conduct of this animal, which constantly exposes itself to be shot by hunters."

*Specimens examined.*—Total 7: Cayetue, Lake Todos Santos, 1 (coll. K. Wolfhügel); Limache, Valparaiso, 1; Los Agostinos, Palomar, Aconcagua, 1; "Nahuelhuapi," 1 (skin only); Palmilla, La Cruz, Valparaiso, 1; Palos Quemados, Valparaiso, 1 (skull only); Papudo, Aconcagua, 1.

### **Dusicyon culpaeus andinus** Thomas.

*Pseudalopex culpaeus andina* Thomas, Ann. Mag. Nat. Hist., (8), **13**, p. 357, 1914—Esperanza, near Mount Sahama, Oruro, Bolivia; Osgood, Field Mus. Nat. Hist., Zool. Ser., **10**, p. 174, footnote, 1914; Cabrera, Journ. Mamm., **12**, p. 63, 1931.

*Canis (Dusicyon) culpaeus andinus* Kraglievich, Physis, **10**, p. 59, 1930.

Similar to *D. culpaeus culpaeus*, but color paler throughout, the head, legs, and feet ochraceous tawny rather than tawny.

*Range.*—Northern Chile from the Province of Coquimbo eastward into western Argentina and northward to western Bolivia and southern Peru.

This form appears to differ from typical *culpaeus* mainly in somewhat paler color, the blackish dorsal area being less extensive and the general coloration averaging paler. In most specimens of *culpaeus* the dorsal coloration spreads to the sides, whereas in *andinus*

the sides are often quite abruptly paler. The under parts are scarcely different, being perhaps a trifle paler in *andinus*. Seasonal variation in color is considerable and present material does not permit characterization in more than general terms, but it is apparent the two forms are definitely separable. There is some evidence that the skulls of *andinus* are heavier in the rostral part and in the dentition.

Cabrera (l.c.) mentions a specimen of this form from Cazadero, on the west slope of Mount Aconquija, and it is altogether probable that it ranges throughout the mountains of northwestern Argentina.

The type locality of *P. inca* (Thomas, op. cit., p. 361) is Sumbay, Arequipa, Peru, at an elevation of 4,000 meters, in the region in which *andinus* appears to be the common form. The published measurements of the skull of the type of *inca* fall within the variation in *andinus* but are disproportionately large for those given for the skin, which is said to have the markings of the *griseus* group. Re-examination of this type in the light of recent knowledge would be very desirable. Cabrera (op. cit., p. 57, footnote) is inclined to consider it allied to *D. gymnocercus*, which otherwise is not recorded from Andean localities. Recent work at Sumbay and other localities in southwestern Peru has yielded only *andinus*, of which specimens are now in Field Museum from Hacienda Collacachi (Puno), Hacienda Picotani (Puno), Salinas (Arequipa), and Pampa de Arrieros (Arequipa).

*Specimens examined.*—Total 6: Balala, Coquimbo, 1; Baños del Toro, Coquimbo, 1; Guanta, Coquimbo, 1; Pica (3 miles south), Tarapaca, 1 (skin only); 20 miles east of San Pedro, Antofagasta, 2.

### **Dusicyon culpaeus magellanicus** Gray.

*Canis magellanicus* Gray, Proc. Zool. Soc. Lond., p. 88, 1836—nomen nudum.

*Vulpes magellanica* Gray, Mag. Nat. Hist. (Charlesworth), **1**, p. 578, 1837—Port Famine, northern side of Straits of Magellan.

*Cerdocyon magellanicus* H. Smith, Jard. Nat. Lib., **9**, p. 266, pl. 30, 1839; Allen, Mamm. Patagonia, p. 162, 1905.

*Canis* (*Pseudalopex*) *magellanicus* Burmeister, Erlaut. Fauna Bras., p. 51, pl. 26, fig. 3, 1856.

*Pseudalopex magellanicus* Gray, Proc. Zool. Soc. Lond., p. 512, 1868.

*Canis montanus* Prichard, Through the Heart of Patagonia, p. 260, 1902—cordillera of Patagonia; preoccupied name.

*Canis* (*Cerdocyon*) *prichardi* Trouessart, Cat. Mamm., Suppl., p. 234, 1904—substitute for *C. montanus*.

*Pseudalopex culpaeus magellanicus* Thomas, Ann. Mag. Nat. Hist., (8), **13**, p. 357, 1914.

*Canis (Dusicyon) culpaeus magellanicus* Kraglievich, Physis, **10**, p. 69, 1930.

*Pseudalopex culpaeus magellanica* Cabrera, Journ. Mamm., **12**, p. 63, 1931.

Very similar to *D. culpaeus culpaeus*, but probably averaging slightly larger; skull with the rostral part slightly more elongate.

*Range.*—Southern Patagonia and the vicinity of the Straits of Magellan; northward range undetermined.

The southern form of the culpeo is represented in Field Museum only by a single skin without skull from the Brunswick Peninsula on the northwest side of the Straits of Magellan. This is in full winter pelage, very long and heavy and richly colored, the tawny markings intense, and the body with considerable suffusion of tawny, very similar to the colored plate published more than fifty years ago by Mivart (Monog. Canidae, p. 52, 1890). Specimens of *culpaeus* from central Chile are mostly in short coat and not comparable, but a single trade skin said to be from Nahuelhuapi is nearly as richly colored as the one from Brunswick Peninsula.

The animal is now relatively scarce in the extreme south where it has been persistently pursued for the fur market in which, of course, it commands a higher price than the smaller and more numerous chilla or pampa fox.

The status of *magellanicus* as a subspecies rests mainly on the conclusion of Thomas (l.c.) expressed as follows: "In the south the skulls tend to get longer, especially in the muzzle, a tendency which is carried, on the average, slightly further in Patagonian and Magellan specimens than in those from central Chile, the type locality of *culpaeus*. On this account we may, perhaps provisionally, recognize an extreme southern subspecies, *Ps. c. magellanicus*, which gradually passes into *Ps. c. culpaeus*."

*Specimen examined.*—Brunswick Peninsula, 1 (skin only).

### **Dusicyon culpaeus lycoides** Philippi.

*Canis (Pseudalopex) lycoides* Philippi, Anal. Univ. Chile, **54**, p. 542 (pp. 4–6, author's ed.), 1896—Tierra del Fuego.

*Pseudalopex lycoides* Thomas, Ann. Mag. Nat. Hist., (8), **13**, p. 357, 1914; Lönnberg, Arch. Zool., **12**, No. 13, pp. 1–10, figs. 1–2, 1919.

*Canis (Dusicyon) lycoides* Kraglievich, Physis, **10**, p. 69, 1930.

*Pseudalopex culpaeus lycoides* Cabrera, Journ. Mamm., **12**, p. 63, 1931.

This form, which is supposed to be confined to the island of Tierra del Fuego, is thought by Lönnberg (l.c.) to be distinguished from

*magellanicus* of the mainland by larger size and by certain cranial characters among which a relatively narrow braincase is perhaps most important.[1] Material representing it is still very scanty and its obviously close relationship to *magellanicus* is at best indicated by the subspecific status given it by Cabrera. During several weeks spent on Tierra del Fuego, Mr. Sanborn and myself could only learn that it is now very scarce although a few skins from remote parts of the island annually come into the fur market. A mounted skin is in the Museo Regional Salesiano at Punta Arenas.

**Dusicyon griseus griseus** Gray. PAMPA FOX; CHILLA.

*Canis griseus* Gray, Proc. Zool. Soc. Lond., p. 88, 1836—nomen nudum.

*Vulpes griseus* Gray, Mag. Nat. Hist. (Charlesworth), **1**, p. 578, 1837—Straits of Magellan.

*Canis patagonicus* Philippi, Arch. Naturg., **32**, (1), p. 116, 1866—Straits of Magellan.

*Pseudalopex griseus* Gray, Proc. Zool. Soc. Lond., p. 512, 1868.

*Cerdocyon griseus* Allen, Mamm. Patagonia, p. 157, pl. 23, 1905.

*P[seudalopex] griseus* Thomas, Ann. Mag. Nat. Hist., (9), **7**, p. 384, 1921.

*Canis (Pseudalopex) patagonicus* Kraglievich, Physis, **10**, p. 49, pl. 14*b*, 1930.

*Pseudalopex gracilis patagonicus* Cabrera, Journ. Mamm., **12**, p. 66, 1931.

*Dusicyon (Dusicyon) griseus* Osgood, Journ. Mamm., **15**, p. 49, 1934.

A small foxlike canid with a well-marked black chin; legs pale tawny, the thighs with a transverse patch of black; under side of tail mixed pale tawny and black. Total length 800–900; tail 300–360; hind foot 120–135.

*Range.*—Pampas of western Argentina from the Straits of Magellan northward at least to Chubut; passes into Chile locally along the eastern base of the Andes.

The occurrence of the typical pampa "fox" within Chilean territory is attested by one specimen obtained by Field Museum's expedition at Rio Nirehuao. Doubtless it crosses the boundary at various localities similarly situated along the eastern base of the Andes; in the Province of Magallanes it has a considerable range in Chile. As judged by the single skin from Chile, *griseus* is considerably paler than any of its northern races. The skull of this specimen and various others from southern Patagonia seem to indicate also that *griseus* has a heavier dentition and a shorter facial region than *domeykoanus*. In these respects *griseus* agrees quite closely with a

[1] Lönnberg's comparisons are made with a skull in the Stockholm Museum "from Chile," no exact locality being mentioned, and with a figure and measurements published by Mivart (Monog. Canidae, p. 55, fig. 21, 1890) of a skull which may have been from northern Chile. Until comparisons of skulls from Tierra del Fuego are compared with others from the mainland directly opposite, some doubt may attach to the distinction of *lycoides* from *magellanicus*.

skull in Field Museum from Valle Santa Morina, Catamarca, which presumably represents *gracilis*. This suggests a possible general distinction between east Andean and west Andean forms, but it needs confirmation with large series. Gradation between eastern and western forms, as stated elsewhere, may not be impossible in northeastern Chile, but it is more likely to be found in the intersecting valleys between the Argentine Province of Neuquen and the adjoining Chilean provinces.

The above-mentioned skull from Catamarca, which is of normal size, raises doubts as to the validity of *Pseudalopex zorrula* (Thomas, Ann. Mag. Nat. Hist., (9), **7**, p. 383, 1921), also from Catamarca. That the single specimen upon which this name is based is more than an exceptionally small female of *gracilis* seems very doubtful.

The adoption of the name *patagonicus* by Kraglievich and Cabrera on the grounds that *griseus* was preoccupied does not appear to be justified. Gray's *Canis griseus* of 1836 was a nomen nudum without status, and the first valid name for the species is *Vulpes griseus* Gray 1837, which is not affected by the earlier *Canis griseus* of Boddaert and others.

The great abundance of this animal throughout its range, and especially in southern Patagonia, is attested by all early writers. Old sheep men recall how "foxes" were seen by dozens at every turn, how they surrounded camps at night, and how they pilfered and marauded at every opportunity. In recent years there has been a great change and, although the little dogs have by no means gone, their numbers are greatly reduced. Although the pelt commands but a small price, trapping, nevertheless, is carried on very actively, since there is a long season when a considerable population is otherwise unemployed. In 1939 about 1,000 skins, probably including a few culpeos, were reported as being brought to market in Punta Arenas. The range of this form is quite strictly limited to the open grass lands and the ocean beaches, and it scarcely enters even the foothills of the Andes. It does not extend to Tierra del Fuego, although large parts of the island are well suited to it and although its abundance and its littoral habits would seem to favor its making the crossing of the Straits more easily than some other mammals that have done so.

*Specimens examined.*—Total 12: CHILE: Rio Ciaike, Magallanes, 7 (skulls only); Rio Nirehuao, 1. ARGENTINA: Puerto Deseado and Province of Santa Cruz, 4 (skulls only).

**Dusicyon griseus domeykoanus**[1] Philippi.

*Canis domeykoanus* Philippi, Anal. Univ. Chile, **108**, p. 168, pl., 1901—Province of Copiapo, Chile.

*Canis rufipes* Philippi, supra cit., pp. 168, 170, 1901—no locality.

*Pseudalopex domeykoanus* Cabrera, Trab. Mus. Nac. Cienc. Nat., Madrid, **31**, p. 27, 1917.

*Pseudalopex gracilis domeykoanus* Cabrera, Journ. Mamm., **12**, p. 65, 1931.

Distinguished from *griseus* by weaker dentition and from *maullinicus* by paler color.

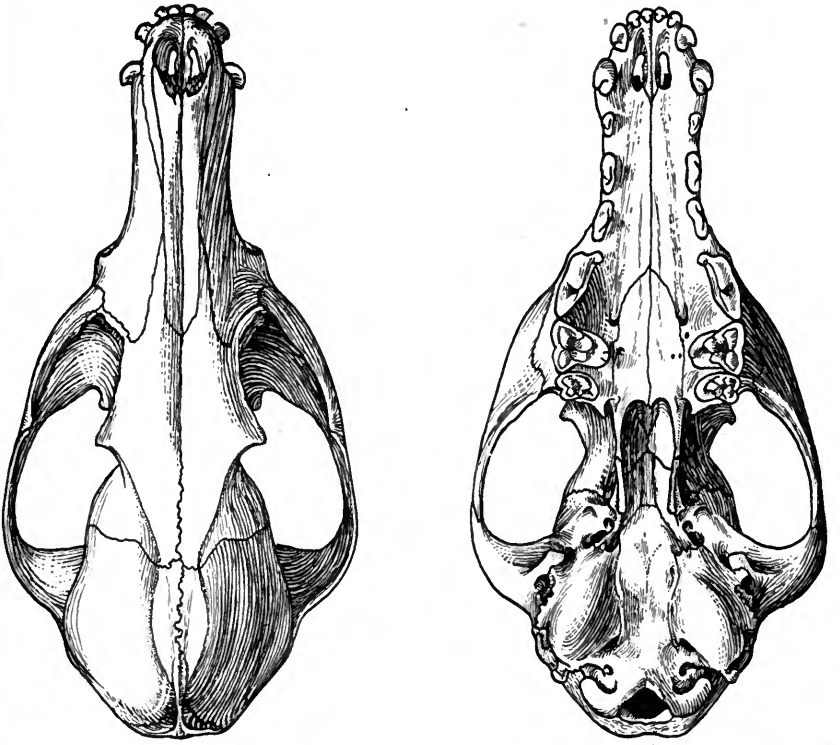


FIG. 4. *Dusicyon griseus domeykoanus*. F.M. No. 23926. × ¾.

*Range.*—Central Chile from Valparaiso northward to the southern part of the Province of Atacama and southward to the vicinity of Concepcion.

The small, foxlike chilla is very abundant in central Chile. It even persists within the city of Santiago as I discovered by seeing

[1] Named for Ignacio Domeyko, Professor of Physics and Chemistry of the "Instituto Nacional" and one of Philippi's earliest friends in Chile.

several when walking in the evening in the parklike surroundings of the Cerro San Cristobal. Apparently it does not extend northward very far and does not range through the extremely arid parts of northern Chile. In the south it meets the range of the darker form of the Valdivian region and this doubtless grades into *griseus* through some of the lower Andean passes. Specimens of typical *gracilis* from the vicinity of Mendoza, Argentina, are not available and just how *domeykoanus* may differ from *gracilis* cannot be stated. Thomas (Ann. Mag. Nat. Hist., (9), **7**, p. 384, 1921) has recorded from Tucuman, Cordova, and Mendoza specimens of *gracilis* which he states are "most doubtfully distinguishable" from the "foxes from west of the Andes." Some Chilean mammals probably extend across to the Mendoza region without change, but the chilla, being mainly a lowland animal, perhaps does not do so and the connection of *gracilis* and *domeykoanus* may be a southern one.

Philippi's type of *domeykoanus* was not examined in Santiago although it is probably preserved there. Wolffsohn has referred to it as the earliest of the names applied by Philippi to the chilla. Specimens in Field Museum from Domeyko, Atacama, are considered as typical. *C. rufipes*, mentioned in the text of the description of *domeykoanus*, is no doubt a synonym.

*Specimens examined.*—Total 19: Domeyko, Atacama, 2; Limache, Valparaiso, 13; Marquesa, Coquimbo, 2; Papudo, Aconcagua, 1; Romero, Coquimbo, 1.

**Dusicyon griseus maullinicus** Philippi.

*Canis maullinicus* Philippi, Arch. Naturg., **69**, (1), p. 158 (middle of page), 1903—"Nueva Braunau," west of Lake Llanquihue, Llanquihue, Chile.

*Canis trichodactylus* Philippi, supra cit., p. 158 (bottom of page), 1903—Province of Valdivia, Chile.

*Canis torquatus* Philippi, supra cit., pp. 159–160, 1903—Puerto Montt, Chile.

Distinguished from *griseus* by weaker dentition and from *domeykoanus* by darker color.

*Range.*—Valdivian forest region of south-central Chile, mainly in the provinces of Cautin, Valdivia, and Llanquihue.

The chilla of the Valdivian forest region averages darker and more richly colored than *domeykoanus* of central Chile. The difference between the two races is less than might be expected under the diverse physical conditions of their respective ranges. In the southern race the general color throughout is slightly more intense, the rufous markings on the ears and legs are richer, and especially

the light areas on the under parts are reduced in extent. Cranial characters, if any, are not demonstrable with material at hand.

Philippi's names, *maullinicus*, *trichodactylus*, and *torquatus*, apparently apply to the chilla since the distinctive black marking on the chin is mentioned in the description of each. The measurements, as compared with those of *amblyodon* and *albigula*, published in the same paper, are inconsistent and unreliable. The localities also have been questioned by Wolffsohn in a newspaper article to which reference is made by Cabrera (Journ. Mamm., **12**, p. 66, footnote, 1931). Thomas (Ann. Mag. Nat. Hist., (9), **7**, p. 385, 1921) also has mentioned this matter as follows: "It has been asserted—whether rightly or wrongly—that the owners of a farm near Santiago amused themselves by sending in to the aged Director of the museum specimens of their local fox, which they labeled with various fictitious localities in distant parts of Chili, and that these became the basis of many of Philippi's species." It seems necessary, however, to regard this as hearsay and to accept the localities as published. Therefore, the name *maullinicus*, which has page priority, is adopted, with *trichodactylus* and *torquatus* as synonyms. The type specimens, if existing, have had no recent examination.

*Specimens examined.*—Total 15: Cabrero, Concepcion, 2 (skins only); Cayetue, Lake Todos Santos, 8 (coll. K. Wolfhügel); Curacautin, Malleco, 3; Rinihue, Valdivia, 2.

**Dusicyon fulvipes** Martin. DARWIN'S FOX.

*canis Lagopus* Molina, Sagg. Stor. Nat. Chili, p. 272, 1782.

*Vulpes fulvipes* Martin, Proc. Zool. Soc. Lond., p. 11, 1837—Chiloe Island, Chile.

*Canis fulvipes* Waterhouse, Zool. Voy. Beagle, Mamm., p. 12, pl. 6, 1839.

*Thous fulvipes* Gray, Proc. Zool. Soc. Lond., p. 514, 1868.

*Canis azarae* (var. *fulvipes*) Mivart, Monog. Canidae, p. 70, figs. 25–27 (skull), 1890.

*Canis* (*Cerdocyon*) *azarae fulvipes* Trouessart, Cat. Mamm., Suppl., p. 233, 1904.

*Pseudalopex fulvipes* Cabrera, Journ. Mamm., **12**, p. 66, 1931.

A small, short-tailed and very dark-colored fox. Total length 790; tail 248; hind foot 123.

*Range.*—Southern part of the island of Chiloe, Chile.

That a small, dark-colored fox inhabited Chiloe Island was known to Molina in the eighteenth century. Its native name *Payneguru*, meaning "blue fox," doubtless caused him to record it as *Canis*

*Lagopus*. The species was really discovered by Charles Darwin, who obtained a specimen December 6, 1832, near the mouth of San Pedro channel on the southern end of Chiloe Island. In his "Naturalist's Voyage Round the World," Darwin gives the following account of the animal's capture: "In the evening we reached the island of San Pedro, where we found the *Beagle* at anchor. In doubling the point, two of the officers landed to take a round of angles with the theodolite. A fox (*Canis fulvipes*), of a kind said to be peculiar to the island and very rare in it, and which is a new species, was sitting on the rocks. He was so intently absorbed in watching the work of the officers that I was able, by quietly walking up behind, to knock him on the head with a geological hammer. This fox, more curious or more scientific, but less wise than the generality of his brethren, is now mounted in the museum of the zoological Society." In Darwin's notes published by Waterhouse is the further statement: "I killed this animal on the sea-beach at the southern point of the island; it is considered extremely rare in the northern and inhabited districts." Darwin's specimen became the type of Martin's *Vulpes fulvipes* and for nearly a century was the only example of the species known to be preserved.

In 1922, when Field Museum's expedition visited Chiloe Island, our first stop was at the village of Quellon on the east coast and near the southern frontier of the well-settled part of the island. Inquiry among natives and settlers here elicited only negative information as to the occurrence of any species of fox on the island. One well-educated and well-informed Chilean, holding a responsible position with a lumber company, produced a Spanish translation of Darwin's "Voyage" in which he had marked the passage about the fox. This, he insisted, was obvious proof that the great English naturalist had no regard for the truth, first because the idea of killing a free, wild fox with a hammer was preposterous and second, because no such fox had since been seen on the island. He stated that he had been especially interested and had carefully questioned many natives. Nevertheless, it was only a short time afterward that I found fox tracks on a sandy beach at the extreme south end of the island near the mouth of the Rio Inio and within twenty miles of the spot described by Darwin. I set a short line of traps along the beach, baited them with fresh fish, and a few days later two fine foxes were in hand, one male and one female, both fully adult. Still later I learned, of course, that the few natives who hunt about the south coast of the island were by no means unaware of the occurrence of

the fox there, but the testimony from Quellon is of considerable interest as indicating the scarcity of the animal and the restriction of its range. Apparently it was but little more numerous in Darwin's time, for he remarks on its rarity. The same is indicated by Philippi, who states that he was never able to obtain a specimen.[1]

The two specimens in Field Museum show the same dark rich color described for the type. In general, all dark markings are intensified and all light ones reduced. The subterminal light bands on the hairs of the upper parts are narrow, and the effect is of a finer grizzling than in related forms. The color of the basal part of the hairs is very dark, not far from the Bone Brown and Clove Brown of Ridgway, whereas in *domeykoanus* and *maullinicus* it is no darker than Snuff Brown. The rufescent areas on the head, ears, and legs are of deep, rich shades, Warm Sepia rather than Hazel or Cinnamon Rufous. The tail is very dark and, although somewhat grizzled proximally, the heavily black-tipped hairs predominate above and below except for a limited light area at the base below. The transverse dark marking on the hind legs is intense black without rufescent mixture. The feet have a somewhat pied appearance with a tendency to the development of a blackish spot above the digits, this being somewhat connected with the body on the foreleg but fully isolated on the hind leg. Such markings occasionally are faintly suggested in other members of the *griseus* series. The light area on the throat is whitish and continuous with a line running along the upper lip to the rhinarium. The bases of the hairs in this area, however, are very dark and the whitish tips narrow. The dark grizzled areas from the sides of the neck are extensive but do not quite meet to form a continuous dark neck-band. A dark band is practically continuous just in front of the axillae. Light hairs with pale brownish bases are narrowly scattered down the middle of the thorax and connect with an expanded area of similar color on the hind belly from which narrow but very distinct whitish lines extend along the inner sides of the legs to the middle of the foot. The inguinal area is dull rufescent. The dark area on the chin is well marked on the male specimen but on the female it is less extensive than in *griseus*, being bordered by a fairly marked light line around the lower lips.

In addition to its rather marked peculiarities of color, *fulvipes* has cranial characters which distinguish it quite sharply from main-

[1] Two living examples have been exhibited in the zoological gardens of Valdivia, Chile, as noted by Carl Junge (Zool. Gart., Leipzig, 6, p. 280, 1933).

land forms. As compared with that of *domeykoanus* or *maullinicus*, the skull is much shorter and broader in the facial region, the audital bullae are decidedly less inflated, the dentition is slightly heavier, the occlusion of the premolars is more nearly complete, and the angle of the mandible is much deeper and heavier. Some of these characters

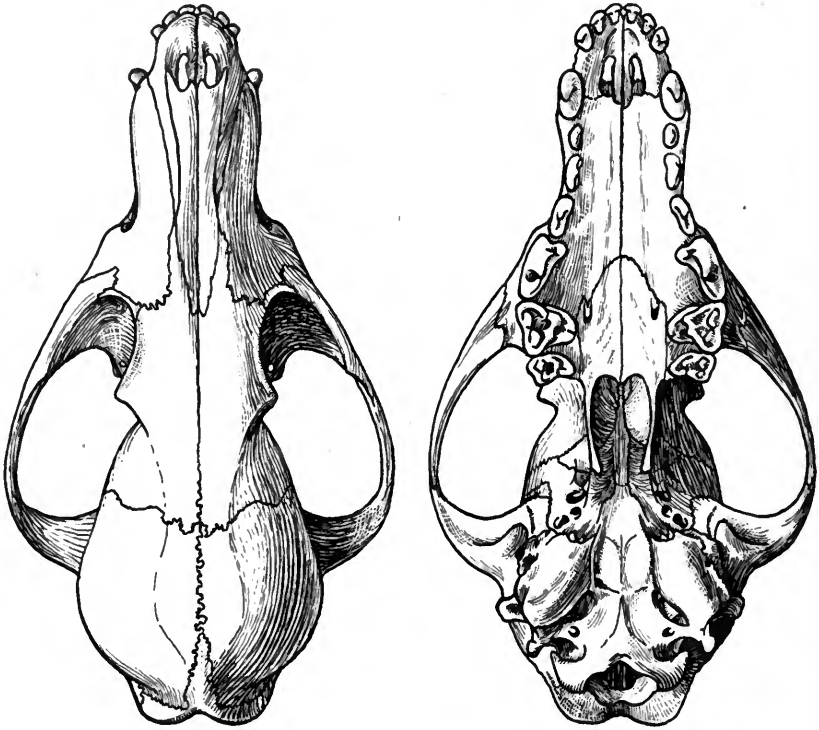


FIG. 5. *Dusicyon fulvipes*. F.M. No. 23815. × ¾.

are at least partially repeated in *sechurae* of northern Peru, which, like *fulvipes*, is a beach fox, whereas *griseus* is mainly a plains animal. It is possible, therefore, to speculate as to a former connection of *fulvipes* with *sechurae* rather than with *griseus*. In its heavy angular process and its almost complete occlusion of the upper and lower premolars *fulvipes* shows some parallelism with *Cerdocyon*. This is, perhaps, of no great significance, but since *fulvipes* is probably quite as much a "crab-eater" in habits as *Cerdocyon* it cannot be wholly overlooked.

In view of its geographical position and its agreement in most general features with *griseus* and subspecies, the conclusion that

*fulvipes* is an offshoot of the *griseus* group is certainly the most natural and logical one. However, since it is so well characterized and since its distribution apparently is limited to the southern end of Chiloe Island, its status as a separate species perhaps should not be disturbed. It is to be remembered, nevertheless, that the mainland coasts in the latitude of Chiloe are practically unexplored zoologically and if foxes should be found there it is not unlikely that they might be much nearer to *fulvipes* than is *maullinicus*, in which the approach to *fulvipes* is very slight.

The male fox collected on Chiloe had a weight of 7¼ pounds and the female 5½ pounds. External measurements are, for male and female, respectively: total length 790, 665; tail 248, 175; hind foot 123, 100; ear from crown 77, —. Those of the skulls, with corresponding ones of comparable skulls of *domeykoanus* (in parentheses), are as follows: greatest length 129, 113 (131, 123.5); condylo-basal length 122.5, 108.6 (127, 119); facio-cranial ratio[1] 48.1, 46.9 (48.9, 48.9); zygomatic width 68.3, 63 (63, 58.5); least interorbital width 22.1, 20.9 (20.9, 20.2); median length of nasals 41.5, 35.2 (43.6, 40.8); width of braincase 43.8, 43 (42.4, 42.6); width of rostrum at base of canines 22.8, 20.1 (18.6, 16.6); palatal length 66, 58.6 (71, 64); length of upper carnassial 12.1, 10.6 (12.7, 10.7); combined length of two upper molars 15.6, 13.1 (14.7, 13.2).

*Specimens examined.*—Near mouth of Rio Inio, Chiloe Island, 2.

**Felis concolor puma** Molina. PUMA; LEON.

*Felis puma* Molina, Sagg. Stor. Nat. Chili, pp. 295–299, 341, 1782—Chile (vicinity of Santiago, by later selection); Merriam, Proc. Wash. Acad. Sci., **3**, p. 597, 1901—description of headskin and skull from Santiago.

*Felis concolor puma* Cabrera, Rev. Chil. Hist. Nat., **33**, pp. 312–320, pl. 19, fig. A (skull), 1929; Nelson and Goldman, Journ. Mamm., **10**, p. 346, 1929—vicinity of Santiago selected as type locality.

A large, long-tailed and plain-colored cat. Total length about seven feet (=200 cm.) including tail, which is about one-third the total length. Said to be larger and more grayish than the Brazilian variety and to have a larger skull and heavier teeth. Length of crown of upper carnassial in adult male about 24.

*Range.*—Central Chile, mainly in the cordillera. Exact limits of range unknown; probably extending at least from lat. 30° in the north to lat. 40° in the south.

The name *puma* appears to be of Peruvian origin and taken from the language of the native Quechuas. The Araucanian name is

[1] Length from posterior end of nasals to alveolus of middle incisors multiplied by 100 and divided by condylo-basal length.

*pagi*, *pagui*, or *pangui*, but in recent times *puma* has become generally used throughout Chile as well as in Peru, Ecuador, Bolivia, and Argentina. Although well known, fairly common, and generally distributed, the Chilean puma has usually been described only in general terms and exact records of local distribution are but few. It has retreated largely from the more populous parts of the country and now appears mainly in the cordillera; as suggested by Cabrera, it probably crosses from one side of the Andes to the other.

Preserved specimens are few. A headskin and skull from Santiago have been described by Merriam and a series of skulls from mountains near Mendoza, Argentina, assumed to belong to the same race, have been discussed by Cabrera.

A specimen in the museum of Valparaiso collected at Cauquenes in 1878 is recorded by Wolffsohn and Porter (1908). Two skulls are recorded by Wolffsohn (1923) from La Chacarilla, Chilicauquen, and Catapilco, San Alfonso.

*Specimen examined.*—"Santiago," 1 (skull and headskin, U.S. N.M.).

**Felis concolor patagonica** Merriam. SOUTH ANDEAN PUMA.

*Felis puma patagonica* Merriam, Proc. Wash. Acad. Sci., **3**, p. 598, 1901—near Lake Pueyrredon, lat. 47° 30′ S., northwestern Santa Cruz, Argentina.

*Felis concolor puma* Cabrera, Rev. Chil. Hist. Nat., **33**, pp. 312–320, 1929—part.

*Felis concolor patagonica* Nelson and Goldman, Journ. Mamm., **10**, p. 346, 1929.

A supposed southern variety of puma said to have larger teeth than *F. c. puma*. Length of crown of upper carnassial 25–27.

*Range.*—East base of cordillera of south-central Chile and eastward into Argentina, at least between parallels 48 and 44 S. lat.; exact limits unknown.

The validity of this variety of the puma is not well established, but since it is recognized by Nelson and Goldman after a study of the entire *concolor* group, it is given a place here. Material representing it is scanty, as well as in the case of *F. c. puma*, but, so far as examined, it indicates fairly pronounced increase in size of the teeth in the more southern specimens.

Cabrera (l.c.) has expressed the opinion that *patagonica* is the same as *puma* and has made comparisons between skulls from the vicinity of Mendoza representing *puma* and one from Aysen repre-

senting *patagonica*. He calls attention to the nearness of Mendoza to the cordillera rising west of Santiago, and the probability that the animals pass from one side of the Andes to the other, doubtless ranging without interruption from north to south. Therefore, he finds no obvious reason for a division of northern and southern or eastern and western forms. In this he is at least partly correct and his reference of the Mendoza skulls to *puma* is open to no question. However, the measurements which he publishes for parallel contrast of adult male skulls from Mendoza and Rio Aysen do not show complete agreement. The length of the upper carnassial in the Mendoza skull he gives as 22.3 and that of the Aysen skull as 27. Since one of the principal distinctions claimed for *patagonica* is the large size of the carnassial, it must be concluded that the evidence adduced is indecisive or that it even strengthens the opinions of Merriam and Nelson and Goldman based on comparison of skulls from animals not fully mature. At least the need for further study with more material is indicated. In a skull of a young male from Rio Nirehuao, obtained by myself in 1923, the upper carnassial has a crown length of 26 and its alveolar length is 24, indicating agreement with the type of *patagonica* and with the Aysen skull measured by Cabrera.

*Felis puma pearsoni* appears to be confined to the coast and treeless parts of southeastern Patagonia and, so far as known, does not reach Chile. Pumas were reported by Darwin as occurring on Tierra del Fuego but other authors do not mention them. My own experience on Tierra del Fuego leads to the belief that they never occurred there, and doubtless Darwin was misinformed.

The abundance of pumas along the east base of the cordillera has been noted by various authors. Prichard (1902) writes: "The distribution of this animal extends over the entire country. It is to be found in the cordillera as on the pampas. The number of pumas in Patagonia is very great, more so than any zoologist has yet given any idea of. During one winter two pioneers killed seventy-three near Lake Argentino. Near San Julian immense numbers are yearly destroyed but, lately, owing to the advent of settlers, they are becoming less numerous."

*Specimens examined.*—Rio Nirehuao, Llanquihue, 2 (1 skin and skull, 1 skull only).

**Felis concolor araucanus** subsp. nov. CHILEAN FOREST PUMA.

*Type* from "Fundo Maitenuhue," Sierra Nahuelbuta, west of Angol, Malleco, Chile. No. 50048 Field Museum of Natural

History. Immature male, skin and skull. Collected January 3, 1940, by Dillman S. Bullock.

*Diagnosis.*—A relatively small, dark, and richly colored puma. Size not greater than in *F. c. puma*, considerably less than in *F. c. patagonica;* length of upper carnassial in adult male about 22 mm. Color much darker and more mixed with black or blackish than in *puma* or *patagonica;* "red" phase predominant.

*Range.*—Humid forest of the Valdivian district of south-central Chile, mainly in the provinces of Angol, Valdivia, and Llanquihue.

*Color.*—General color of upper parts Ochraceous Tawny heavily mixed with black along middle line, producing a general effect of Cinnamon Brown which becomes somewhat paler laterally; under parts Cinnamon with restricted white areas on the inner sides of the legs and on the chin and throat; upper side of tail like middle of back; tip of tail blackish brown approaching pure black; ears mainly Blackish Brown, grayish basally and on the edges and faintly so in the middle; base of whiskers sharply blackish; sides of face and supraorbital region grayish.

*Measurements.*—Skulls of adult male and female paratypes, respectively: greatest length 193, 174; condylo-basal length 171, 158; zygomatic width 140.2, 120.5; interorbital width 39.7, 37.3; postorbital width 52.3, 52.1; median nasal length 45.2, 40.7; length of upper toothrow from front of canine 67.7, 55.9; length of upper carnassial 22.2, 21.2.

*Remarks.*—This form is represented in Field Museum by three skins with skulls, one skin without skull, and one skull without skin, all obtained through the co-operation of Dr. Dillman S. Bullock of Angol. The specimen selected as type is a skin with skull of a young male apparently in its second year, but the characters of the adult male are shown by the skull without skin.

My attention was called to the existence of this form during several weeks spent in various parts of its range in 1939. At that time a number of skins in the possession of local owners were examined and their uniformly dark coloration was especially noted. At least a dozen skins were seen, including a considerable number in use as rugs. Most of them had been taken in the vicinity of Lake Todos Santos, which is in the heart of the humid, heavily forested Valdivian district. At Cayetue, on an arm of this lake, several complete specimens were seen in the collection of Professor Kurt Wolfhügel. All of these were small and dark except one which was of very large size and grayish coloration as in the race *patagonica*. Its exact

source was not known, but it may easily have come from the Argentine side of the mountains only a few miles away or, as suggested by Professor Wolfhügel, it may have been an accidental intruder from that region.

The relationship of this form to *F. c. puma* is doubtless very close, its principal distinction being its dark color in keeping with the climatic conditions of its habitat where nearly all mammals are somewhat differentiated from those of other parts of Chile. The only available representative of *puma* for comparison is the skull with headskin from the vicinity of Santiago described by Merriam (Proc. Wash. Acad. Sci., 3, p. 597, 1901), which has been lent by the United States National Museum. The general color of the headskin is much paler than in *araucanus* and the ears are wholly light gray without the dark areas which are so pronounced in *araucanus* and at least partly indicated in *patagonica*. In the Santiago skull the teeth are all larger and heavier than in *araucanus*, the carnassial being 24 mm. in length as against 22 in *araucanus*. Material is insufficient to demonstrate any cranial characters.

Whether or not the distinction of *patagonica* from *puma* proves to be justified, there seems little doubt that this dark forest form should be recognized. Its relationship to *patagonica* is much the same as that of the North American form *olympus* to *hippolestes*.

**Felis pajeros colocolo** Molina. CHILEAN PAMPA CAT.

*felis colocola* Molina, Sagg. Stor. Nat. Chili, pp. 295, 341, 1782—forests of Chile. Province of Valparaiso here selected.

*felis colocolo* Molina, supra cit., ed. 2, Bologna, p. 245, 1810.

*Felis colocola* Desmarest, Mamm., 1, p. 234, note 3, 1822.[1]

*Felis pajeros* Gay, Hist. Chile, Zool., 1, p. 69, 1847.

*Panthera Maracaya albescens* Fitzinger, Sitzungsber. K. Akad. Wiss., Wien, 59, p. 232, 1869—renaming of *Felis colocolo* Molina, which was regarded "als eine der zahlreichen Abänderungen des Maracaya Panthers"; preoccupied name.

*Felis colocolo* Wolffsohn, Rev. Chil. Hist. Nat., 12, pp. 165–172, pl. 10, 1908.

*Lynchailurus colocolus colocolus* Cabrera, Notas Mus. La Plata, 5, Zool., No. 29, p. 12, 1940.

*Lynchailurus pajeros huina* Pocock, Ann. Mag. Nat. Hist., (11), 7, p. 261, 1941.

*Felis colocolo* Thomas, according to his identification of specimens in the British Museum (fide Pocock, l.c.).

[1] "M. Cuvier pense que le colocolla pourroit bien n'etre que l'ocelot. Nous croyons qu'il seroit aussi possible de le regarder comme le chibigouazou."

A moderate-sized cat with irregular markings on the back and sides forming elongated areas of alternating fulvous and grayish white; legs with transverse bands of brownish or blackish; tail at least partially ringed with blackish or brownish, the under side usually plain. Head and body 567–642; tail 295–322; hind foot 118–139; ear 61–65 (fide Wolffsohn).

*Range.*—West-central Chile, probably from Coquimbo to Concepcion; at present known principally from Valparaiso and vicinity.

This is the Chilean variety of the well-known pampa cat of eastern and southern Argentina. Although common in central Chile, few specimens have been preserved in museums. It is somewhat darker and more distinctly marked than the Argentine variety (*F. colocolo pajeros*).[1]

Under the name *Lynchailurus pajeros huina*, Pocock (l.c.), who had several specimens collected by Wolffsohn in the Valparaiso district, states that it is "distinguished from typical *pajeros* by the much darker, more varied hue of the upper side, which shows distinct pattern on the back and flanks, and by the invariably ochraceous, rusty or brown hue of the pattern on the underside."

The exact relationship of this form to the several northern varieties (*garleppi, thomasi, budini, steinbachi*) which have been described is uncertain. An immature example in Field Museum from Coquimbo is paler than the one illustrated by Wolffsohn and those described by Pocock. Another, also immature, from Putre, Tacna, cannot be identified satisfactorily as to subspecies, but perhaps will prove to be nearer to *garleppi* than to *colocolo*.

The name *colocolo*, which is here applied to it, has had an extraordinary history, appearing and reappearing in literature in many connections and being the subject of much difference of opinion. Originally proposed by Molina in 1782, it was something of a puzzle to early authors who knew nothing of any Chilean cats. Then in 1827 it was adopted by Hamilton Smith (Griffith's Cuvier, **2**, p. 479, 1827) for a supposed species from Guiana. This animal was described by Smith from reports received from a traveler rather than from a specimen and his description was accompanied by a figure having no better basis than a hunter's tale and an artist's imagination. The *Felis colocolo* of Hamilton Smith, therefore, is quite unidentifiable and if it had been so regarded from the beginning much misunderstanding would have been avoided. Unfortunately, it was taken up by various authors to such an extent that the original *Felis colocolo* of Molina was almost forgotten. This so

[1] It is not unlikely that this variety occurs occasionally within Chilean limits on the eastern side of the Andes. In fact, Pocock (op. cit., p. 363, footnote) mentions a skull from Last Hope Inlet, which may constitute a record.

prejudiced the case that even down to very recent dates conclusions in regard to it are subject to suspicion and further analysis.

The whole history has been quite thoroughly reviewed in a recent paper by Cabrera (l.c.), who seems to be the first to understand fully all the factors involved and who does not omit reference to any important previous author. He finds that *Felis colocolo* should either be regarded as unidentifiable or applied to one of the two commoner small cats of Chile, namely, the one described by Gay in 1847 under the name *Felis pajeros*. In this he agrees with Wolffsohn (l.c.) who published a figure (photo) of the animal and based his conclusion on a first-hand field knowledge of Chilean mammals. He is also in agreement with Thomas, who published nothing on the subject but whose views are known through labeled specimens in the British Museum.

On the other hand, Allen (1919) came to a different conclusion and applied *colocolo* to the cat named *jacobita* by Cornalia in 1865. He makes no mention of Wolffsohn's important paper and his text indicates that he had no specimens from Chile except those of *Felis guigna*. He was much influenced by the action of Philippi, who in 1869 and 1870 had identified Molina's *colocolo* with the species which, unbeknown to him, had been called *jacobita* in 1865. Philippi's opinion, however, was deeply tinged with the pernicious influence of the mythical *colocolo* of Hamilton Smith. Without this influence, and because he was ignorant of the discovery by Cornalia, it is probable that he would have seen the case as later authors, notably Wolffsohn, have done. In fact, Cabrera has adduced some evidence that Philippi's earliest opinion was contrary to his published accounts, since a cat labeled by him as *colocolo* and sent to the museum of Madrid, in 1863, proves to be of the form allied to *F. pajeros*.

Finally, Pocock (op. cit., p. 269) comes to essentially the same conclusions as Allen, but he makes no mention of the papers by Wolffsohn and Cabrera. That he had not seen them is evident, since he proposes a new generic name *Colocolo*, which is the exact equivalent of *Oreailurus* Cabrera.

In agreeing with Wolffsohn, Thomas, and Cabrera rather than with Allen and Pocock, more reliance is placed upon a general study of all Molina's work than upon arguments over details. It is known that Molina's descriptions were usually colored by hearsay, that such specimens as he may have seen were not in his hands at the time of writing, and that scarcely any of his descriptions will bear close

analysis without revealing at least slight conflict with reality. Some of his names must be rejected as wholly unidentifiable, and others can be accepted on the basis of the general characters indicated without regard to minor discrepancies. This has been done acceptably in other cases and should be in this one.

Having in mind Molina's shortcomings, and wholly disregarding the confusion caused by Hamilton Smith, the case is greatly simplified. There are three spotted cats native to Chile: one of larger size, very rare, and apparently confined to limited areas in the highlands; the other two smaller, fairly common, and generally distributed in the most populous parts of the country. They differ in numerous details, but they have some characters in common and are subject to some variation in color and markings. Molina gave names to only two spotted cats, one of which he called *Felis guigna* and the other *Felis colocolo*. He describes them in a single paragraph in which they are contrasted with each other. An English translation is as follows: "The guigna (*felis guigna*) and the colocolo (*felis colocolo*) are two species of beautifully pelaged wild cats which inhabit the forest of Chile. They resemble the domestic cat, but are a little larger, the head and the tail a little larger. The guigna is of a fulvous color varied with rounded black spots four or five lines in diameter, extending to the end of the tail. The colocolo is white, irregularly spotted with black and yellowish. Its tail is annulated with black to the tip."

The general distinctions made here are those of the two common Chilean cats, *guigna*, with small rounded black spots, and *colocolo*, with irregular markings of black and yellowish. So far as they go, and especially from the contemporary standpoint, they furnish a sufficient distinction.[1] The indication that the animals were similar in size, somewhat larger than a house cat, may be significant, but everything else can be disregarded as due to the author's demonstrated unreliability. The white ground color and the annulated tail, under the broad interpretation necessary with Molina's descriptions, might apply to either of the common species as well as to the rare one (*jacobita*) which it is unlikely Molina had ever seen. If he had had any knowledge of it, he could scarcely have failed to men-

[1] In his summary catalogue concluding his volume (1782, p. 341) Molina omits reference to the annulated tail and gives Latin diagnoses of the two species indicating what he evidently considered their most important distinctions, as follows:

Felis *guigna* cauda elongata, corpore maculis omnibus orbiculatis.

Felis *colocolo* cauda elongata, corpore albo maculis irreg. atris, flavique.

tion its larger size.[1] It considerably exceeds both the common species and, as Cabrera has noted, it is several times larger than a house cat.

Molina's name *guigna* has always been accepted for one of the common cats of Chile and his *colocolo* would almost certainly have been used for the other except for the curse that was laid upon it by its early misuse by Hamilton Smith. Therefore, it seems logical now to ignore all the misunderstanding connected with this curse and to judge the case as if none of this had happened. This is essentially what was done by Wolffsohn (l.c.), whose knowledge of Chilean mammals was extensive and whose opinion is very important, but whose paper on the subject has not been widely consulted. He describes several specimens, illustrating one with a photograph (in which the tail shows at least five well-marked blackish rings or semi-rings), and discusses the habits and distribution of the form. He reports it as the most common species in central Chile, where he found it, especially in the vicinity of Valparaiso, Santiago, and Quillota. He expresses the opinion that it may extend southward as far as Concepcion, but no southern specimens have been recorded. He mentions two phases of color, one called "plomo" and the other "anarjado."

According to Wolffsohn and Philippi, the names *guina* or *huina* and *gato montes* are applied in some parts of Chile to one of the common cats and elsewhere to the other. That the name *colocolo* was in use for any cat by the natives of Molina's time is doubtful. The Araucanian name was *kudmu* or *kodkod*, which Wolffsohn believed was corrupted by the Spaniards to *colocolo*. Although not mentioned in the original edition of Molina's work, there is indication in the second Italian edition (1810, p. 245) that the name was connected with the proper name of the early Araucanian hero, Colocolo.[2] The spelling *colocola* of the first edition is changed in the second to *colocolo*, so a typographical error may be inferred. This is mentioned by Philippi (1870, p. 41, footnote), who says: "Colocola ist offenbar ein Druck odor vielmehr Schreibfehler, und ist nur sonderbar, dass man hört in Chile immer Colocolo und niemals Colocola." He also refers to the use of the name *colocolo* for the

[1] In his second edition (1810, p. 245) Molina plainly states that the *colocolo* is about the same size as *guigna* and that its markings are "come quello delle gato domestiche."

[2] "Il quale col suo nome rinuova la memoria del *Gran Colocolo* promotore e sostegno della liberta degli Araucani."

mouse opossum and the singing house mouse, which Wolffsohn thinks may have meant the *coruro* (*Spalacopus*).

*Specimens examined.*—Total 3: Limache, Valparaiso, 1 (skull only); Marquesa, Coquimbo, 1 (skin only); Province of Valparaiso, 1 (skull only).

**Felis guigna guigna** Molina. GUIÑA; GATO MONTES.

*felis guigna* Molina, Sagg. Stor. Nat. Chili, pp. 295, 341, 1782—forests of Chile; Poeppig, Froriep's Notizen, **25**, p. 7, 1829; Thomas, Ann. Mag. Nat. Hist., (7), **12**, p. 240, 1903—selected type locality Valdivia, Chile.

*Felis tigrillo* "Poeppig," Schinz, Syn. Mamm., **1**, p. 470, 1844—Chile.

*Felis guina* Philippi, Arch. Naturg., **36**, (1), pp. 41–43, 1870; **39**, (1), pp. 8–12, pl. 2, 1873.

*Herpailurus guigna* Pocock, Ann. Mag. Nat. Hist., (8), **20**, pp. 346–347, 1917.

*Noctifelis guigna* Allen, Bull. Amer. Mus. Nat. Hist., **41**, p. 361, 1919.

A medium-sized cat heavily spotted with rounded blackish spots on both upper and under parts; ground color buffy or brownish; slight tendency to streaking on head and shoulders; tail narrowly ringed with blackish. Head and body 390–450; tail 195–230; hind foot 89–96.

*Range.*—Forested region of south-central Chile from the Province of Cautin to the island of Chiloe and the Guaitecas.

Although fairly common in easily accessible parts of Chile, this cat was for many years very imperfectly known, and even at the present time well-preserved specimens are comparatively rare. After being named by Molina as early as 1782, only one reliable reference (Poeppig, l.c.) concerning it appeared, until a century later, in 1873, when Philippi described and figured specimens from Valdivia. He mentions its abundance and refers to the frequent occurrence of melanism. In 1919, in speaking of Philippi's account, Allen says: "So far as I am aware, no later report based on actual material has been published." However, in 1908 Wolffsohn and Porter (1908, p. 76) had recorded two specimens in the Valparaiso Museum, one from Valdivia and one from the Guaiteca Islands. Allen describes a series of eight specimens from Marquhue, Temuco, Cautin, and remarks that there is "considerable variation in color, some being much darker than others, possibly tending toward melanism."

As a species *F. guigna* is probably distinct, being characterized by small size, dark color, and almost wholly spotted pattern of markings; but it is obviously very closely related to *F. geoffroyi*, and Allen's recognition of the genus *Noctifelis* for its exclusive reception seems quite unjustified. The pattern of markings in *guigna*

is essentially as in *geoffroyi* except on the occiput and nape where dark lines are broken and indistinct in *guigna* but fully coalesced and well defined in *geoffroyi*. The feet in *guigna* are usually unspotted. The skulls are similar in all general characters. In the two specimens in Field Museum the small second upper premolar is absent as was the case in seven skulls examined by Allen. These

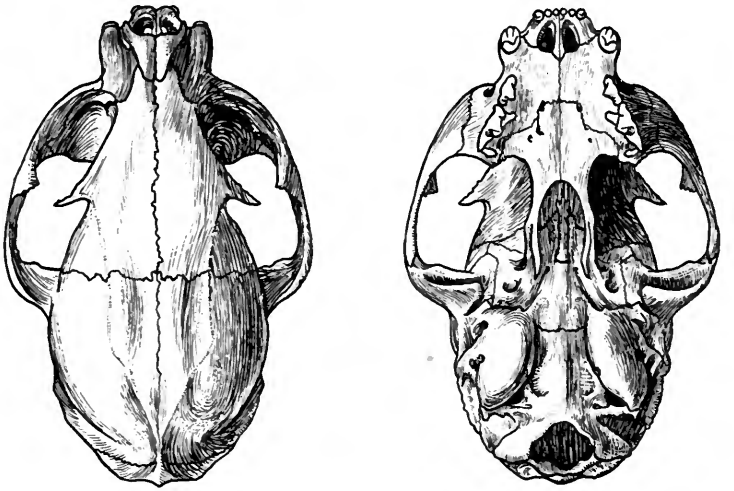


FIG. 6. *Felis guigna guigna*. F.M. No. 24359. × ¾.

two specimens are from Valdivia and Chiloe Island, one being wholly black and the other spotted.

*Specimens examined.*—Total 11: Cayetue, Lake Todos Santos, 9 (coll. K. Wolfhügel); mouth of Rio Inio, Chiloe Island, 1; Rinihue, Valdivia, 1.

**Felis guigna molinae** subsp. nov.

*Type* from vicinity of Valparaiso, Chile. No. 24369 Field Museum of Natural History. Collected (purchased in mounted condition) December, 1922, by Colin C. Sanborn. Orig. No. 585.

*Diagnosis.*—Decidedly larger than *F. g. guigna;* coloration probably averaging considerably paler.

*Color.*—Markings as in *F. g. guigna;* ground color in type specimen Cinnamon Buff to Clay Color; dark spots Snuff Brown to Mummy Brown; forehead without stripes; feet unspotted.

*Skull.*—Larger than in *F. g. guigna;* mesopterygoid fossa narrow and pointed in front; posterior lateral shelves of palate only slightly

emarginate; teeth much heavier than in *guigna*, equaling or slightly exceeding those of *salinarum* although considerably weaker than those of *geoffroyi;* anterior upper premolars absent in one specimen, present in another.

*Measurements.*—Paratype measured in flesh by J. A. Wolffsohn: total length 722; tail 229; hind foot 116. Skull of type and an adult male of *F. g. guigna* from Chiloe Island: greatest length 92.8, 84.6; zygomatic width 62, 53.6; least interorbital width 17.9, 15.8; postorbital constriction 27.9, 25; width of braincase 41.6, 38.1; upper toothrow, canine to molar 27.8, 24.8; length of last upper premolar 11.4, 9.3.

*Remarks.*—Only one skin and two skulls of this form are available, both from the vicinity of Valparaiso. The type was obtained by Sanborn by purchase, through the assistance of J. A. Wolffsohn. It was in mounted condition and had been in the hands of a private owner at Viña del Mar, a suburb of Valparaiso. After receipt at Field Museum it was dismounted and the skull previously included in the skin was found to be entire and in excellent condition. A second skull later received from Wolffsohn is slightly larger but otherwise agrees closely with that of the type. This second skull is from Hacienda Limache and its label carries the flesh measurements and the notation "Skull only. Skin spoilt. This specimen is the largest of the few I have measured."

Although the material is scanty and it is necessary to take as type a somewhat damaged specimen, the differentiation of this form seems so fully evident that its recognition need not be delayed. Doubtless it ranges throughout central Chile from Coquimbo to Concepcion in a region faunally different from that inhabited by typical *guigna.*

Apparently it is less common than *F. colocolo* and further specimens are much to be desired. Between its range and that of *F. geoffroyi salinarum* there is a very wide gap, including most of northeastern Chile from which no specimens are known. At least in some parts of this region it is probable that spotted cats will be found, but whether or not they will establish a connection between *molinae* and *salinarum* (i.e. *guigna* and *geoffroyi*) cannot be predicted at this time.

**Felis (Oreailurus) jacobita** Cornalia. ANDEAN HIGHLAND CAT.

*Felis jacobita* Cornalia, Mem. Soc. Ital. Sci. Nat., Milano, **1**, No. 1, pp. 3–7, one pl. unnumbered, 1865—mountains near Humachaca, near Chilean boundary, Argentina.

*Felis colocolo* Philippi, Anal. Univ. Chile, **33**, pl. 205, 1869; Arch. Naturg., **36**, p. 43, pl. 1, fig. 7, 1870; **39**, pp. 11–14, pl. 3, figs. 1–2 (skull), 1873; Burmeister, Descr. Phys. Repub. Argentina, **3**, p. 126, 1879.

*Oncifelis colocolo* Allen, Bull. Amer. Mus. Nat. Hist., **41**, p. 371, 1919.

*Oreailurus* [*jacobita*] Cabrera, Notas Mus. La Plata, **5**, Zool., No. 29, p. 16, 1940.

*Colocolo colocola* Pocock, Ann. Mag. Nat. Hist., (11), **7**, p. 272, 1941.

A spotted cat of larger size than *F. colocolo* and *F. guigna*, with long, soft and thick pelage; color pale gray spotted and transversely striped with blackish or brownish; under parts white; tail with about nine blackish or brownish rings and a light tip. Skull with audital bullae divided into two chambers indicated by a deep external sulcus. Head and body 600; tail 430; height 350 (ex Cornalia).[1]

*Range.*—High Andes of northeastern Chile, from the latitude of Santiago northward to southern Bolivia and northwestern Argentina.

This is the rarest of Chilean cats and, so far as known, only five (or possibly six) specimens are existing. These are the type, which may be still in Milan or elsewhere in Italy; the specimen described by Philippi in 1870 and 1873 from Infernillo, Hacienda de la Dehesa, cordillera of Santiago;[2] and three trade skins in the British Museum, described by Pocock, two without locality, received from the wholesale furrier Ernest Poland, and the third labeled "Bolivia" and presented by Rowland Ward. Of these last Pocock says: "In general coloration and coat, these specimens are reminiscent of the Snow Leopard (*Uncia*), suggesting rocky hills, not jungle or forest, as their habitat. The coat is very full and soft, about 40 mm. long on the back and 35 mm. on the uniformly bushy tail." A possible sixth specimen is one in the Argentine Museo Nacional, recorded by Yepes (1929) from Sarso, western Aconquija, Tucuman, Argentina.

The only skull so far known is the one described and figured by Philippi from his menagerie specimen. Cornalia's description does not mention a skull and it seems probable there was none. The very peculiar double-chambered audital bulla, shown in Philippi's figure, combined with the external peculiarities of the animal, indicates a high degree of differentiation doubtless warranting the generic or

[1] No measurements are available except those of the original describer. In the supposed race called *neumeyeri* by Matschie, the body length is given as 850 and the tail 410. Pocock's reference of *neumeyeri* to his "*colocola*," without examination of the type, is open to question, since its locality is very distant and climatically very different.

[2] This specimen is doubtless one which is now mounted and on exhibition in the Museo Nacional in Santiago where I saw it last in 1939. Time did not permit its removal from the case for careful examination, but its general agreement with Cornalia's figure was evident. It carries the number 131 and the locality "Los Andes, Prov. Santiago." I was not then aware of the importance of the skull and regret very much that no search was made for it.

subgeneric separation advocated by Cabrera and Pocock. The range of the species is one characterized by a high degree of endemism. It corresponds roughly to that of the chinchilla and various other markedly distinct types.

*Specimens examined.*—Cordillera of Santiago, 1 (Mus. Nac. Chile).

**Lutra provocax** Thomas. LARGE RIVER OTTER; HUILLIN.

*Lutra huidobrius* of some authors, not *Castor huidobrius* of Molina, which is unidentifiable.

*Lutra paranensis* Thomas, Proc. Zool. Soc. Lond., p. 198, footnote, 1889.

*Lutra provocax* Thomas, Ann. Mag. Nat. Hist., (8), 1, p. 391, 1908—south of Lake Nahuelhuapi, Argentina.

A good-sized otter with the upper parts rich, dark brown and the under parts silvery whitish in considerable contrast. Total length 1,010 (male), 920 (female); tail 400 (male), 350 (female); hind foot 125 (male), 108 (female).

*Range.*—Rivers and estuaries of central and southern Chile, at least from the Rio Cachapoal (Province of Colchagua) in the north to the Straits of Magellan in the south; extending through the Andes to western Argentina at least in the Nahuelhuapi region.

The large river otter of southern Chile, known as the *huillin*, was found to be fairly common in the lower reaches of the Rio Inio near the south end of Chiloe Island. Several were seen and one adult male was shot by Sanborn as it swam near the boat in which we were rowing a few miles above the mouth of the river. Measurements of this specimen are: total length 1,010; tail 400; hind foot 125; circumference of neck 320; circumference of chest 390. An adult female brought to us later by natives was also preserved.

Thomas records this species from Temuco and from the Straits of Magellan. Wolffsohn (1921) also records it from Temuco, and Wolffsohn and Porter (1908) mention two specimens from Valdivia. E. C. Reed (1877) states that an otter of this species was seen at the mouth of the Rio Cauquenes at its junction with the Cachapoal and he expresses his belief that this river is the northern limit of the animal's range in Chile.

Molina's name *Castor huidobrius* has sometimes been used for this species, but Molina's account is so obviously composite and contradictory that it cannot be accepted for any known animal. The native name *guillino*, which he uses in connection with it, indicates only that reports of this otter were probably among those entering into his confused description. In the second edition of

Molina's work are some additional statements to which Fontecilla (1929) has called attention, with the implication that they are corrections sufficient to establish the name for an otter. Careful reading of them, however, seems to indicate as much confusion as the original description. Molina says, in effect, that the supposed species was placed in the genus *Castor* because its dentition resembled that of the beaver, and he adds that the beaver differs in not eating fish.

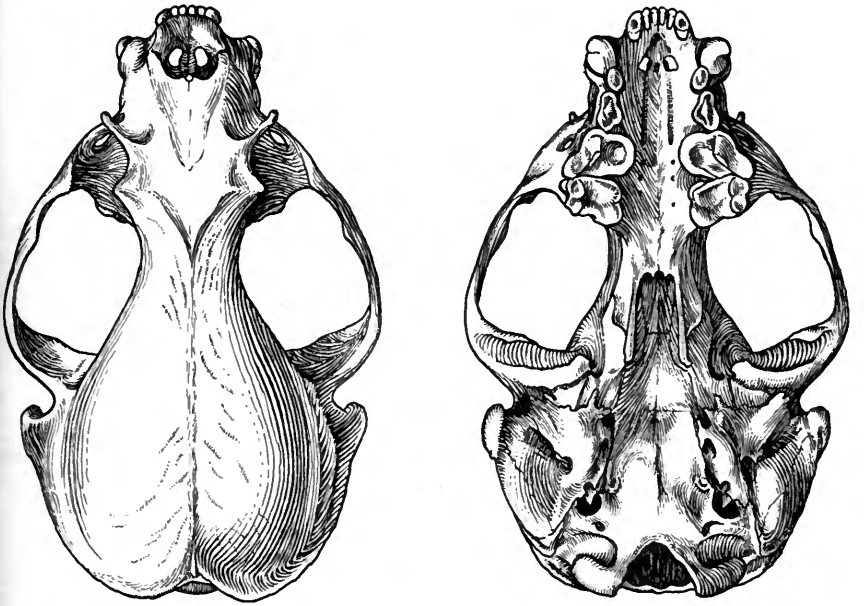


FIG. 7. *Lutra provocax*. F.M. No. 24224. × ⅔.

The technical name *Castor huidobrius*, which appeared in the first edition, is omitted in the second, as well as reference to Molina's friend and patron Don Garcia Huidobro, whom he had desired to honor. This is significant of Molina's own doubt in the matter and is plain indication of his intention to suppress the name. He refers to the opinion of Sonnini that the animal might be an otter and he states he would not object to this although he continues to insist that its dentition would indicate a different genus. In other words, he continues to confuse hearsay accounts in which otter and coypu are inextricably combined. On the whole, therefore, I have no hesitation in agreeing to the conclusion of Thomas, who says: "I am not prepared to recognize as an otter a species described as having long rodent incisors and unpalmated forefeet, and think that in view of

the insoluble mixture of local names, habits, and characters contained in Molina's description, the name *Castor huidobrius* should be set aside as indeterminable." (Proc. U. S. Nat. Mus., **58**, p. 225, 1920.)

Lesson's *Guillinomys chilensis* (Nouv. Tabl. Regne Anim., Mamm., p. 126, 1842) is merely a renaming of the unidentifiable *Castor huidobrius* and, moreover, it is antedated by *Mustela chilensis* Kerr 1792.

*Specimens examined.*—Total 5: Lake Todos Santos, Llanquihue, 3 (coll. K. Wolfhügel); mouth of Rio Inio, Chiloe Island, 2.

**Lutra felina** Molina. MARINE OTTER; CHUNGUNGO.

*mustela felina* Molina, Sagg. Stor. Nat. Chili, pp. 284, 342, 1782—Chile.

*Mustela (Lutra) chilensis* Kerr, Anim. Kingd., Mamm., p. 172, 1792—coasts of Chile.

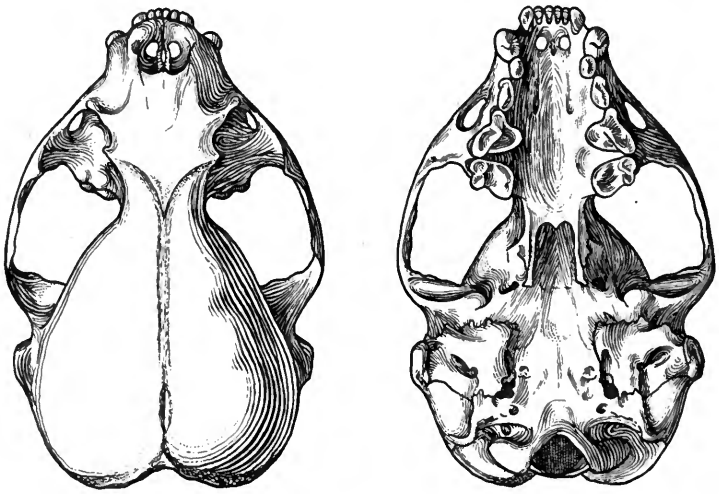


FIG. 8. *Lutra felina.* F.M. No. 24226. × ⅔.

*Lutra chilensis* Bennett, Proc. Zool. Soc. Lond., pp. 1–2, 1832—Chile.

*Lutra californica* Gray, Mag. Nat. Hist. (Charlesworth), **1**, p. 580, 1837—said to be from California; probably from Chile.

*Lutra brachydactyla* Wagner, Suppl. Schreber's Säugeth., **2**, p. 261, footnote, 1841—"West Amerika."

A small otter of nearly uniform coloration, the under parts scarcely or not at all paler than the upper parts. Total length 910; tail 340; hind foot with claw 97.

*Range.*—Entire coast of Chile south to Tierra del Fuego, practically to Cape Horn; northward to the coast of northern Peru.

This is the small brown otter which the Chileans call *chungungo* or *gato del mar*. It appears to be mainly marine or littoral in habits and, although it lives side by side with the larger species, it is less fluviatile. It is especially abundant among the numerous islands from Chiloe southward. Two specimens from the arid coast of northern Chile at Caldera are only slightly paler on the under parts than others from the southern islands and the distinction of a northern form is doubtful. Should such a form prove demonstrable, it might take the name *peruviensis* (Gervais, Zool. Voy. Bonite, **1**, Mamm., pp. 15–17, pl. 3, 1841) based on material from San Lorenzo Island, near Callao, Peru.

During the voyage of the *Beagle*, Darwin found this otter abundant, especially in the Chonos Archipelago and among the islands off the southwestern shores of Tierra del Fuego. Since his time it has been greatly diminished in numbers, but doubtless remains in a fairly secure retreat on the long uninhabited coast between Chiloe and the Straits of Magellan. In 1923, Field Museum's expedition found it rather common about the southern end of Chiloe Island. An adult male taken there had a weight of nine pounds.

*Specimens examined.*—Total 8: Ayentema, Chiloe Island, 1; Caldera, Atacama, 2; Cucao, Chiloe Island, 2; Guaiteca Islands, 1; Papudo, Aconcagua, 1 (skull only); Rio Aconcagua, Valparaiso, 1 (skin only).

**Grison (Grisonella) cuja** Molina. QUIQUE.

*mustela Cuja* Molina, Sagg. Stor. Nat. Chili, pp. 291–292, 342, 1782; ed. 2, p. 242, 1810—Chile, more in the south than in the north.

*mustela Quiqui* Molina, supra cit., pp. 292, 342; ed. 2, p. 242, 1810—southern provinces of Chile.

*Galictis vittata* var. *Chilensis* Nehring, Zool. Jahrb., Syst., **1**, p. 190, 1886—Chile.

*Grison (Grisonella) cuja* Thomas, Ann. Mag. Nat. Hist., (8), **10**, p. 46, 1912—specimens from Temuco, Chile, regarded as typical.

(?)*Grison furax melinus* Thomas, supra cit., p. 47, 1912—Quillota, Valparaiso, Chile.

*Grisonella melina* Thomas, supra cit., (9), **8**, p. 213, 1921.

A short-tailed, loosely pelaged, ferret-like musteline with the upper parts yellowish buff or grayish mixed with black; under parts, feet, legs, and nose black. Total length 550–650; tail 150–200; hind foot 50–60.

*Range.*—Central Chile from the Province of Coquimbo to the Province of Valdivia.

The small *kiki* or *cuja* is generally distributed in central Chile but is nowhere common. That there is more than one Chilean species is very doubtful. Thomas has restricted the name *cuja* to three specimens of unusually small size from Temuco and proposed the new name *melinus* for specimens from the vicinity of Valparaiso. Material in Field Museum is not sufficient to be wholly conclusive, but, so far as it goes, it supports the inference that this division is

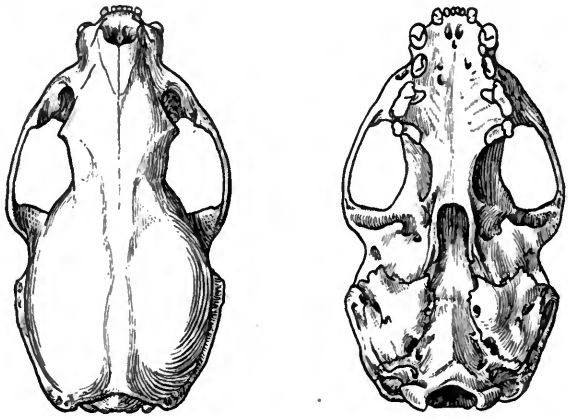


FIG. 9. *Grison cuja*. F.M. No. 23441. × ¾.

questionable. Specimens from Papudo, although apparently quite adult, are not so large as the type and other examples of *melinus* examined by Thomas. On the other hand, a skin from Rinihue, Valdivia, in the region assigned to *cuja*, appears not to differ in color or size from more northern specimens. Unfortunately it has no skull and no flesh measurements, but it is difficult to believe that it represents a species different from that of more northern localities. Variation in size and color is considerable in the small series examined. Two immature specimens are much more heavily buff-colored than adults, and their tails are very short and light-colored.

Comparison of Chilean specimens with others from Argentina (*huronax*) shows scarcely any difference in color or size, and it is unlikely that more than subspecific distinction is justified. It seems probable, therefore, that the subgenus *Grisonella* contains but one species for which the earliest name is Molina's *cuja*. The names *furax* (Minas, Brazil), *huronax* (Mar del Plata, Argentina), *ratellinus* (San Juan, Argentina), *shiptoni* (Concepcion, Tucuman, Argentina), and *luteolus* (Chulumani, Bolivia) are in most cases

based on very scanty material and the characters assigned to them are of a kind to indicate, at the most, differences of subspecific importance.

While *G. cuja* reaches the northern part of the forested Valdivian region, it does not penetrate very far and its main range seems to be in the well-defined area between Coquimbo and Concepcion in which faunal conditions are fairly uniform.

Probably it crosses the Andes through the passes of the lake region to meet eastern forms. In fact, Thomas has referred specimens "from Tucuman to Chubut" to his *melinus*, thus giving that subspecies an interrupted range in which his *cuja* would stand between *melinus* of Valparaiso and others regarded as the same from east of the Andes.

Writing in 1846, Thomas Bridges states that "the native hunters of this little animal [the chinchilla] domesticate the Quique of Molina which they term here Huron, the Spanish for ferret; the Huron enters the crevices and holes made by the Chinchilla, and drives them out, when they are either killed with sticks by the hunters or taken by the dogs trained for that purpose."

*Specimens examined.*—Total 16: Lake Todos Santos, 4 (coll. K. Wolfhügel); Paiguano, Coquimbo, 2; Papudo, Aconcagua, 6 (2 skins with skulls, 4 skulls without skins); Rinihue, Valdivia, 1 (skin only); Santiago, 2 (skins only); "southern" Chile, 1 (skin only).

**Lyncodon patagonica** Blainville. HURONCITO.

*Mustela patagonica* Blainville, Osteog. Mamm. Rec. Foss., Atlas, **2**, fasc. 10, pl. 12 (*Mustela*); text, **2**, fasc. 4, p. 42 (Putois du Chili), p. 81 (Putois du Paraguay), 1842—Rio Negro, Argentina ("rapporte de l'Amerique du Sud par M. d'Orbigny").

*Mustela* (*Lyncodon*) *patagonica* Gervais, Dict. Univ. d'Hist. Nat., **4**, p. 685, 1844.

*Lyncodon patagonica* Burmeister, Descr. Phys. Repub. Argentina, **3**, pp. 160–162, 1879.

A small slender-bodied musteline externally somewhat similar to *Grison*, but with the top of the head creamy or white, which extends as a broad stripe to the shoulders; dentition reduced to 28 teeth; length of head and body about 350; tail 70–90; hind foot 35.

*Range.*—Known from scattered localities mainly in western Argentina from the Province of Rioja to the Province of Santa Cruz; intrusive in Chile along the southern Argentine border.

Two specimens of this very rare carnivore are recorded by Wolffsohn (1921, p. 515) from Puerto Prat, Last Hope Inlet. Although

this locality is actually on the coast of Chile the climate there is relatively dry and conditions closely approximate those of the pampas to the eastward; so it is not strange that a wide-ranging pampas animal should be found there. The specimens, which were probably collected by Wolffsohn himself, are said to be preserved in the Seminario de San Rafael, Avenida de las Delicias, Valparaiso.

**Conepatus chinga chinga** Molina. CHILEAN SKUNK; CHINGUE.

*viverra chinga* Molina, Sagg. Stor. Nat. Chili, pp. 288–291, 342, 1782—Chile.

*Viverra chilensis* Link, Beytr. Nat., 1, p. 85, 1795—Chile.

*Mephitis chilensis* Geoffroy, Cat. Mamm. Mus. Paris, pp. 109–110, 1803.

*Mephitis dimidiata* G. Fischer, Zoogn., 3, pp. 203–204, 1814—Chile.

*Mephitis (Thiosmus) molinae* Lichtenstein, Abhandl. Akad. Wiss., Berlin, p. 272, (1836), 1838—Chile.

*Mephitis furcata* Wagner, Suppl. Schreber's Säugeth., 2, pp. 192–193, 1841—*M. chilensis* of Lichtenstein renamed.

A black and white skunk with the terminal half of the tail with hairs wholly white to the roots; dorsal white stripes narrow but continuous from the occiput to the base of the tail.

*Range.*—Central Chile probably from Coquimbo to Concepcion, mainly in the coast region.

Although Molina's description mentions white spots instead of stripes, his general account applies wholly to the skunk and there is no good reason for not accepting the name *chinga*. No exact locality has been assigned to it, but central Chile in the vicinity of Valparaiso is the logical choice. It appears to be not very common, and prepared specimens are scarce. Thomas has a passing reference (Proc. U. S. Nat. Mus., **58**, p. 224, 1920) doubtless based on specimens and to the effect that *C. chinga* has the white stripes reaching fully to the base of the tail. This is confirmed by the only specimen in Field Museum, in which the terminal half of the tail is wholly white to the roots of the hairs.

*Specimen examined.*—Concepcion, 1 (skin only).

**Conepatus chinga mendosus** Thomas.

*Conepatus suffocans mendosus* Thomas, Ann. Mag. Nat. Hist., (9), 8, p. 222, 1921—Tupungato, Mendoza, Argentina.

*Conepatus suffocans enuchus* Thomas, supra cit., (9), 19, p. 651, 1927—San Martin de los Andes, Neuquen, Argentina.

Similar to *C. chinga*, but with the white stripes on the back usually interrupted; tail with terminal white reduced to one-fourth or less.

*Range.*—Western Argentina from the Province of Mendoza southward to Neuquen and thence into Chile at least locally.

Two specimens taken by Sanborn at Rinihue, Valdivia, appear to furnish the expected connection between *C. chinga* and various forms which have been associated with *C. suffocans*. Their characters closely approximate those described for *C. s. enuchus*, from which they are not far removed geographically. This last, therefore, is interpreted as intermediate between *chinga* and *mendosus*. The Chilean skins have the white stripes extending only halfway down the back but reappearing as two white areas on either side of the base of the tail, reaching in one case for a few inches on the rump. The ends of the tails are wholly whitish but not so extensively as in *chinga*, although perhaps more so than in *enuchus* and clearly much more so than in typical *mendosus*. Especially in this character of the relative amount of white on the tail there is gradation from *chinga* to *mendosus*. There is no apparent difference in size, but *mendosus*, *enuchus*, and the specimens from Rinihue are collectively distinguishable from *chinga* by the reduction of the white dorsal stripes. Therefore, until specimens come in to indicate more clearly where lines should be drawn, it seems best to throw *mendosus* and *enuchus* together and link *suffocans* with *chinga* as a subspecies.

*Specimens examined.*—Total 4: Cayetue, Lake Todos Santos, 2 (coll. K. Wolfhügel); Rinihue, Valdivia, 2.

**Conepatus humboldti** Gray. PATAGONIAN SKUNK.

*Conepatus humboldtii* Gray, Mag. Nat. Hist. (Charlesworth), **1**, p. 581, 1837—Straits of Magellan; Milne-Edwards, Miss. Sci. Cap Horn, **6**, Zool., Mamm., pp. 6–14, pl. 1 (col.), 1890; Allen, Mamm. Patagonia, pp. 144–147, pl. 22, figs. 1–1*d*, 2–2*d*, (skulls), 1905.

*Mephitis (Thiosmus) patagonica* Lichtenstein, Abhandl. Akad. Wiss., Berlin, p. 275, (1836), 1838—Straits of Magellan.

A skunk of medium size and rather soft silky pelage; color blackish brown, cinnamon brown, or even partly ochraceous buff, usually with two narrow white stripes united on the head but well separated on the back and passing to the proximal part of the tail; tail with hairs of two lengths, very long ones wholly white, and shorter ones broadly white at base and blackish or brownish terminally. Total length 500–540; tail 150–180; hind foot 55–60.

*Range.*—Southwestern Argentina and adjacent parts of Chile from the Straits of Magellan northward to Chubut and western Rio Negro.

This is the common skunk of southern Patagonia, still fairly numerous, and confined mainly to open, unforested regions. Dealers in raw furs in Punta Arenas report handling some 15,000 skunk skins

in the season of 1939. The species does not extend to Tierra del Fuego and its connections in the north have not been worked out. Allen (l.c.) mentions specimens from Santa Cruz, Rio Gallegos, "Basalt Canyons" southeast of Lake Buenos Aires, and Swan Lake. Thomas (Ann. Mag. Nat. Hist., (10), **4**, p. 38, 1929) records others from Alta Vista (Lake Argentino), La Concepcion, Chubut, and Pico Salamanca, Chubut. Two adults and two young taken within Chilean boundaries at Rio Nirehuao are in Field Museum as well

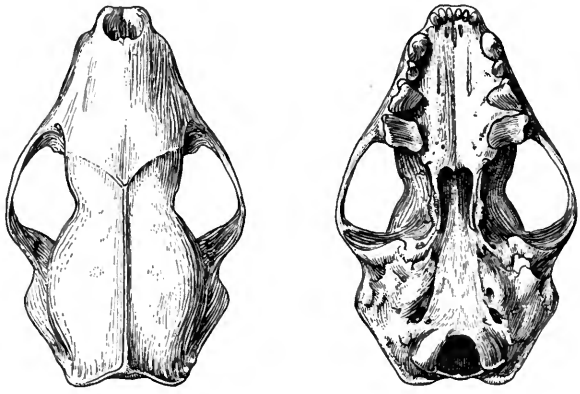


FIG. 10. *Conepatus humboldti*. F.M. No. 34193. × ¾.

as a similar specimen from Huanuluan, Rio Negro, Argentina. These northern specimens have the dentition slightly weaker than typical, but material is not at hand to indicate whether or not this is a tendency toward distinguishable northern forms.

Present material is insufficient to establish connection between *humboldti* and *chinga*, and perhaps there is none. In our northern specimens, however, one has the white joined on the head and the other has it narrowly divided, thus differing in the character which Thomas (Ann. Mag. Nat. Hist., (9), **19**, p. 651, 1927) has especially mentioned as distinguishing *humboldti* from *suffocans*.

Four trade skins purchased in Punta Arenas are quite constant as to markings but somewhat variable in color. Three have the ground color dark Bone Brown and the fourth is much lighter, the median under parts and head light Bone Brown, the sides Natal Brown and the mid-dorsum bright Ochraceous Buff. An imperfect trade skin from "Chubut" is almost without white, only a few traces showing on the shoulders.

*Specimens examined.*—Total 12: ARGENTINA: "Chubut," 1 (skin only); Huanuluan, Rio Negro, 1. CHILE: Punta Arenas, 6 (4 skins, 2 skulls); Rio Nirehuao, 4.

**Conepatus rex** Thomas. ANDEAN HIGHLAND SKUNK.

*Conepatus rex* Thomas, Ann. Mag. Nat. Hist., (7), **1**, p. 278, 1898—Tambo Esperanza, near Mount Sajama, Bolivia.

*Conepatus arequipae* Thomas, supra cit., (7), **6**, p. 466, 1900—Sumbay, Arequipa, Peru; Proc. U. S. Nat. Mus., **58**, pp. 224–225, 1920.

*Conepatus chorensis* Thomas, supra cit., (7), **9**, p. 126, 1902—Choro, paramos northwest of Cochabamba, Bolivia.

*Conepatus porcinus* Thomas, supra cit., (7), **9**, p. 128, 1902—Cochabamba, Bolivia.

*Conepatus huntii* Thomas, supra cit., (7), **12**, p. 461, 1903—Caylloma, "on the Sumbay road," Arequipa, Peru.

A large heavily pelaged, glossy black skunk, with very broad variable white areas on the back. The white may form two broad stripes joined only in front on the head or may extend as a broad area across the neck and shoulders diverging into diminishing stripes posteriorly and frequently enclosing one or more black spots or short stripes on the neck. Usually the white extends only to the middle of the back, but occasionally it continues as weak stripes to the base of the tail. Tail black at base but with numerous thinly scattered white hairs on terminal half. Total length 638 (580–720); tail vertebrae 219 (195–265); hind foot with claws 75 (73–82).

*Range.*—Elevated and semi-arid regions of northern Chile, southern Peru, and adjacent parts of Bolivia and Argentina.

That the highland Andean skunk enters Chile is attested by two skins without skulls purchased at Arica, Province of Tacna, by Mr. Sanborn. They were said to be from the highlands of Tacna in a region of about the same latitude as the type locality of *C. rex* and less than one hundred miles west. These skins, together with a very fine series recently obtained by Field Museum from southern Peru, furnish fairly conclusive evidence that various names proposed for skunks from Peru and Bolivia should be assigned to *C. rex*. There is no geographic reason for finding more than one skunk in the region and present evidence fails to demonstrate that there is more than one. Variation in series from several localities covers all the supposed distinctions. Thomas himself (l.c. 1920) has discredited *chorensis* and *porcinus*, placing them as probable synonyms of *arequipae*. A topotype of *arequipae* and several others from nearby localities are indistinguishable from *rex*. To these there may now be added *hunti*, of which three topotypes are in hand showing three different types of markings. One of the Tacna specimens and various others duplicate the character supposed to define *hunti*, that

is, the complete enclosure of a short black stripe on the shoulders between the broad white stripes. *C. ajax* of Jujuy, Argentina, also belongs in this series and may be recognizable on the basis of average characters, but its description offers nothing by which to distinguish it. A few other names, which it is not practical to consider, may apply to the same group.

*Specimens examined.*—Total 17: CHILE: Province of Tacna, 2 (skins only). PERU: Cailloma, Arequipa, 3; Hacienda Collacachi, Puno, 8; Huacallani, Puno, 1; Salinas, Arequipa, 2; Sumbay, Arequipa, 1.

### **Leptonychotes weddelli** Lesson.

*Otaria weddellii* Lesson, Ferussac's Bull. Sci. Nat., Geol., 7, pp. 437–438, 1826—South Orkney Islands, southeast of Cape Horn; based on "le . leopard de mer" of Weddell.

*Leptonychotes weddellii* Allen, N. Amer. Pinnipeds, p. 467, 1880.

A large phocid seal without external ears and with hind limbs incapable of being turned forward. Coloration spotted and marbled yellowish white and bluish gray. Total length about eight feet (= 2,300 mm.).

According to Albert (1902) a specimen of this mainly Antarctic seal was taken at Juan Fernandez Island in 1865 and Reiche (1905), in his extensive general account of the island of Mocha, states that the species is occasionally reported there. These records are not substantiated by any others and it must be concluded that at best the occurrence of the species in these waters is rare or exceptional.

### **Hydrurga leptonyx** Blainville.

*Phoca leptonyx* Blainville, Journ. Phys., **91**, pp. 287, 288, 1820—Falkland Islands.

The leopard seal is given by Gay (1847, p. 79) as a Chilean species but no actual records of its occurrence are mentioned.

Although frequently reported from the Falkland Islands, it does not reach the continental coast and otherwise is confined to the Antarctic. A specimen is said to have been brought from the vicinity of Cape Horn by the French Antarctic Expedition of 1837–40.

### **Mirounga leonina** Linnaeus. ELEPHANT SEAL.

*Phoca leonina* Linnaeus, Syst. Nat., ed. 10, p. 37, 1758—based on the "Sea Lyon" of Anson from Juan Fernandez Island.

*Phoca elephantina* Molina, Sagg. Stor. Nat. Chili, pp. 280–282, 341, 1782—new name for *Phoca leonina* Linnaeus 1758, regarded as inappropriate.

*Phoca ansoni* Desmarest, Mamm., **1**, pp. 239–240, pl. 109, fig. 2, 1820—Juan Fernandez Island.

*Macrorhinus leoninus* Allen, N. Amer. Pinnipeds, p. 466, 1880.

*Mirounga leonina* Allen, Mamm. Patagonia, p. 95, 1905.

Largest of the earless or phocid seals, adult males reaching a length of nearly twenty feet (six meters ±). Snout with a short inflatable proboscis. Color plain.

The elephant seal, once common about the Juan Fernandez Islands and southward to the Cape Horn Islands and the Falklands seems wholly extirpated on the Chilean coast. After verging on extinction, the species is now somewhat rehabilitated on the island of South Georgia (see Matthews, 1929, and Kellogg, 1942) and stragglers are reported northward on the Argentine coast, but no recent reports have been received of occurrences in Chilean waters.

**Otaria flavescens** Shaw.[1] SOUTHERN SEA LION; LOBO DEL MAR.

*Lion marins* Pernetty, Voy. Iles Malouines, **2**, p. 447, pl. 8, 1769—Falkland Islands.

*Phoca jubata* Schreber, Säugeth., **3**, p. 300, pl. 73 (ex Pernetty), 1776—in part only; based on mixed references to both southern and northern forms; later restricted to the northern sea lion.

*Phoca jubata* of Erxleben 1777 and many authors.

*Phoca leonina* Molina, Sagg. Stor. Nat. Chili, p. 282, 1782—coast of Chile; preoccupied by *Phoca leonina* Linnaeus 1758 (=*Mirounga leonina*).

*Phoca scont* Boddaert, Elenchus Anim., **1**, p. 172, 1784—in part only; based on references to Erxleben, Buffon, Pennant and Pernetty, all except the last having a mixed basis; hence essentially a renaming of *P. jubata* and here restricted to the northern sea lion as a synonym of *jubata*.

*Eared Seal* Pennant, Hist. Quad., **2**, p. 278, No. 481, 1793—Straits of Magellan; based on a specimen in the Leverian Museum, apparently the one figured with a condor by Shaw in 1792 (Mus. Leverianum, pl. opp. p. 4).

*Phoca flavescens* Shaw, Gen. Zool., **1**, pt. 2, pp. 260–261, 1800—based on Pennant.

*Phoca aurita* Bechstein, Allgem. Uebers. Vierf. Thiere, **2**, p. 590, 1800—based on Pennant.

*Otaria leonina* Peron, Voy. Terr. Austr., **2**, pp. 40, 55, 1816—Falkland Islands; antedated by *Phoca leonina* Molina 1782, which is preoccupied by *Phoca leonina* Linnaeus 1758 (=*Mirounga*). First definite recognition of the distinction of the northern and southern sea lions, the name *leonina* being applied to the southern one and *jubata* assigned to the northern.

*P[hoca] byronia* Blainville, Journ. Phys., **91**, p. 287, pp. 300 (named), 419, 1820—based on a skull now in the British Museum erroneously stated to

[1] Besides those mentioned below, other names proposed for this species are: *Otaria godeffroyi* Peters, *Otaria guerin* Quoy and Gaimard, *Otaria minor* Gray, *Otaria molossina* Lesson and Garnot, *Otaria pernettyi* Lesson, *Otaria pygmaea* Gray, *Otaria ulloae* Tschudi, and *Platyrhynchus uraniae* Lesson.

be from the island of Tinian, one of the Ladrones where the species does not occur.

*Otaria chilensis* Müller, Arch. Naturg., 7, (1), pp. 333–334, 1841—Chile.

*Otaria jubata* Allen, N. Amer. Pinnipeds, p. 208, 1880.

*Otaria velutina* Philippi, Anal. Mus. Nac. Chile, (1), Zool., pp. 14–17, 1892—coast of Province of Atacama, Chile.

*Otaria fulva* Philippi, supra cit., pp. 17–22, pls. 2–5, 1892—Algarrobo, Province of Valparaiso, Chile.

*Otaria rufa* Philippi, supra cit., pp. 28–29, pl. 13, 1892—no locality; probably from Chile.

*Otaria chonotica* Philippi, supra cit., p. 49, 1892—Chonos Archipelago, Chile.

*Otaria byronia* Allen, Bull. Amer. Mus. Nat. Hist., **16**, p. 114, 1902; Mamm. Patagonia, p. 113, pls. 20–21, 1905—adopted for the southern sea lion on the basis of the restriction of *jubata* to the northern one by Peron in 1816.

*Otaria flavescens* Cabrera, Notas Mus. La Plata, **5**, Zool., No. 29, pp. 17–22, 1940—chosen in preference to *aurita* Bechstein because better known in literature;[1] Cabrera and Yepes, Mam. Sud. Amer. Hist. Nat. Ediar, pp. 177–180, pl. 33, 1940.

A large marine mammal with small external ears and coarse pelage without under fur. Skull large and heavy with a broad deeply excavated palate extending far back nearly to pterygoid bones.

*Range.*—Atlantic and Pacific coasts of South America from the Galapagos Islands southward along the entire Chilean coast to Tierra del Fuego and the Falkland Islands; thence northward in widely scattered colonies to the coast of Uruguay.

The southern sea lion has maintained itself better than the other pinnipeds of the Chilean coast and in fact appears to be the only one now remaining there. Its colonies, however, are small and widely scattered. During Field Museum's expedition in 1939–40, occasional animals were seen swimming in the channels between Puerto Montt and Punta Arenas—not more than a dozen altogether. A small colony of less than one hundred was observed at Cape Penas on the north shore of Tierra del Fuego and reports were received of a somewhat larger one on the Brunswick Peninsula on the north side of the Straits of Magellan.

[1] Dr. Remington Kellogg has called my attention to *Phoca flavescens* Retzius (Faunae Suecicae, Pars prima sistens Mammalia, etc., Lipsiae, p. 9, 1800), applying, at least in part, to the gray seal (*Halichoerus*), a name which has rarely been quoted. Since it is of even date with *flavescens* of Shaw and *aurita* of Bechstein, it is subject to action by a first reviser. It was not considered by Cabrera, who made his choice only between *flavescens* of Shaw and *aurita* of Bechstein. Although it is doubtful if further action is necessary it may now be stated that *flavescens* of Shaw is preferred to *flavescens* of Retzius for the same reasons that caused it to be adopted by Cabrera. Therefore, unless or until one of the three names can be shown to have actual priority, *flavescens* of Shaw may be used and the other two have a status essentially the same as they would have if antedated.

Apparently the largest colonies now remaining are those of the Falkland Islands, where killing has been regulated under a license system. According to Hamilton (Discovery Reports, **7**, pp. 313–314, 1934) a take of 4,563 was reported in 1930. The same author states that "the sea-lion herd in the Falklands is very large; it is not outside the bounds of possibility that it may exceed 100,000 head." Considerable numbers also remain on islands off the coast of Peru and the Galapagos Islands. Recent reports from Juan Fernandez and other islands off the coast of Chile are lacking.

Kellogg (1942, pp. 454–455), reviewing the former abundance of this animal, quotes Balch to the effect "that at least 52,000 sea lion skins were taken in 1821–22 by the shore crews of the American brigs *Alabama* and *Frederick* on the islands of Mocha and St. Mary's off the coast of Chile."

Cabrera's contention that *flavescens* of Shaw is the proper name for this species seems well founded. Although this name was discarded by Allen as "not determinable," he was obliged to admit that it "probably=*O. jubata*" (North American Pinnipeds, p. 194, 1880), and "from its size, color, and habitat it is presumably referable to *Otaria jubata*." (p. 215.) Later (Mammals of Southern Patagonia, pp. 111–112, 1905), while insisting that it is "indeterminable from the description," he found it necessary to add: "But the locality, if correctly indicated, leads to the inference that it was more likely a sea lion than a fur seal; and this being the case, it may be hypothetically referred to the genus *Otaria*, to which it has been provisionally assigned by the majority of writers for the last fifty years."

As shown by Cabrera, it was not even indeterminable from the description, for the color is quite sufficient to indicate to which of the two eared seals of the Straits of Magellan it applies. It was based on a preserved specimen and, although the description is lacking in details, it contains no contradictory matter.[1]

**Arctocephalus australis** Zimmermann. SOUTHERN FUR SEAL; LOBO DE DOS PELOS.

*Falkland Isle Seal* Pennant, Hist. Quad., **2**, p. 521, 1781.

*Phoca australis* Zimmermann, Geog. Gesch., **3**, p. 276, 1782—based on Pennant.

[1] What constitutes an indeterminable description is left by codes of nomenclature to individual opinion. Purely as a "reviser," Allen had no power to reject a name of this kind and the opinions of subsequent authors are entitled to full consideration.

(?)*Phoca lupina* Molina, Sagg. Stor. Nat. Chili, pp. 275–279, 341, 1782—coast and islands of Chile; Juan Fernandez Island here selected.

(?)*Phoca porcina* Molina, supra cit., p. 279, 1782—based on a young animal not positively identifiable.

(?)*Otaria* (*Arctophoca*) *philippii* Peters, Monatsber. Akad. Wiss., Berlin, p. 276, pl. 2, A.B.C., 1865—Juan Fernandez Island, Chile.

(?)*Arctocephalus philippii* Peters, supra cit., pp. 393–399, 1875; pp. 505–507, 1877; Allen, Mamm. Patagonia, p. 131, pl. 16, fig. 1, pl. 17, fig. 1, 1905.

(?)*Otaria* (*Arctophoca*) *argentata* Philippi in Peters, Monatsber. Akad. Wiss., Berlin, p. 560, pls. 1–2, 1871—Juan Fernandez Island, Chile.

(?)*Otaria philippii* Philippi, Anal. Mus. Nac. Chile, 1, Zool., pp. 6, 33, pls. 14–19, 1892.

(?)*Otaria brachydactyla* Philippi, supra cit., pp. 6, 43, pls. 13, 22, 1892—Chonos Archipelago, Chile.

(?)*Otaria leucostoma* Philippi, supra cit., pp. 6, 46, pl. 23, 1892—Mas Afuera Island, Chile.

*Arctocephalus australis* Allen, N. Amer. Pinnipeds, pp. 193, 210, 1880; Mamm. Patagonia, pp. 124–130, pl. 15, fig. 2, pl. 16, fig. 2, pl. 17, fig. 2, 1905.

*Phoca falklandica*, *Otaria aurita*, *O. hauvillii*, *O. shawii*, *Arctocephalus nigrescens*, *A. grayii*, *A. gracilis*, and *Euotaria latirostris* of various authors.

A large marine mammal with small external ears and short thick pelage composed of relatively stiff outer hairs and soft dense under fur. Skull with a short flat palate ending about halfway between last molars and pterygoid processes; zygomata broad and heavy.

*Range.*—Formerly the coasts of Tierra del Fuego, the Straits of Magellan and northward for an unknown distance on the coast of Chile; probably at least to the Juan Fernandez Islands; also the Falkland Islands and the east coast of Argentina north to Uruguay; now extirpated except on islands of Uruguay, where a small herd is maintained under protection.

The southern fur seal which once lived in hordes from the Falkland Islands northward along both coasts of South America now appears to be gone from all Chilean waters. The paleontologist, Dr. Barnum Brown, reported (see Allen, l.c., 1905, p. 130) seeing considerable numbers off the south coast of Tierra del Fuego in 1899. Near Cape Hall, a herd estimated to contain 1,500 animals was seen and several hundred others were observed south of Lennox Island. The last reported catch of commercial sealers was of 936 skins taken near Cape Horn and carried to Nova Scotia in 1906 by the Canadian schooner *Edith B. Balcom* (Kellogg, 1942, p. 460). The following extract from Kellogg's review of southern sealing gives some indication of the former abundance of the animal.

"From then [1793] on to 1807, the business of killing fur seals along the Chilean coast was prosecuted with unremitting vigor, and

at times shore crews from as many as 12 to 15 vessels had camps at Mas Afuera Island. Gangs of men put ashore in 1798 on Mas Afuera by three American vessels killed some 60,000 fur seals. By 1801, the sealing fleet on the coast of Chile numbered upwards of 30 vessels. A few of these ships carried 60,000 and one at least 100,000 fur seal skins to the market at Canton, China, where they were exchanged for merchandise to be sold in the United States.

"The rookeries on these islands had been so thoroughly ransacked in a period of 15 years that sealers could no longer expect to make a profit by going there, and by 1824 fur seals were practically exterminated on both Juan Fernandez and Mas Afuera. Estimates of the number of fur seals killed on Mas Afuera and Juan Fernandez islands during this period range from a million to more than three million. Although the virtual destruction of this portion of the southern fur seal herd was accomplished at the beginning of the nineteenth century, a few persisted for many years on inaccessible rocky ledges. As late as 1898, fifty fur seal pelts taken on Juan Fernandez were sold in London."

Material is not available to determine whether or not the fur seal of Juan Fernandez is separable from that of the Falklands. Various names have been applied to the northern one and numerous skulls figured, mostly those of immature animals, but that any of these skulls were "matched" with skins is uncertain. Allen in his extensive account (Mammals of Patagonia, pp. 120–143, 1905) has recognized a supposed northern species under the name *Arctocephalus philippii*, basing his conclusions on a series of skulls from the Galapagos Islands in the American Museum of Natural History which he found to be very similar to the figures of *philippii* published by Peters and Philippi. The Galapagos skulls, however, as I am informed (in litt.) by Dr. Remington Kellogg and Mr. Gerrit S. Miller, Jr., who have examined Allen's specimens, are referable not to *Arctocephalus* but to *Zalophus*. They agree with skulls in Field Museum collected by myself on the Galapagos in 1940, at which time many of the same species were observed although no entire specimens were preserved. The conclusion that *Zalophus* occurs in Chilean waters as well as those of the Galapagos is perhaps not justified without examination of specimens, but it is evident that Allen's recognition of *philippii* is not to be relied upon, and when conditions are favorable the whole subject should be reinvestigated.

If the fur seal of Juan Fernandez is distinguishable, as is not unlikely, it is probable that Molina's name *lupina* will need serious

consideration. Molina gave four names to seals and accompanied them with lengthy descriptions. One of them, *porcina*, must be regarded as unidentifiable since its description indicates a young animal which may have been either a fur seal or a sea lion. The other three, however, apply very satisfactorily to the three common seals of the Chilean coast, the sea lion, which he called *leonina*, the elephant seal, which he called *elephantina*, and the fur seal, which he named *lupina*. The descriptions in all cases include certain inaccuracies, but the three species are well distinguished by general characters, and there is no serious room for doubt as to the application of the names. In the case of *lupina*, the one wholly diagnostic character is clearly given in the statement (translation): "It is covered with two kinds of hair, one stiff, and the other soft." Elsewhere it is stated that "they are common upon all the coast of Chile and in the islands, where every year the inhabitants kill a vast number of them with clubs."

Besides these statements, which very definitely indicate the fur seal, there are some others, as in most of Molina's descriptions, which do not apply to it, or, in fact, to any other seal. Thus it is declared that "each of these [fore] feet has four toes, which distinguishes this from the other species of phoca." A few statements indicate possible confusion with some other seal but may quite as well be interpreted as inaccuracies in detail, which are always to be expected from Molina. One of these which has been seized upon by some authors as suggesting a phocid rather than an otary is as follows: "The head is large and round and resembles that of a dog with the ears cut, and instead of the latter it has two margined holes (*buchi marginati*) which serve for the same purpose." This might be more serious if phocid seals were common on the Chilean coast, but with the exception of the elephant seal, they were rare even in Molina's time.

As a whole, Molina's description of *lupina* is preponderantly applicable to the fur seal, and it is quite sufficiently contrasted with the other common species of the region. Few, if any, of Molina's other names which have been accepted have better claims for consideration.

Allen, in 1880 (N. Amer. Pinnipeds, p. 430), has a passing reference to the name *lupina* and a parenthetical statement that it applies to "a Fur Seal, or at least an Otary." Later, however, in a very extensive account (1905, pp. 120–143) he is quite inexplicably silent in regard to it. Molina's other names are allocated in his very full

synonymies, but there is no mention whatever of *lupina*. More recently, Cabrera (1940, p. 19) has referred to it with the observation "solo puede aplicarse a un *Arctocephalus* o lobo de dos pelos."

## ORDER RODENTIA

### Key to Chilean Genera

Size large, total length more than 600 mm.
  Ears small and rounded; tail round, scaly, and nearly naked. *Myocastor* (coypu).
  Ears elongate; tail crested and densely hairy. . *Lagidium* (mountain viscachas).
Size medium or small, total length less than 450 mm.
  No external tail. . . . . *Cavia* (cavy).
  Tail well-developed.
    Hind feet with only three developed toes, the fourth rudimentary; tail crested; ears large and leafy. . . . . *Chinchilla*.
    Hind feet with at least four well-developed toes.
      Soles of hind feet finely granulated without well-distinguished, smooth-surfaced pads.
        Front feet without vestige of a fifth toe; adult males with a naked pad on the breast. . . . . *Abrocoma*.
        Front feet with a small fifth toe with a nail instead of a claw; no pad on breast. . . . . *Octodon*.
      Soles of hind feet naked or partially hairy, with well-distinguished smooth-surfaced pads.
        Grinding teeth rootless, four in each row.
          Grinding teeth crescentic, without indentation on the inner side. *Ctenomys*.
          Grinding teeth quadrate with a single deep indentation on both inner and outer sides.
            Color mainly brownish; indentations of grinding teeth meeting in the middle. . . . . *Aconaemys*.
            Color mainly blackish; indentations of grinding teeth separated in the middle by a slight space. . . . . *Spalacopus*.
        Grinding teeth rooted, three in each row.
          Upper front teeth distinctly grooved on front surface.
            First and fifth hind toes unequal, at least one of them reaching beyond base of middle toes.
              Tail much longer than head and body. . . . . *Irenomys*.
              Tail shorter than head and body. . . . . *Euneomys*.
            First and fifth hind toes short, about equal, not reaching to base of middle toes. . . . . *Reithrodon*.
          Upper front teeth with front surfaces smooth, ungrooved.
            Soles of hind feet hairy in spaces between pads. . . . . *Eligmodontia*.
            Soles of hind feet naked in spaces between pads.
              Ears large, more than 20 mm. in length.
                Tail about equal to or longer than head and body. . . *Phyllotis*.
                Tail shorter than head and body. . . . . *Phyllotis* (*Auliscomys*).
              Ears medium or small, less than 20 mm. in length.
                Tail decidedly longer than head and body. . . . . *Oryzomys*.
                Tail about equal to or shorter than head and body.

Front claws elongate, nearly or quite equaling free part of digits.....*Notiomys.*

Claws moderate, much shorter than free part of digits.

Last upper grinding tooth more than half as large as preceding tooth and with a deep indentation on its inner side.....*Phyllotis (micropus).*

Last upper grinding tooth nearly round, less than half as large as preceding tooth and without deep indentation on its inner side.....*Akodon.*

**Abrocoma bennetti bennetti** Waterhouse. TREE RAT; BORI; CHINCHILLA RAT.

*Abrocoma bennetti* Waterhouse, Proc. Zool. Soc. Lond., p. 31, 1837; Zool. Voy. Beagle, Mamm., pp. 85–86, pl. 28, 1839—near old village of Aconcagua, Province of Aconcagua, Chile.

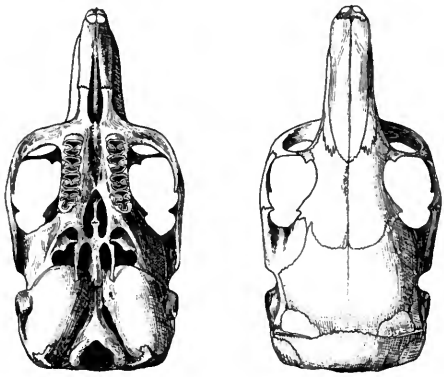


FIG. 11. *Abrocoma bennetti bennetti.* F.M. No. 23148. × 1.

*Abrocoma cuvieri* Waterhouse, Proc. Zool. Soc. Lond., p. 32, 1837—Valparaiso; Thomas, Ann. Mag. Nat. Hist., (9), **19**, p. 553, 1927—"Unquestionably the young of *A. bennettii.*"

*Habrocoma helvina* Wagner, Arch. Naturg., **8**, (1), pp. 7–8, 1842; Suppl. Schreber's Säugeth., **3**, p. 314, 1843—Chile.

*Abrocoma laniger* Prell, Zool. Gart., Leipzig, **7**, p. 208, 1934.

A brownish gray rat with tail slightly shorter than head and body; front feet with only four toes; soles of feet granulated; under parts mainly brownish rather than whitish gray. Length 350–398; tail 145–166; hind foot 36–39.

*Range.*—Coastal hills of central Chile and inland along the eastern base of the Andes, between lat. 32° and 34°.

Even a small series of this animal shows considerable variation in size and cranial characters, and it is evident that as in some other octodonts, there are growth changes in progress for a long period.

Two large examples have the following measurements: total length 398, 393; tail 166, 161; hind foot 39, 37. The specimen from Baños de Cauquenes has rather small ears and audital bullae, but the departure is very slight.

Darwin says of the original specimens: "This animal was caught amongst some thickets in a valley on the flanks of the Cordillera, near Aconcagua. On the elevated plain, near the town of Santa Rosa, in front of the same part of the Andes, I saw two others." The old village has now disappeared and is represented only by a "fundo" called Plaza Vieja. This is some five kilometers west of the present town of Los Andes.

The species appears to be at least partly arboreal in habits. Darwin mentions its facility in climbing trees, and E. C. Reed (1877) calls it the "Raton de los arboles."

*Specimens examined.*—Total 8: Baños de Cauquenes, O'Higgins, 1; Limache, Valparaiso, 1; Olmue, Valparaiso, 5; Papudo, Aconcagua, 1.

**Abrocoma bennetti murrayi** Wolffsohn.

*Abrocoma Murrayi* Wolffsohn, Rev. Chil. Hist. Nat., **20**, pp. 6–7, 1916; Act. Soc. Sci. Chili, **23**, p. 78, 1916—mountains near Vallenar, Province of Atacama.

Similar to *A. b. bennetti*, but averaging paler and more deeply pelaged. Total length 382 (370–405); tail 167 (156–178); hind foot 36 (35–38).

*Range.*—North-central provinces of Chile west of the Andes and up to an altitude of about 4,000 feet.

Although individual specimens of *bennetti* and *murrayi* may seem quite distinct, the series of both now available points to gradation between them. In *murrayi* the color is paler and more grayish, and the pelage is softer and somewhat lengthened. The ears probably average larger, but this is difficult to demonstrate from dry skins. The skull of *murrayi* averages smaller and more arched, while the audital bullae are decidedly larger, although even in this there may be specimens closely approaching each other. The rostrum is more slender, and the teeth, including the incisors, are weaker.

Two specimens from the vicinity of Vallenar and presumably typical are practically the same in color as the large series from farther south in the Province of Coquimbo. Two others from Paiguano, also in Coquimbo but at a higher altitude (3,300 ft.), are considerably paler. The series from Romero thus stands in an intermediate position between these pale specimens and typical

*bennetti.* Two fragmentary skulls from the stomach of an owl, taken at Ramadilla (west of Copiapo) furnish evidence of the northward extension of the form.

The skins of these rats are taken in considerable numbers by natives who obtain a very small price for them in local fur markets where they are known as chinchilla rats or false chinchillas.

*Specimens examined.*—Total 20: Domeyko, south of Vallenar, Atacama, 2; Ramadilla, Atacama, 2 (skull fragments); Paiguano, Coquimbo, 2; Romero, Coquimbo, 12; near Vallenar, Atacama, 2.

**Octodon degus** Molina. DEGU.

*sciurus degus* Molina, Sagg. Stor. Nat. Chile, pp. 303–304, 342, 1782—Santiago, Chile (St. Jago of Molina).

*Myoxus getulus* Poeppig, Froriep's Notizen, Geb. Nat. Heilk., **23**, No. 18, p. 278, footnote, 1829—Santiago, Chile.

*Octodon cumingii* Bennett, Proc. Zool. Soc. Lond., pp. 47–48, 1832—near Valparaiso, Chile; Bridges, Proc. Zool. Soc. Lond., p. 130, 1843 (habits); Gay, Hist. Chile, Zool., **1**, p. 99, 1847.

*Dendrobius degus* Meyen, Nov. Act. Acad. Leop.-Carol., **16**, pt. 2, p. 601, 1833.

*Dendroleius degus* Meyen, supra cit., pl. 44 and p. 610b (errata).

*Octodon degus* Waterhouse, Nat. Hist. Mamm., **2**, p. 253, pl. 11, fig. 2 (col.), 1848.

*Octodon pallidus* Wagner, Arch. Naturg., **11**, (2), p. 33, 1845—probably based on albinotic specimens.

*Octodon cummingii* var. *peruana* Tschudi, Fauna Peruana, **1**, Mamm., pp. 172–173, pl. 12, 1845–46—Quebrada de San Mateo, near San Juan de Matucana, Peru; probably based on an escaped pet (Thomas, 1927a).

*Octodon degus* var. *alba* Fitzinger, Sitzungsber. K. Akad. Wiss., Wien, **56**, p. 131, 1867—nomen nudum.

*Octodon degus clivorum* Thomas, Ann. Mag. Nat. Hist., (9), **19**, p. 556, 1927—Puente Alto, south of Santiago, Chile.

A diurnal rodent with short leafy ears, a tufted black-tipped tail, and feet with finely granulated soles; breast without a naked pad; forefeet with four well-developed toes and a rudimentary fifth bearing a nail instead of a claw. Total length 295 (284–310); tail 117 (106–130); hind foot 36 (35–38).

*Range.*—Central Chile mainly in the coastal region from Vallenar to Curico; inland to Santiago and neighboring mountains to an altitude of about 4,000 feet.

The degu has a considerable range from the southern part of the Province of Atacama to the vicinity of Curico. Bridges (Proc. Zool. Soc. Lond., p. 130, 1843) says: "I have seen it as far north as lat. 28°, and in south 35°, and it may probably extend further." San-

born collected a series at Vallenar and in the vicinity of Coquimbo, while Wolffsohn has taken it at numerous localities between Valparaiso and Santiago. Other records are very few. It was not seen in the Province of Maule nor at Concepcion, so it evidently does not reach southern Chile. There are records from slightly east and south of Santiago, and E. C. Reed (1877, pp. 537–541) states that it is common "baja de la hacienda" near Baños de Cauquenes in the Province of O'Higgins but not extending higher than 100 meters. During several days spent at the Baños, in 1923, I did not see it, perhaps because I was mainly above its range.

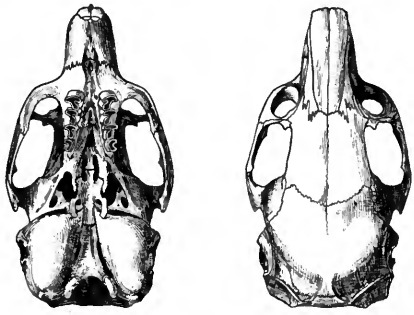


FIG. 12. *Octodon degus*. F.M. No. 35904. × 9/10±.

Examination of a large series of specimens fails to disclose any marked geographic variation in the species. Even seasonal differences in color are slight and the coloration of the young approximates that of the adults. Slight white spots in the axillary region are occasionally found, but the under parts are usually uniform whereas in *bridgesi* and *lunatus* white axillary and inguinal areas are the rule. In very old examples the size is often larger than that of average maturity.

The name *clivorum* was proposed by Thomas in the belief that a highland and a lowland form could be distinguished. This, however, is not borne out by the geography or by the specimens in Field Museum and the British Museum, which have been re-examined in this connection. Puente Alto, the type locality of *clivorum*, is but a short distance from Santiago and but little higher, so there can be little doubt that *clivorum* is a synonym of *degus*. In case any such separation should prove possible, it would involve the recognition of *cumingi*, which is from the coast at Valparaiso, rather than *clivorum*, from practically the same region as *degus*. In fact, it is

probable that Thomas, in proposing *clivorum*, intended to assign *degus* to Valparaiso, overlooking the unusual action of Molina in giving an exact locality for one of his species.

*Specimens examined.*—Total 46: Buen Retiro, Calera, Valparaiso, 2; Limache, Valparaiso, 6; Longotoma, Aconcagua, 2; Maipu, Santiago, 1; Olmue, Valparaiso, 9; Papudo, Aconcagua, 8; Puente Alto, Santiago, 8 (B.M.); Romero, Coquimbo, 3; Santiago, 2; Tambillos, Coquimbo, 2; Vallenar, Coquimbo, 3.

**Octodon bridgesi** Waterhouse.

*Octodon bridgesi* Waterhouse, Proc. Zool. Soc. Lond., p. 155, 1844; p. 7, 1846—River Teno, near Curico, Province of Curico, Chile; Thomas, Ann. Mag. Nat. Hist., (9), **19**, p. 553, 1927—lectotype designated; Yepes, Rev. Chil. Hist. Nat., **34**, p. 323, 1930.

A dark grayish rat with a rounded and slightly pencilled tail which is shorter than the head and body; forefeet with a rudimentary fifth toe; hind feet with granulated soles; last upper grinding tooth with a deep indentation on the inner side. Total length 344; tail 150; hind foot 40 (one specimen).

*Range.*—Western base of the Chilean Andes in the provinces of O'Higgins, Colchagua, and Curico.

Although discovered many years ago, this animal is still rare and poorly represented in museums. It has been reported by Chilean writers, but preserved specimens are few. Yepes mentions examples from Colchagua in the Santiago Museum. In the British Museum are at least the lectotype and one paratype from Rio Teno, Colchagua, and possibly a third specimen mentioned by Waterhouse. The one adult in Field Museum was taken by myself at Baños de Cauquenes, Province of O'Higgins.

**Octodon lunatus** sp. nov.

*Type* from Olmue, Province of Valparaiso, Chile. No. 23204 Field Museum of Natural History. Adolescent female. Collected May 30, 1923, by Colin C. Sanborn. Orig. No. 334.

*Diagnosis.*—External and general characters as in *O. bridgesi;* last upper molar with its grinding surface crescentic, quite without indentation on its inner border.

*Color.*—Practically as in *O. bridgesi*, but perhaps with the general tone of the upper parts more brownish; under side of tail variable, but often wholly or at least for half its length blackish.

*Skull.*—Much as in *bridgesi;* interorbital space apparently a little wider; audital bullae slightly larger; anterior cheekteeth with deep

internal indentations as in *bridgesi;* last upper molar of simple crescentic shape with its postero-external element directed outward and its inner border with scarcely a trace of an indentation, the tooth being somewhat longer but essentially as in *O. degus;* last lower molar also much as in *O. degus,* shorter than in *O. bridgesi.*

*Measurements.*—Average of four topotypes: total length 360 (328–382); tail 157 (152–161); hind foot 40.7 (40–42). Skull of type and a more mature specimen: greatest length 45.8, 46.5; basilar length 36.8, 38.3; zygomatic width 24.3, 24.9; interorbital constriction 8.7, 8.5; nasals 16.8 × 5.7, 17.9 × 5.9; diastema 10.5, 10.8; toothrow (crowns) 9.7, 10.4.

FIG. 13. Maxillary teeth of *Octodon degus* (left, F.M. No. 23175), *O. lunatus* (middle, No. 23204, type), and *O. bridgesi* (right, No. 23213). × 2.

*Remarks.*—The discovery of this species was somewhat unexpected, since specimens of it are much more numerous than those of typical *bridgesi,* with which, not unnaturally, it has been confused. It might be described succinctly by saying that it is like *bridgesi* in all except its last molar, which is nearly like that of *degus.* That it intergrades with *bridgesi* is doubtful, for the tooth distinction is a trenchant one and no specimens have appeared from the region between the two ranges although it is in the best known and most populous part of Chile.

Apparently *bridgesi* is confined to the base of the Andes, east of the central valley, while *lunatus* inhabits the coastal hills on the other side of the valley. In each case the known range is limited to a very small area.

A series of eight specimens from Olmue and Papudo, collected by Sanborn, represents *lunatus* in Field Museum. These have been compared with but a single example of *bridgesi.* That this is not abnormal as to its last upper molar is indicated by Waterhouse (Nat. Hist. Mamm., **2,** p. 261, 1848), who describes this tooth in the original specimens of *bridgesi* and notes its distinction from that of *degus.*

**Aconaemys fuscus fuscus** Waterhouse.

*Schizodon fuscus* Waterhouse, Proc. Zool. Soc. Lond., pp. 91–92, 1841; Nat. Hist. Mamm., **2**, pp. 265–267, pl. 11, fig. 1, 1848—Valle de las Cuevas, near Volcan Peteroa, alt. 6,000 ft., near Chile-Argentine boundary, lat. 35° 15′ S.

*Aconaemys fuscus* Ameghino, Rev. Arg. Hist. Nat., **1**, Ent. 4a, p. 245, 1891; Thomas, Ann. Mag. Nat. Hist., (9), **19**, p. 553, 1927—lectotype designated; Wolffsohn, Rev. Chil. Hist. Nat., **31**, p. 98, 1927.

A short-tailed, burrowing, octodont rodent of uniformly dark brown color above and below; external ears moderately developed; front claws considerably lengthened. Skull with a large infraorbital foramen, a wide flat interorbital space and usually an open fronto-parietal fontanelle. Cheekteeth prismatic, presenting an 8-shaped pattern with the inner and outer indentations meeting in the middle. Total length 232 (217–247); tail 62 (57–73); hind foot 30.8 (30–32).

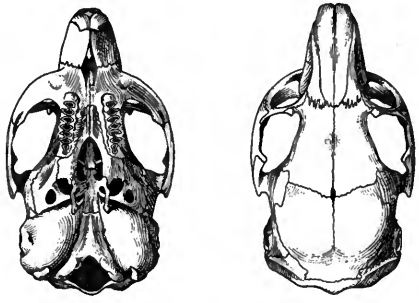


FIG. 14. *Aconaemys fuscus fuscus.* A.M.N.H. No. 91656. × 1.

*Range.*—High slopes of the Andes of south-central Chile (lat. 35°–40°) and in the coastal cordillera of Nahuelbuta.

Aside from the unique type of the doubtful species *porteri*, this rare octodont has heretofore been known only from the original series taken a century ago in the Valle de las Cuevas, described by Bridges as some six leagues from the volcano of Peteroa and apparently on the eastern side of the Andes in Argentine territory, at an elevation of about 6,000 feet. According to Bridges, it was "very common on the eastern side of the Andes, where it completely undermines the face of the country, especially in dry places, making it very disagreeable for the rider, as the horses are continually plunging into the burrows."

Thomas (1917) notes that "the British Museum contains eleven specimens of *Aconaemys fuscus*, received at different dates from Mr. T. Bridges, but whether all were from the Valle de las Cuevas where Mr. Bridges discovered the species, there is, unfortunately, no evidence to show."

In 1929 Dr. H. E. Anthony found the species in the Sierra Nahuelbuta and collected three subadult specimens now in the American Museum of Natural History. Field Museum's expedition in 1939–40 also visited the Sierra Nahuelbuta and obtained an excellent series of *Aconaemys* numbering eleven specimens. A further record is that of a specimen from "Pinares," Lonquimai, Province of Cautin, seen in the collection of D. S. Bullock at El Vergel, Angol. This last, like those from Nahuelbuta, was taken in a scattered forest of Araucarias. This association is perhaps of some significance, for *Aconaemys* appears to be an ancient type now reduced to a few small colonies and obviously on its way out, like the great trees under which it makes its burrows.

It is still abundant in the Sierra Nahuelbuta, but only in the higher parts of the range, scarcely descending beyond the lower limits of the "pines." In some places the ground was honeycombed with its burrows. These in most cases open flush with the ground and below are divided into several diverging tunnels. They are relatively shallow and although loose earth thrown out was often seen it was seldom fresh and probably most of it dated from winter, for it is evident the animals are active under the snow at that season. One burrow was noted with a large accumulation of scats around it apparently deposited in winter. The burrows are frequently connected by runways either quite open or only covered by roots and interlaced vegetation. The workings were always on high, well-drained ground, on slopes or knolls, and frequently about rock ledges or boulders of which there were many scattered through the forest. Although mainly nocturnal, the animals are somewhat active by day, as several specimens were caught during daylight.

Among the specimens taken (in early November) are several small young but a few days or weeks old, and an old female containing two very large foetuses, each about two inches long.

There is nothing in our series to indicate any distinction from typical *A. fuscus*, but this conclusion is based only on published descriptions, since actual comparison of specimens has not been possible. The tails, in most cases, are wholly dark brown above and below although in several the proximal half of the lower side is slightly paler.

Measurements of the skull of an adult male are as follows: greatest length 40.4; basilar length 32.8; zygomatic breadth 23.3; nasals 14.8 × 5.4; least interorbital breadth 8.3; height of infraorbital foramen 6.9; diastema 9.6; upper cheekteeth (crowns) 8.5.

**Aconaemys fuscus porteri** Thomas.

*Aconaemys porteri* Thomas, Ann. Mag. Nat. Hist., (8), **19**, p. 281, 1917—received from Osorno, Llanquihue, Chile; exact locality unknown.

This is said to differ from *A. fuscus* in having the pelage "more woolly" and the tail "completely bicolor, black above and creamy whitish below for its whole length." Until its unique type is supplemented by further specimens, its status must remain uncertain. As suggested by Thomas, this type doubtless was not collected at Osorno but in some of the mountains east of it. These mountains are rapidly becoming more and more accessible and furnish an interesting and little-known field for work by local naturalists.

**Spalacopus cyanus cyanus** Molina. CORURO.

*mus cyanus* Molina, Sagg. Stor. Nat. Chili, pp. 300–301, 342, 1782—Chile; Province of Valparaiso by present selection.

*Bathyergus maritimus* Poeppig, Froriep's Notizen, Geb. Nat. Heilk., **23**, p. 279, 1829—nomen nudum.

*Spalacopus poeppigii* Wagler, Isis, pp. 1219–1220, 1832—foot of the Andes, Chile; Waterhouse, Nat. Hist. Mamm., **2**, p. 269, pl. 9, fig. 1, 1848.

*Poephagomys ater* F. Cuvier, Ann. Sci. Nat., Zool., (2), **1**, pp. 323–326, pl. 13, 1834—Coquimbo, Chile.

*Psammomys noctivagus* Poeppig, Reise in Chile, Peru, und Amaz., **1**, p. 166, 1835—sand dunes on coast of northern Chile.

*Psammoryctes noctivagus* Poeppig, Arch. Naturg., **1**, (1), pp. 252–255, 397, 1835.

*Spalacopus cyaneus* Wolffsohn, Act. Soc. Sci. Chile, **23**, p. 64, 1913; Cabrera, Trab. Mus. Nat. Cienc. Nat., Madrid, **31**, p. 52, 1917.

A small, thickset, short-tailed, burrowing rodent wholly deep brownish black in color; grinding teeth quadrate with a single deep indentation on inner and outer sides. Total length 201 (195–204); tail 45.6 (43–48); hind foot 29 (28–30).

*Range.*—In typical form confined to the coastal region of central Chile mainly in the provinces of Valparaiso and Aconcagua.

This very peculiar rodent, which the Chileans call *coruro*, is known mainly from the coastal region extending northward at least to the central part of the Province of Atacama and southward to Maule. This statement of range is based more upon reports than specimens, for material representing the species is almost entirely from one region in the vicinity of Valparaiso. Molina's name *cyanus* may be restricted to the animal of this region. A southern form from Maule appears to be distinguishable, but whether or not a northern one can be characterized must await the acquisition of specimens. A small series of typical *cyanus* from Papudo is in Field Museum,

and others from the same vicinity are reported to be in the British Museum. At Calera, in the Province of Atacama, Sanborn saw numerous deserted burrows attributed to the *coruro* and, since Poeppig also reported it from this region, there can be no doubt of its occurrence as far north as lat. 27° S. Three specimens from the

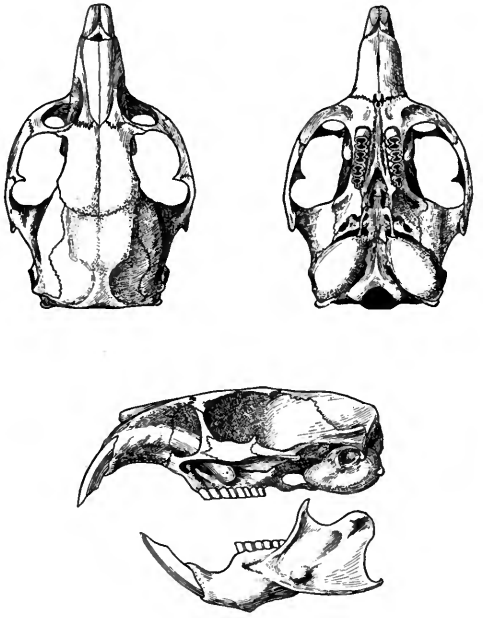


FIG. 15. *Spalacopus cyanus cyanus.* F.M. No. 23018. × 1.

"Cordillera de Santiago" are recorded by Wolffsohn and Porter (1908).

Specimens from localities removed from the coast are not available, but Bridges stated (Waterhouse, Nat. Hist. Mamm., **2**, p. 271, 1848) that "it generally selects slopes of hills and mountains, where bulbs are found, especially in the interior parts of the country" and E. C. Reed (1877, pp. 537–541), in notes from Cauquenes, says: "Se enquentra en varias partes de las faldas de la cordillera." Wolffsohn (in litt.) states that he has found it up to 3,000 meters.

**Spalacopus cyanus maulinus** subsp. nov.

*Type* from Quirihue, Province of Maule, Chile. No. 23010 Field Museum of Natural History. Adult male. Collected May 2, 1923, by Colin C. Sanborn. Orig. No. 279.

*Diagnosis.*—Size and color about as in *S. cyanus;* skull narrower interorbitally; lambdoid crest with a pronounced, median, forward flexure instead of being evenly transverse; bony base of upper incisors reaching to level of middle of third cheektooth instead of only to second cheektooth; incisors less proodont than in *cyanus;* cheekteeth decidedly weaker and with narrower surfaces than in *cyanus.*

*Measurements.*—Type and two topotypes, measured by the collector: total length 185, 187, 197; tail 45, 47, 42; hind foot 30, 30, 31. Skull of type:[1] greatest length 40.5 (41.2); condylo-basal length 38 (37.7); zygomatic width 24.2 (25); nasals 14.2 × 4.6 (12.6 × 5); least interorbital width 7.9 (9.2); diastema 11.9 (12.3); postpalatilar length 14.5 (15); upper toothrow (crowns) 6.3 (8.1), (alveoli) 7.4 (8.8); width of first cheektooth 1.6 (2.3).

*Remarks.*—Three specimens from Maule differ so markedly from typical *cyanus* in cranial and dental characters that a separate name for them seems imperative. The most pronounced distinction is in the narrow, weak cheekteeth, but several cranial peculiarities are marked and constant. The description of *S. tabanus* indicates that it differs even more from this form than from *cyanus,* so it needs but scant consideration in this connection even though it was said to come from "South" Chile.

The cheekteeth in *Spalacopus* appear to be subject to changes during growth and wear which cause considerable variation in the area of their horizontal surfaces, but these seem insufficient for the marked reduction shown in this form.

### Spalacopus cyanus tabanus Thomas.

*Spalacopus tabanus* Thomas, Ann. Mag. Nat. Hist., (9), **15**, p. 585, 1925—"South" Chile.

This name is based upon a single specimen of unusually large size from an unknown locality. That it came from "South" Chile appears to have been an assumption without proper foundation, for the only southern specimens from a known locality are smaller instead of larger than typical *cyanus.* The published measurements[2] of the type of *tabanus* exceed those of any specimen of *cyanus* examined and there is no certainty that it does not represent a different

[1] Measurements in parentheses are those of an adult of *cyanus* from Papudo, Aconcagua.

[2] Some of these are as follows: "Skull: condylo-basal length 42; condylo-incisive length 44; zygomatic breadth 27; nasals 14.2; interorbital breadth 8.8; upper toothrow series (crowns) 8."

form. It may be only an exceptionally large example of *cyanus* or it may be from the northern coast where a definable form possibly may be found. In this latter case the name *tabanus* would become a synonym of *ater* or *noctivagus*. In fact, there is scarcely more reason for recognizing *tabanus* than *ater* or *noctivagus*, and its appearance as late as 1925, with a type of unknown source, is regrettable.

**Ctenomys magellanicus magellanicus** Bennett. PATAGONIAN TUCO TUCO.

*Ctenomys magellanicus* Bennett, Proc. Zool. Soc. Lond., p. 190, 1835—Port Gregory (or Bahia San Gregorio), near eastern end of north side of Straits of Magellan, Chile; Phil. Mag. Journ. Sci., (3), **9**, pp. 68–69, 1836; Trans. Zool. Soc. Lond., **2**, p. 84, pl. 17, 1841; Allen, Mamm. Patagonia, p. 34, 1905; Thomas, Ann. Mag. Nat. Hist., (10), **4**, p. 43, 1929.

*Ctenomys neglectus* Nehring, Zool. Anz., **23**, pp. 535–537, fig. 1, 1900—Patagonia.

A rather large, light-colored species, with pale grizzled grayish buff upper parts and clear Cinnamon Buff under parts. Skull notably angular with many sharp ridges and pointed processes. Size as in *C. m. fueginus*.

*Range.*—Extreme southern Patagonia east of the mountains, from the Straits of Magellan northward to the vicinity of the Santa Cruz River on the east and Lake Argentino on the west. Rare or extirpated over most of this area.

This animal, the first Chilean *Ctenomys* to be described, is now either quite extinct or so near it that its preservation beyond a few years is very unlikely. As late as the summer of 1927–28 when Budin collected at Punta Arenas and elsewhere within its range it had become so scarce that he was unable to find it except at one locality considerably north of the Straits at Rio Perro, at the north end of Lake Argentino, as recorded by Thomas (l.c.) who notes that "the type, nearly a century old, is almost precisely the same colour as Sr. Budin's beautiful fresh specimen, and matches it closely in every respect." In 1940 Mr. Sanborn and myself made every effort to find it at various localities but without success. Everywhere we received reports of its former abundance and, in some cases, explicit testimony as to its occurrence in small numbers at specific localities within five years, but on visiting these places only abandoned burrows were found. One such place was on the bay of San Gregorio, the type locality, where it seems to have persisted until very recently. According to report, one of the regions where it was once excessively numerous was toward the northern end of the Straits near the boundary between Chile and Argentina, on the estancia Monte Dinero.

Practically the whole of southern Patagonia east of the mountains is now in private ownership completely fenced and devoted to sheep-raising. That the extinction of an animal like *Ctenomys* is welcomed by the sheep owners is natural, not only because of its effect on the forage, but because its burrows are a hazard to horsemen. The extinction, however, has required no effort on their part, the mere presence of the sheep being sufficient to accomplish it. It might be supposed that the rodents would retreat into the few areas not frequented by the sheep, but there is little evidence that this has taken place with much success. During the summer season a certain number may be trampled to death by the sheep, but the burrows, in most cases, seem too deep to fail to give considerable protection. In drives of sheep as many as 50,000 closely packed animals often passed over long stretches of grassland, and, in such cases, according to report, the pugnacious *Ctenomys* sometimes came out of their burrows and actually attempted to attack the sheep. It is related as not uncommon to see a sheep with a wriggling *Ctenomys* dangling from its nose, probably to the great discomfort of the sheep and doubtless with ultimate fatality for the rodent. No doubt the highest mortality comes in winter and early spring when the passing hoofs would open up the burrows sufficiently to let in snow water, and what this did not accomplish directly would soon be finished by alternate freezing and thawing.

Recorded specimens of the species are very few. They include the type and several others in the British Museum, namely, two alcoholics from Port Gregory and two skulls from Punta Arenas. Five weathered skulls, mostly imperfect and incomplete, from the vicinity of Punta Arenas are in the United States National Museum, and in the American Museum of Natural History there is one skin and skull and one imperfect skull from "30 miles south of the Port of Santa Cruz," recorded by Allen in 1905. These and the specimen taken by Budin at Lake Argentino complete the list and it seems that additions to it are not very probable.

The specimens in the United States National Museum and the American Museum of Natural History have been lent for examination, but they do not furnish a very satisfactory basis for definition of the species, except as to general characters. The skin from Santa Cruz is very similar in color to specimens from Tierra del Fuego, although taken at a different season. The under parts are a shade paler and less vinaceous and the upper parts slightly paler, but whether or not this is wholly due to season is uncertain. The skulls

from Punta Arenas and Santa Cruz agree in having narrower, less inflated audital bullae than in *fueginus*, and most of them have the interorbital space wider than in any of the considerable series available from Tierra del Fuego. None of the skulls from the mainland are equal in size to the larger examples of *fueginus*, but with due allowance for age and sex, there is no clear evidence of difference in size between *magellanicus* and *fueginus*.

A skull from Santa Cruz (A.M.N.H. No. 17444) and another from Punta Arenas (U.S.N.M. No. 23410), both unsexed, yield the following measurements, respectively: basilar length 42.5, 44.3; zygomatic width 30.6, 28; diastema 14.5, 14.8; least interorbital width 9.9, 10.3; greatest width of premaxillaries 11.4, 11.3; maxillary toothrow (alveoli) 10.3, 11.4.

*Specimens examined.*—Total 7. CHILE: Punta Arenas, 5 (one nearly complete skull, three very imperfect, one pair of jaws, U.S.N.M.). ARGENTINA: 30 miles south of Santa Cruz, 2 (one skin and skull, one broken skull, A.M.N.H.).

### **Ctenomys magellanicus fueginus** Philippi.

*Ctenomys fueginus* Philippi, Arch. Naturg., **46**, (1), pp. 276–279, pl. 13, figs. 1–3, 6, 1880—Tierra del Fuego ("östlichen Insel").

Similar in size and color to *C. magellanicus* of the Patagonian mainland. Skull similar to that of *magellanicus*, but with audital bullae slightly more swollen and bulbous, interorbital space wider, and rostral or antemolar part of skull broader. Total length 304 (male), 276 (female); tail vertebrae 82, 79; hind foot 41, 37.

*Range.*—Northern and eastern Tierra del Fuego, now reduced to small, scattered, and greatly isolated colonies.

Although *Ctenomys* were not found on the north side of the Straits in 1940, they were discovered in some numbers at a few localities on Tierra del Fuego. Here they have persisted longer than on the mainland but their fate is sealed and within a very few years doubtless they will be gone. A small colony of some two dozen burrows was found occupying a gravel ridge just back of the beach between Cape Penas and Via Monte on the north shore of the island. Another group, slightly smaller, was encountered near the road leading from Via Monte to Lake Fagnano and about ten miles north of the east end of the lake. Signs of considerable numbers were seen also just west of San Sebastian on the road leading to Cullen. Otherwise, during several hundred miles of travel on Tierra del Fuego no signs of *Ctenomys* were seen. According to the testimony of residents of the island their numbers in former years were incalculable.

A sufficient series of specimens of this form is available to make it reasonably certain that it merits at least subspecific distinction from the mainland form. The very swollen audital bullae and the narrow rostral part of the skull are constant throughout this series but are not found in any of the few specimens of true *magellanicus* that have been examined. The skulls available representing *magellanicus* are mostly without designation of sex, which must be considered in making comparisons, since the series of *fueginus* shows males to be markedly larger than females. Skulls of an adult male and female, respectively, yield the following measurements: greatest length 56.3, 49.9; occipito-nasal length 52, 47.2; basilar length 46.1, 41.1; zygomatic width 32, 27.7; interorbital width 11, 9.2; mastoid width 29, 27.3; nasals 20.3 × 8, 17.6 × 6.6; diastema 16.6, 14; upper toothrow (alveoli) 10.5, 9.7; width of upper incisors 7, 6.2.

The skull of the original type of *fueginus* is preserved in fair condition in the Chilean national collection. It agrees well with Philippi's figures, which are quite good. In the lateral view the bullae appear too deep but the top view is natural size and essentially as in the specimen. A mounted skin in the museum is labeled *C. fueginus* but it is obviously not a *Ctenomys* and doubtless had a later origin than the type, of which the skin is probably lost.

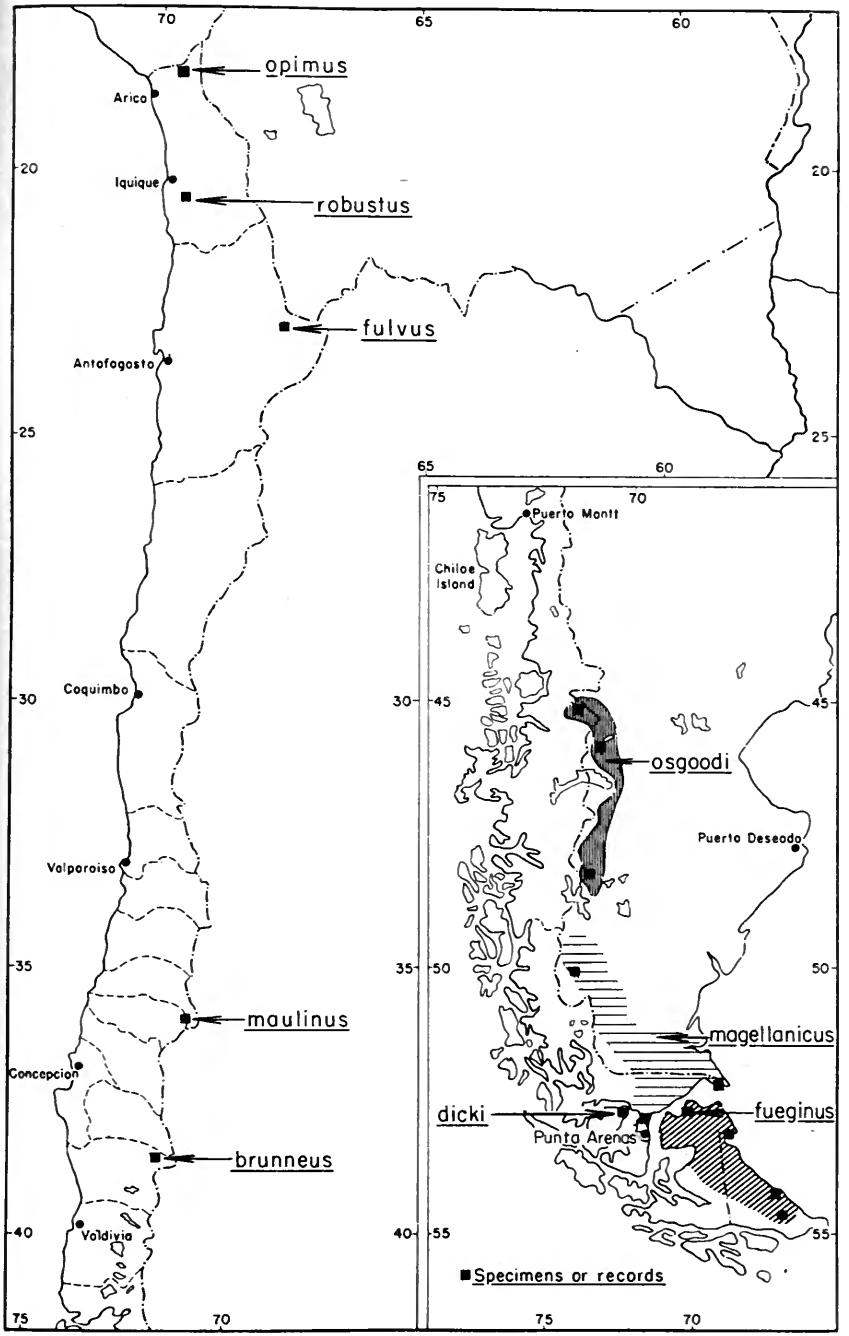
No comparisons of the skull were possible, but the following measurements were taken: greatest length 49; occipito-nasal length 46.3; basilar length 40; zygomatic width 27; mastoid width 26; nasals 18 × 6; diastema 13.5; upper toothrow 10; width of upper incisors 6.1; width across postorbital processes 11.2; depth of infraorbital fossa 9.5; greatest mandibular width 36.

The vernacular name *coruro* is universally applied to this animal on Tierra del Fuego as well as elsewhere in the vicinity of the Straits of Magellan, evidently having been brought there from northern and central Chile where it is used for a different animal of similar habits, belonging to the genus *Spalacopus*. In northern Patagonia and Argentina generally the name *tuco tuco* is more frequently applied to it.

*Specimens examined.*—Total 17: Tierra del Fuego: north coast near Estancia Via Monte, 11; near east end of Lake Fagnano, 4; no exact locality, 2 (mounted in Salesian Museum, Punta Arenas).

### Ctenomys magellanicus osgoodi J. A. Allen.

*Ctenomys robustus* Allen, Bull. Amer. Mus. Nat. Hist., **19**, p. 185, 1903—Mayer Basin, west of upper Rio Chico, Santa Cruz, Patagonia.




MAP 4. Distribution of Chilean forms of the genus *Ctenomys*.

*Ctenomys osgoodi* Allen, Mamm. Patagonia, p. 191, postscript, pl. 7, figs. 2–2*b*, 3–3*b*, 1905—substitute for *C. robustus*, preoccupied.

*Ctenomys fodax* Thomas, Ann. Mag. Nat. Hist., (8), **5**, p. 243, 1910—Valle del Lago Blanco, Chubut, Argentina.

*Ctenomys talarum fodax* Rusconi, Anal. Soc. Arg. Est. Geog., **3**, p. 243, 1928.

Similar in size and general characters to *C. magellanicus*, but prevailing color much darker, brownish ochraceous rather than grayish buff. Skull also similar, but with audital bullae narrower, more laterally compressed.

*Range.*—Valleys along the eastern base of the Andes from west-central Santa Cruz, Argentina, northward to west-central Chubut, passing locally into Chilean territory.

This form has heretofore been regarded as a species distinct from *C. magellanicus*, but its obviously close relationship seems best indicated by the subspecific status. It differs mainly and rather markedly in color, but this, as noted by Allen in his report on the original series of 23 specimens, is subject to some variation. A considerable area, unrepresented by specimens, lies between the southernmost localities for *osgoodi* and the northernmost ones for *magellanicus*. Whether or not actual intergradation will be found in this area is of course uncertain, but probabilities seem to favor it. The skulls of *osgoodi* are characterized by narrow audital bullae which are notably different from those of *fueginus*, but which are approached by those in the few available skulls of *magellanicus*.

Although stated to be from the "Rio Chico near the Cordilleras," it is clear from the "Narrative of the Princeton Expeditions," quoted by Allen himself (1905, p. 40), that the type of *robustus* (=*osgoodi*) was taken in the basin of the Mayer River, which is somewhat farther west. Since this river traverses Chilean territory for some distance before emptying into a northern arm of Lake San Martin, it is altogether probable that the species extends into Chile in this region.

Three specimens in Field Museum collected by myself at Rio Nirehuao (Casa Richards) in eastern Chile and one from Valle del Lago Blanco, Chubut, the last a topotype of *C. fodax*, are here referred to *osgoodi*. The various slight characters enumerated in the description of *fodax* seem to be of a kind that may be found in any local colony of the animals, but which have no stability beyond the limits of effective close breeding. Such characters have been noted frequently in the North American *Thomomys* and at least in some cases have been referred to as indicating a "differentiate" rather than a subspecies in the usual sense. In this case, some of the characters are found in the topotype from Valle del Lago Blanco,

but are not repeated in specimens from Rio Nirehuao, indicating that they are very local and probably unstable.

*Specimens examined.*—Total 4: ARGENTINA: Valle del Lago Blanco, Chubut, 1. CHILE: Rio Nirehuao, 3.

**Ctenomys magellanicus dicki** subsp. nov.

*Type* from Estancia Ponsonby, east end of Riesco Island, Magallanes, Chile. No. 50734 Field Museum of Natural History. Adult male. Collected February 2, 1940, by Colin C. Sanborn. Orig. No. 2401.

*Diagnosis.*—Similar in general to *C. m. magellanicus*, but differing widely in color, being wholly mixed blackish and buffy Smoke Gray both above and below.

*Color.*—Upper parts and sides mixed buffy Smoke Gray and black, the mixture about evenly divided anteriorly, the black predominating on the lower back; under parts scarcely lighter but with slight brownish tone; forehead and sides of nose at base of whiskers almost entirely black; cheeks and orbital region slightly grayer than elsewhere; fore and hind feet largely blackish or brownish with toes lighter; tail mixed black and gray except in apical fourth where there is a sharply contrasted narrow white line above and below, ending in a short white pencil.

*Skull.*—Essentially as in *C. m. fueginus*, but the audital bullae slightly smaller and shorter; interorbital space slightly wider as in *magellanicus*.

*Measurements.*—Adult male (type) and female respectively: total length 290, 275; tail 80, 72; hind foot 40, 37. Skull: greatest length 53, 47.7; occipito-nasal length 48.5, 46.3; basilar length 44.3, 40.2; zygomatic width 29.5, 26.8; interorbital width 10.7, 9.7; mastoid width 26.5, 25.4; nasals 19 × 7.3, 17.3 × 6.9; diastema 15.6, 13.5; upper toothrow (alveoli) 10.8, 10.2, (crowns) 9.8, 9.5.

*Remarks.*—This very distinct form is doubtless confined to the eastern part of Riesco Island where it is already rare and difficult to obtain. Although this part of the island is not forested, it has but little open grassland, being largely covered with a heavy growth of the "mata negra" or black brush (*Chiliotrichum diffusum*).

During a few days' stay in this region we were able to obtain only two specimens, an adult male and female, these apparently being the only occupants of a small area where about a dozen burrows were found. The two specimens are essentially alike in color

with the dark bluish black predominating but everywhere mixed with lighter, giving them a uniform speckled appearance. It is, of course, possible that these specimens may represent some form of melanism, but the island habitat, the regularity of markings, and the absence of anything of the sort in the close relatives seems to make this unlikely. The channel separating Riesco Island from the mainland is deep and permits the passage of vessels of considerable size, but at one or two points it is quite narrow, perhaps not more than a few hundred feet.

The new form is named in honor of Mr. John Dick, prominent and well-known citizen of Punta Arenas, through whom our brief visit to Riesco Island was made possible, and to whom we are indebted for much other assistance.

**Ctenomys maulinus maulinus** Philippi.

*Ctenomys maulinus* Philippi, Zeitsch. gesammt. Naturw., Berlin, Neue Folge, 6, pp. 442–445, 1872—Laguna de Maule, lat. 36° S., Province of Talca, Chile.

A medium-sized, uniformly colored, light brown (Snuff Brown) tuco tuco; tail with a short white pencil at the tip. Skull with a persistent fronto-parietal fontanelle, a wide flat interorbital space and scarcely evident postorbital processes; audital bullae relatively short and swollen. Total length 275–300; tail 83–90; hind foot 38–40. Skull length 49; zygomatic breadth 27.6; cheekteeth 10.[1]

*Range.*—Known only from the type locality.

Since Philippi's description of *Ctenomys maulinus*, some seventy years ago, no specimens certainly representing it had been critically examined. Therefore, in November, 1939, Mr. Sanborn made a somewhat hurried trip into the Province of Talca for the purpose of obtaining topotypical material. At that time snow was still heavy on the mountains and travel conditions somewhat difficult, but he succeeded in obtaining three specimens, all females, on the upper Rio Maule, two from Arroyo del Valle and one from a locality some fourteen kilometers above the settlement of Curillanque.

The species proves to be a very distinct one not greatly inferior in size to *C. magellanicus osgoodi* of northwestern Argentina, but it shows many detailed differences making it uncertain whether or not it should be regarded as a northern representative of the *magellanicus* series. Among these differences are its duller color, its broader interorbital space, open fronto-parietal fontanelle and the reduction or absence of the "petro-tympanic bulb" between the squamosal, parietal, and supraoccipital. Although much darker in color, it is

[1] Measurements are of females only, no males being available.

possible that it may be somewhat related to *C. emilianus,* which is found in the same latitude on the eastern side of the Andes.

In one of his later papers (Ann. Mag. Nat. Hist., (9), **20,** p. 210, 1927), Thomas adopted the name *maulinus,* "on the ground of locality," for a small tuco tuco of the *mendocinus* group from Chos Malal, Neuquen, Argentina.[1] Chos Malal, however, is well east of the cordillera, open to the pampas, whereas Laguna Maule, although in about the same latitude, is on the west side in a more or less forested region. So far as known, the *mendocinus* group does not extend into Chile at any point, being almost wholly confined to the open pampas where it has developed numerous subspecific forms. The one from Chos Malal, if recognizable, is thus without a name, but it does not seem advisable to supply one until further work has been done on the group.

The type of *maulinus* has disappeared, but from its published measurements it is evident that the specimen was immature. Philippi, himself, says: "Ich muss übrigens bemerken, dass nach Herrn Medina bedeutend grössere Exemplare vorkommen." In his account of *maulinus,* Philippi also reports tuco tucos from the "Termas de Chillan" somewhat farther south than Laguna Maule.

The skull of an adult female furnishes the following measurements: greatest length 49; basilar length 41.5; zygomatic breadth 27.6; interorbital breadth 9.9; nasals 17 × 8.2; diastema 13.3; upper cheekteeth (crowns) 10.

**Ctenomys maulinus brunneus** subsp. nov.

*Type* from Rio Colorado, Province of Malleco, Chile. Alt. 3,000 ft. No. 23215 Field Museum of Natural History. Young adult male. Collected February 5, 1924, by Colin C. Sanborn. Orig. No. 691.

*Diagnosis.*—Similar to *C. m. maulinus,* but much darker, browner, and more richly colored. Upper parts Cinnamon Brown to Prout's Brown; under parts Cinnamon Rufous to Hazel; feet dull buffy white; tail brown above, pale buffy below with a buffy white pencil at the tip. Skull with audital bullae narrow and elongate instead of short and swollen.

*Measurements.*—Two males: total length 305, 282; tail 95, 78; hind foot 42, 37. Skull of adult male: greatest length 51; zygomatic

[1] The combination *Ctenomys mendocinus maulinus* is used by Yepes (Rev. Cent. Est. Cienc. Nat., **2,** No. 4, p. 12, 1938).

breadth 29.4; width across postorbital processes 12.7; least interorbital width 10.4; nasals 20 × 7.7; diastema 14; upper cheekteeth (crowns) 10.8.

This form is represented by two adults and two immatures from a locality some two hundred miles south of Laguna Maule and on

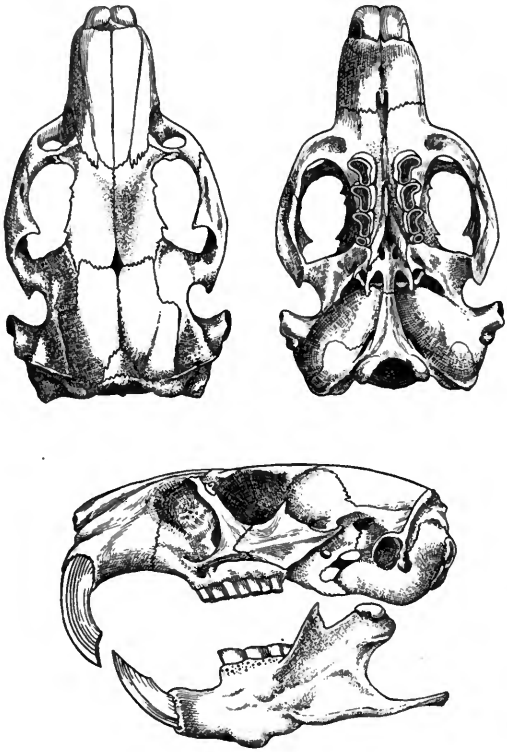


FIG. 16. *Ctenomys maulinus brunneus.* F.M. No. 23214. × 1.

the same western slope of the Andes. In the intervening region tuco tucos have been reported, but no specimens are extant. It is decidedly darker in color than typical *maulinus* and, although it is necessary to compare males of one with females of the other, the skulls show such pronounced difference in the size and shape of the audital bullae that further cranial characters may be expected when adult males of both forms are available.

It is also represented by two specimens in the American Museum of Natural History, obtained by H. E. Anthony "west of Lonquimai"

in the Province of Cautin. Although not directly compared, these appear the same as those in Field Museum.

**Ctenomys fulvus** Philippi.

*Ctenomys fulvus* Philippi, Reise durch die Wüste Atacama, pp. 157–158, Zool., pl. 1, 1860—vicinity of Pingo Pingo, about lat. 24° S., alt. 9,000–11,000 ft., Atacama Desert, Chile.

*Ctenomys atacamensis* Philippi, supra cit., pp. 158–159, Zool., pl. 2, fig. 1, 1860—Tilpozo, about lat. 23° 20′ S., Atacama Desert, Chile.

*Ctenomys pallidus* Philippi, Anal. Mus. Nac. Chile, Zool., Ent. 13a, pp. 13–15, pl. 4, fig. 1 (col.), pl. 5, figs. 3*a*, 3*b*, 3*c* (skull figured under name *brasiliensis*), 1896—Breas, southwest of Antofagasta de la Sierra, about lat. 26° 3′ S. and long. 67° 56′ W., alt. 9,000–10,000 ft., Chile.

*Ctenomys pernix* Philippi, supra cit., pp. 15–16, pl. 5, fig. 5 (skull), pl. 6, fig. 2 (col.), 1896—Aguas Calientes, near Socaire, east of Salar de Atacama, about lat. 23° S., long. 68° 16′ W., Chile.

*Ctenomys chilensis* Philippi, supra cit., pp. 16–17, pl. 6, fig. 1, 1896—said to be from Cordillera of Linares, but probably from Atacama Desert, Chile.

Similar to *C. robustus*, but smaller, shorter-tailed and somewhat darker colored especially on the head and upper side of tail. Total length 282–335; tail 84–96; hind foot 42–46.

*Range.*—High altitudes in the eastern part of the Province of Antofagasta near the Bolivian and Argentine boundaries.

Eight fine specimens taken by Sanborn near San Pedro de Atacama appear to represent this species. They are the only modern specimens from the Atacama region and have not been compared directly with Philippi's types, but they agree in all general respects with his descriptions and figures and the locality is in the region from which his material came.

The species is one of large size, although smaller than *robustus*, and the color is not excessively pale. The upper parts are slightly grizzled Clay Color, the sides considerably paler than the back; the under parts are uniform, clear Cinnamon Buff; the forehead and a narrow line around the mouth are definitely darkened or even slightly blackish; the tail is blackish brown above with a light pencil; the feet are whitish buff with some darkening medially and proximally. Flesh measurements of a good-sized male are: total length 335; tail 96; hind foot 46.

The relationship of *fulvus* to later described forms from Bolivia and Argentina remains to be determined, but such material as is at hand seems to indicate fairly close affinity to *coludo*, *famosus*, and *johannis* of Catamarca, Rioja, and San Juan, Argentina. All

of these have relatively small feet, but it is not unlikely that they will be found eventually to be no more than subspecies of *fulvus*.

The types of *fulvus*, *atacamensis*, *pallidus*, and *pernix* were found in the museum at Santiago in a fairly good state of preservation although all are mounted and exposed to light. No material was available for comparison and only general notes could be taken, the skulls in several cases being inside the skins. So far as all general characters are concerned, however, they offer no evidence that all are not one and the same species. Since the localities are all in the same region, some of them quite close to each other, the only reasonable course at this time is to unite them all under one name.

The following is a transcript of the notes made when the specimens were examined:

"*Ctenomys fulvus*.—Type existing and identifiable from posture, which agrees with plate. Skull inside and could be removed. Color on back much as in plate, sides paler, more whitish. Hind foot measures 43. Tail quite hairy as in plate but not expanded at tip, this being because it is split. Width of upper incisors 5.5."

"*Ctenomys atacamensis*.—Type existing and identifiable from posture. Skull inside. Color and all general characters as in *fulvus*. Hind foot now 31. Width of upper incisors 4.5. In all probability it is only the young of *fulvus*."

"*Ctenomys pallidus*.—Type existing and identifiable. Skull removed and cleaned. It is the one mistakenly indicated as *brasiliensis* on Philippi's plate (l.c., 1896, pl. 5, fig. 3*b–c*), which in his text (p. 14) he indicates is his *pallidus*. The color is considerably like that in Philippi's figure, though of course the feet are plain buffy like the under parts. The color is a little darker than that of *fulvus*, but the general appearance is similar and probably there is close relationship. Hind foot 45. The skull is fairly adult but doubtless there could be larger examples. Skull measurements: greatest length 54; basilar length 45.5; occipito-nasal length 53; zygomatic width 33.5; mastoid width 32; nasals 19 × 8; diastema 15; upper toothrow 11.3; width upper incisors 7.3; width across postorbital processes 14.5; depth infraorbital fossa 11; greatest mandibular breadth 47.2."

"*Ctenomys pernix*.—Type existing. Skull removed and cleaned. Apparently this is the skull figured by Philippi, but more of it is broken away now. The color is much like that of *pallidus*. It may well be only the young of *pallidus*. Hind foot 34. Toothrow 8, nasals 13.5 × 6, zygomatic width 25. Skull is young and lacks postorbital processes. Philippi's figure gives entirely erroneous idea

of the color and size. The color should be about like *pallidus*, shown on preceding plate."

As to the authenticity of these types there can be scarcely any doubt unless possibly it be in the case of *pernix*. All the others coincide so precisely with the figures as far as attitude and details of position are concerned that they are unmistakable. My notes on the supposed type of *pernix* are not specific as to agreement with the figure and the matter is complicated by Philippi's statement (l.c., 1896, p. 15) that the specimen figured was lost. If it was not in his hands when the description was written, doubtless the one examined by me and now labeled *pernix* formed the basis of the description and might be regarded as the type. On the other hand, the specimen may have been only temporarily mislaid, or, if misappropriated, it may have been surreptitiously returned, as I was informed has happened in several other cases. Wolffsohn has published a note (1921, p. 525) in which he states that the types of *pallidus* and *pernix* were collected by a Sr. Carlos F. Rahmer who expressed the opinion that one was the female and the other the male of the same species. This coincides to some extent with information which I, myself, received directly from employees of the museum in Santiago who entertained me with what they said had long been a stock story among themselves to the effect that Philippi had given separate names to several *Ctenomys*, all of which were caught at one burrow. So far as published records and present labels go, however, different localities are assigned to them, but since these are all in the same region the conclusion that all are synonyms of *fulvus* is not likely to be affected.

*Ctenomys chilensis* offers a further complication for, although it is said to come from the cordillera of Linares in a distant and very different region, the unmistakable type specimen is indistinguishable by external characters from the others from Atacama. The inference is very strong, therefore, that Philippi was wrong in assigning this specimen to Linares. This leads to the possibility of a transposition in which it might be assumed that the one from Linares, if there was one, was the specimen mentioned under *pernix* as lost, and the one called *chilensis* is really from Atacama as its characters seem to indicate. Obviously the specimens were mounted by taxidermists before being described and figured, and labels, if there were any, were subject to easy transposition. In the case of *pernix* it may be best under the circumstances to disregard the figure and consider the name based on the description and the specimens known to be

in hand when it was written. As for *chilensis*, it stands or falls with its type specimen. That it came from Atacama needs confirmation by removal and careful examination of its skull, but until this is done it may be regarded, like the others, as a synonym of *fulvus*. The type of *chilensis* is mounted in a unique position with the head greatly elevated. This position is faithfully reproduced in Philippi's figure so the identification of the specimen is in no doubt. My notes upon it are brief but quite conclusive, as follows:

"*Ctenomys chilensis*.—Type existing and readily identifiable from posture. Skull inside. It is evidently a young animal and slightly darker than *pallidus* and *pernix* but not nearly so dark as shown in Philippi's figure, which is all wrong as to color. It is simply a pale buff animal with rather long, soft fur like the northern ones and might even be the lost specimen of *pernix* mentioned by Philippi. The under parts are fulvous except a somewhat lighter patch on the throat. The feet are whitish buff."

*Specimens examined*.—Total 15: Twenty miles east of San Pedro de Atacama, at 12,000 feet, 8; Chilean boundary near Silalo, Bolivia, at 14,000 feet, 1; Atacama Desert, 6 (Santiago Museum, including types of *fulvus*, *atacamensis*, *pallidus*, *pernix*, and *chilensis*).

### Ctenomys robustus Philippi.

*Ctenomys robustus* Philippi, Anal. Mus. Nac. Chile, Zool., Ent. 13a, pp. 11–13, pl. 4, fig. 2, pl. 5, figs. 1*a–d*, 1896—near Pica, Tarapaca, Chile.

A large, short-tailed and thickset burrowing rodent of uniformly pale buffy color. Total length 360; tail 111; hind foot 55.

*Range*.—Known only from moderate elevations in central Tarapaca.

Four specimens in Field Museum from Canchones, which is in the open plain between Pica and Noria, might almost be regarded as topotypes, since the exact locality of Philippi's type is unknown. The species appears to be quite distinct, of very large size, pale, sandy, uniform coloration, and having a large, heavily ridged skull with swollen audital bullae and broad, cuneate nasals. The pelage is ample but somewhat coarser and harsher than in *fulvus*. The largest of the recent specimens does not quite equal the type, but its skull agrees with the figure of the type in all general respects. Notes on the type are as follows:

"*Ctenomys robustus*.—Type existing and identifiable from posture. It is mounted in a small group with another specimen which is shown emerging from its burrow. Skull removed and cleaned and agrees

with Philippi's figures, which are quite good except the side view, which is confused in the postorbital region. The skin is much paler than Philippi's figure (which is reduced size), but darker than *pallidus, fulvus,* etc., and with shorter and slightly coarser hair. Doubtless a good species. Hind foot 48. Skull: greatest length 61; occipito-nasal length 57; zygomatic width 42; mastoid width 39; nasals 23 × 10; diastema 18; upper toothrow 12.3; width of upper incisors 10.5; width across postorbital processes 21; depth of infraorbital foramen 13; greatest mandibular width 56.6."

*Specimens examined.*—Total 5: Canchones, Salar de Pintados, Tarapaca, 4; near Pica, Tarapaca, 1 (type).

**Ctenomys opimus** Wagner.

*Ctenomys opimus* Wagner, Arch. Naturg., **14**, (1), pp. 75–78, 1848; Thomas, Ann. Mag. Nat. Hist., (7), **6**, p. 1900 (locality)—Sahama, Bolivia.

Pelage long and soft; general color buffy gray with the top of the head and sometimes the mid-dorsal line blackish. Total length 295–395; tail 85–100; hind foot 37–42.

A specimen taken by Sanborn at Choquelimpie, Tacna, at an altitude of 15,000 feet furnishes the only Chilean record. It agrees closely with a series from Mount Sahama.

**Myocastor coypus coypus** Molina. COYPU.

*mus coypus* Molina, Sagg. Stor. Nat. Chili, pp. 287–288, 342, 1782—rivers of Chili.

*Myopotamus Coypus* Commerson MS., Geoffroy, Ann. Mus. Paris, **6**, p. 81, 1805.

*Myopotamus coypu albomaculatus* Fitzinger, Sitzungsber. K. Akad. Wiss., Wien, Math.-Naturw. Cl., **56**, p. 134, 1867—Chile.

*Myopotamus coypu dorsalis* Fitzinger, supra cit.—no locality.

A very large heavily pelaged aquatic rodent with a long, rounded, tapering, and thinly haired tail; middle toes of hind feet connected by a basal web; mammae situated high on the sides near the middle line of the back rather than on the abdomen. Total length 800–900; tail 350–400; hind foot 130–140.

*Range.*—Rivers and lakes of central Chile west of the Andes from the Province of Coquimbo and the vicinity of Valparaiso to the vicinity of Concepcion and the Bio Bio River.

The coypu of central Chile is doubtless the one to which Molina's name *coypus* should be restricted. Although still found in some numbers near populous districts, it is doubtless much less common than formerly. Bridges (Proc. Zool. Soc. Lond., 1843, p. 130) says: "The places where the Coypo most abounds in Chile are the

borders of the river Maypo near Santiago, the capital of the country, also in the lakes of Aculeo and Quintero." Specimens from this region are lacking in Field Museum, but it seems fair to assume that they would be at least as pale in color as those from Malleco and Cautin which have been used to represent the typical form of the species. Four examples from Valparaiso taken in 1880 and 1887 are listed by Wolffsohn and Porter (1908). Wolffsohn (1923) records specimens from Penco, Concepcion, and Cachapoal collected in 1901 and 1907.

There are also in Field Museum two specimens from Santa Cruz, Bolivia, which obviously belong to a distinct form. These are exceedingly large and dark colored, the upper parts almost wholly clear blackish brown. At least until further information about its type specimen is forthcoming, the name *popelairi* (*Mastonotus popelairi* Wesmael, Bull. Acad. Roy. Sci., Bruxelles, **8**, pt. 2, pp. 59–61, 1841 —Bobica, Bolivia) may be applied to this form. With this and the dark form of southern Chile described below, the subspecies of *coypus* will be as follows:

*Myocastor coypus coypus* Molina, central Chile.
*Myocastor coypus melanops* Osgood, southern Chile.
*Myocastor coypus santacruzae* Hollister, southwestern Argentina.
*Myocastor coypus bonariensis* Geoffroy, northeastern Argentina and Uruguay.
*Myocastor coypus popelairi* Wesmael, southeastern Bolivia.

The name *Castor huidobrius* of Molina and subsequent ones derived from it (as *Guillinomys chilensis* Lesson 1842) must be regarded as composite and unidentifiable. Molina's description is a hopeless combination of the characters of coypu and otter, plainly being derived from confused reports from natives (see under *Lutra provocax*, p. 88).

*Specimens examined.*—Total 8: Lake Malleco, Cautin, 5; Bio Bio River, near Concepcion, 1; Rio Andalien, Concepcion, 2.

**Myocastor coypus melanops** subsp. nov.

*Type* from Quellon, Chiloe Island. No. 24338 Field Museum of Natural History. Young adult male. Collected January 30, 1923, by Wilfred H. Osgood. Orig. No. 5548.

*Diagnosis.*—Similar to *M. c. coypus*, but darker and more richly colored; top of head and sides of face mainly blackish brown (between Vandyke Brown and Black); forelegs very dark brown; light-tipped hairs of body and sides of neck rich Hazel or Sanford's Brown rather than Clay Color or Cinnamon.

*Skull and teeth.*—Essentially as in *M. coypus.*

*Measurements.*—Type: total length 880; tail 365; hind foot 135. Skull of type: greatest length 115; basilar length 90; zygomatic width 67; nasals 42.5; interorbital width 24.3; upper toothrow (alveoli) 29.2.

*Remarks.*—A series of seven coypus taken on Chiloe Island is uniformly rich colored in comparison with the few available speci-

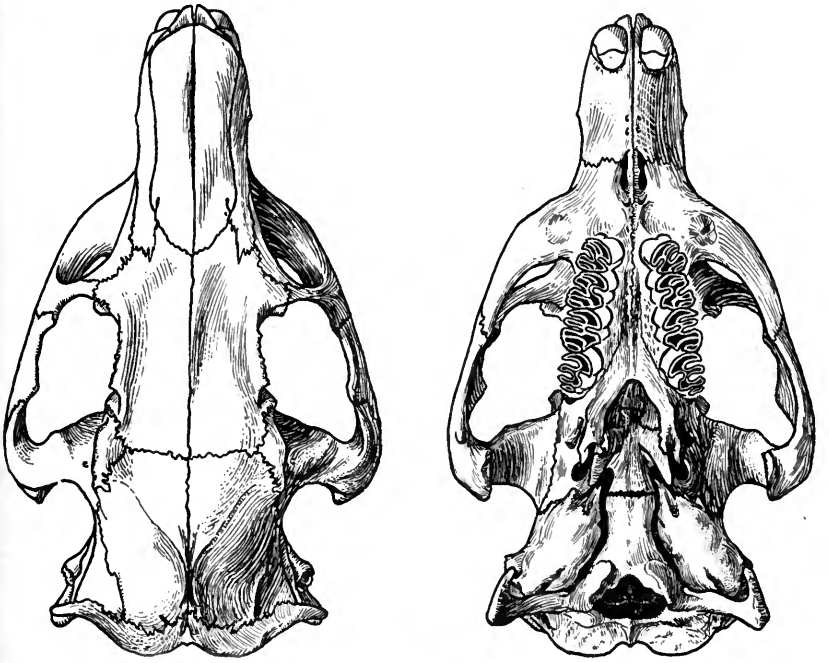


FIG. 17. *Myocastor coypus melanops.* F.M. No. 24338, type. × ¾.

mens from central Chile. No specimens from the southern mainland have been examined, but it seems quite probable that a dark form may be found throughout the relatively cool, humid forest region from Valdivia southward, perhaps even to the Straits of Magellan. On Chiloe Island the animals were found about the mouths of streams in brackish water and they doubtless enter salt water freely. That the form here described is confined to the island, therefore, is improbable. The physical conditions in southern Chile are vastly different from those of the region inhabited by typical *coypus* and if a recognizable distinction were not found it would be exceptional. Specimens from the extreme south are not available. Some 3,000 skins are reported as marketed at Punta Arenas in 1939.

The weight of a freshly killed adult male was found to be 9¼ pounds; of two females 7¼ and 8¾ pounds.

**Chinchilla chinchilla velligera** Prell. CHILEAN CHINCHILLA.

*Chinchilla laniger* or *lanigera* of various authors, not *Mus laniger* of Molina which is composite and unidentifiable (see Osgood, 1941).

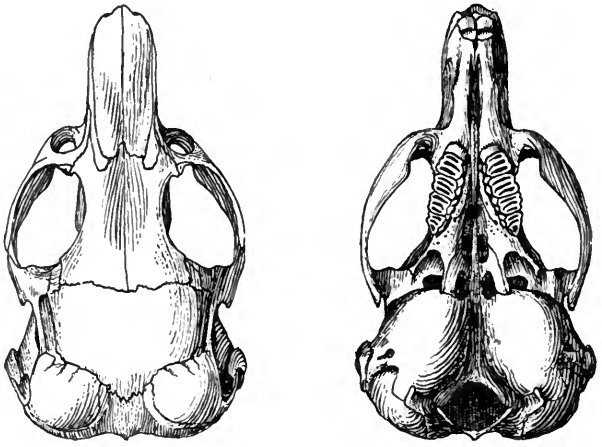


FIG. 18. *Chinchilla chinchilla velligera.* F.M. No. 44344. × 1.

*Chinchilla velligera* Prell, Zool. Anz., **108**, p. 100, 1934 (based on the *Chinchilla lanigera* of Bennett, Gard. Menag. Zool. Soc. Lond., **1**, p. 1, 1829)—from Chile; vicinity of Coquimbo, by present selection.

*Chinchilla chinchilla velligera* Osgood, Journ. Mamm., **22**, p. 411, 1941.

A medium-sized rodent with long, soft, and lax pelage, pale gray color, large rounded ears, five front toes, three well-developed hind toes and a rudimentary fourth. Length of head and body about 10 inches, of tail about 6 inches. Said to differ from northern and eastern varieties (Peru and Bolivia) in smaller size, longer tail, and more grayish color.

*Range.*—Coast hills of northern Chile from the vicinity of Coquimbo to the vicinity of Copiapo and northeastward in the cordillera for an unknown distance.

Although greatly reduced by continued persecution for its fur, the chinchilla is still represented by isolated colonies which are scattered over much of its original range. This range was in the northern, more arid part of Chile from the southern part of the Province of Coquimbo northward. Gay states that it was more common in the coastal hills than in the cordillera, and its southern limit he gives as the Rio Choapa (lat. 32°). In northern Chile, however, chinchillas undoubtedly enter the cordillera and pass into

Argentina and Bolivia where they are found at very high altitudes. Records from the cordillera south of lat. 32° are lacking. Whether these northern animals belong to the so-called Chilean variety or to the Peruvian is doubtful, but it seems quite probable that there is gradation between them as in the case of other mammals of the same region. Tschudi states that the Peruvian form, in times when it was abundant, ranged from the coast near Lima to elevations as high as 11,000 feet. The Chilean one, therefore, may well have done the same. A difference in size, and especially in length of tail, between Chilean and Peruvian chinchillas was recognized by various early authors, especially by Waterhouse (Nat. Hist. Mamm., **2**, pp. 236–242, 1848), who calls the Chilean the "Smaller Chinchilla" and the Peruvian the "Short-tailed Chinchilla." More recently Brass (Aus dem Reich. der Pelze, Berlin, **2**, p. 613, 1911) and Prell (l.c.) have added a third variety (*boliviana*) and stated that all three are commonly recognized in the fur trade. Prell states that the Peruvian and Bolivian forms differ only slightly in color and he implies that they may be no more than subspecifically separable, but he evidently believes the Chilean form to be quite distinct from them. Without well-docketed material it may not be possible to gainsay his conclusions, but the distinctions made in the fur trade, while doubtless related to definite taxonomic characters, do not furnish a sound basis for classification. In this case, however, the animal has become extinct over most of its original range and it is doubtful if any better basis will ever be available.[1] At least for the present, therefore, the

[1] A classification used in the fur trade is indicated by the following, received from the Pan American Chinchilla Corporation, Inc., of Calama, Chile: "Three species of chinchillas still in existence in South America [are] trade-named *Chinchilla boliviana, Chinchilla cordillerana* and *Chinchilla costina*. Without doubt a fourth species of chinchilla had formerly existed in certain sections of northern Chile, in southern Peru and in Bolivia, though very small in number. It was the least prolific one in the chinchilla family with but one young (and one litter) per year. In the old pelt trade it was trade-named *Chinchilla realis, real*, or *fina*. None of the former fur traders or the chinchilleros have seen a *Chinchilla realis* for approximately 25 years, or heard of one alive.

"Therefore the *boliviana* species is the finest known alive in so far as breed and quality are concerned. This animal is exceedingly rare in captivity as well as in the wild state, and without doubt will be entirely extinct in the Cordilleras within a short time.

"The *cordillerana* is smaller in size of body, the fur very fine in texture, but not quite as deep and dense as the fur of the *boliviana*. Its head is not quite as thick and stubby as that of the *boliviana*, the ears slightly closer together.

"The *costina* presents a difference in appearance by having large, long ears, a long tail and a very pointed head; the pelt is considerably less dense and less deep than that of the other species. The *costina* exists in wild state at an elevation ranging from 4,000 to 8,000 feet; a hundred years ago it lived down to the very sea coast of Chile (center north)."

arrangement proposed by Prell may be accepted in which a Chilean, a Peruvian, and a Bolivian form are recognized. These may stand as follows:

CHINCHILLA CHINCHILLA CHINCHILLA Lichtenstein. Peruvian Chinchilla.

*Eriomys chinchilla* Lichtenstein, Darst. neu. o. wenig. bek. Säugeth., 2 pages (unnumbered), pl. 28, 1829—no exact locality; vicinity of Lima, Peru, by present selection.[1]

*Chinchilla brevicaudata* Waterhouse, Nat. Hist. Mamm., **2**, p. 241, 1848—based on the same specimen as *Eriomys chinchilla* Lichtenstein; evidently a renaming to avoid tautonymy.

*Chinchilla major* "Burmeister" Trouessart, Cat. Mamm., nov. ed., **3**, p. 628, 1897—under *Chinchilla brevicaudata;* apparently a latinization of "la variation grande" of Burmeister.

CHINCHILLA CHINCHILLA VELLIGERA Prell. Chilean Chinchilla.

*Chinchilla lanigera* Bennett, Gard. Menag. Zool. Soc. Lond., **1**, p. 1, 1829; *Chinchilla laniger* Gray, Spicilegia Zool., p. 11, pl. 7, fig. 1, 1830—Coquimbo, Chile.

*Chinchilla velligera* Prell, Zool. Anz., **108**, p. 100, 1934—based on the *Chinchilla lanigera* of Bennett, from Chile, probably from Coquimbo (see Waterhouse, Nat. Hist. Mamm., **2**, p. 239, footnote, 1848).

CHINCHILLA CHINCHILLA BOLIVIANA Brass. Bolivian Chinchilla.

*Chinchilla boliviana* Brass, Aus dem Reich. der Pelze, Berlin, **2**, p. 613, 1911—Bolivia.

*Chinchilla intermedia* Dennler, Animales Peliferos, No. 12, Buenos Aires, 1939 (fide Cabrera, in litt.)—Andes of Bolivia and Argentina.

Thus it appears, although chinchillas have been treated in literature for more than 150 years under many names and combinations, the Chilean form did not receive a valid specific name until 1934, the Bolivian one was not distinguished until 1911, and the Peruvian one retains the tautonymous name *chinchilla,* although it was not the basis of the generic name. All other names involve various combinations with or synonyms of *Mus laniger* Molina, which it now appears should be rejected as unidentifiable. The nomenclatural tangle involved has been fully discussed elsewhere (Osgood, 1941).

The present condition of the chinchilla in Chile is a precarious one, doubtless becoming more so from year to year. Although some

[1] Palmer's suggestion (Index Gen. Mamm., p. 270, 1904) that the locality was "probably Chile" does not accord with the characters of the specimens described.

local legislation has been enacted attempting protection, enforcement is next to impossible. As far back as 1924, when Mr. Sanborn was in northern Chile, he found "chinchilleros," or native chinchilla hunters, active and boasting of ability to catch one or two animals per month, evidently enough to make it profitable from their standpoint. They worked in total disregard of law. At that time he found at least one man in La Serena, Coquimbo, who was attempting to breed the animals in captivity and had kept a small number for as many as six years. Others in the same vicinity are said to have been engaged in breeding experiments during the past twenty-five years, at least some of them under government license, but such reports as are available indicate little success.[1]

Two skins and skulls and two additional complete skeletons, purchased from natives in La Serena, are in Field Museum. These were said to have been taken near La Higuera in coast hills not exceeding 2,000 feet in height and about sixty miles north of La Serena. Measurements taken by Sanborn from two freshly killed females are as follows: total length 425, 376; tail 151, 136; hind foot 59, 57; ear 63, 62.

**Lagidium viscacia viscacia** Molina. MOUNTAIN VISCACHA.

*lepus viscacia* Molina, Sagg. Stor. Nat. Chili, pp. 307–308, 342, 1782—Chilean Andes; cordillera of Santiago by present selection.

*Lepus chilensis* Oken, Lehrb. Naturg., **3**, Abt. 2, p. 836, 1816—Chile.

*Lagotis criniger* Lesson, Nouv. Tabl. Reg. Anim., Mamm., p. 105, 1842—nomen nudum; Gay, Hist. Chile, Zool., **1**, pp. 92–95, 1847; Atlas, pls. 5–6, 1848—central provinces of Chile.

*Lagidium crassidens* Philippi, Anal. Mus. Nac. Chile, Zool., Ent. 13a, p. 10, pl. 3, fig. 1 (as *L. peruanum*), 1896—Chile.

*Viscaccia viscacia* Lahille, Anal. Soc. Cient. Arg., **62**, pp. 39–44, 1906.

*Viscaccia viscaccia* Thomas, Ann. Mag. Nat. Hist., (7), **19**, p. 441, 1907.

*Lagidium viscaccia* Thomas, supra cit., (9), **3**, p. 500, 1919.

A large rodent with dense soft pelage, elongated ears, and a long, heavily crested tail. Total length 800; tail vertebrae 370; hind foot 112.

*Range.*—Andes of central Chile mainly in the provinces of Aconcagua, Santiago, and Valparaiso.

This is the best known of the mountain viscachas of Chile, and the one to which Molina's name *viscacia* very properly has been restricted. It is characterized by fairly large size and dark, sooty gray color. The dorsal stripe is rather short and inconspicuous and

[1] For a good account of the present status of the chinchilla see Bidlingmaier (1937).

the tail and feet are extensively sooty. Two adults measured by the collector have the following dimensions: total length 800, 795; tail 370, 365; hind foot 112. The skull is of good size with a long rostrum, premaxillae not greatly exceeding nasals, incisors orthodont and faintly or not at all pigmented, cheekteeth rather broad and heavy.

A skull labeled *crassidens* was found in the museum at Santiago. It is clearly the one figured as *peruanum* by Philippi (l.c., pl. 3, fig. 1) and, as appears from his text, the one which was the sole basis of the name *crassidens*. Philippi mentions no locality for it but, as already concluded by Thomas (l.c., 1919), it no doubt belongs to the common form of central Chile. The skull is rather larger than usual and the incisors are unpigmented. My own measurements of it are as follows: greatest length 95; occipito-nasal length 92; basilar length 78; zygomatic width 48; nasals 37.5 × 13; diastema 27.5; width across postorbital processes 25.5; cheekteeth 22.5.

*Specimens examined.*—Total 7: Near Limache, Valparaiso, 3; Palomar, Aconcagua, 1; Sewell, O'Higgins, 2 (B.M.); Sierra de los Condes, Santiago, 1.

**Lagidium viscacia cuvieri** Bennett.

*Lagotis cuvieri* Bennett, Proc. Zool. Soc. Lond., p. 59, 1833—South America ("In Peruvia?"); Tarapaca, Chile, by selection.

*Lagidium lutescens* Philippi, Anal. Mus. Nac. Chile, Zool., Ent. 13a, pp. 8–9, pl. 2, fig. 2 (col.), pl. 3, fig. 5, 1896—between Copacoya and Inacaliri, Tarapaca, Chile.

*V[iscaccia] Cuvieri* Thomas, Ann. Mag. Nat. Hist., (7), **19**, p. 441, 1907.

Similar to *L. v. viscacia*, but smaller, with general coloration buffy rather than grayish. Total length 565–649; tail 220–265; hind foot 93–100 (three specimens).

*Range.*—Mountains of northern Chile from northern Antofagasta, through Tarapaca into Tacna; probably extending also into adjoining parts of Bolivia.

The mountain viscacha of northern Chile is markedly different from *L. viscacia* of central Chile and direct evidence of intergradation between the two is lacking, but it may take place through some of the numerous forms named from Bolivia and Argentina. The original type of *cuvieri* was without definite locality, but Thomas (l.c.) has assigned the name to specimens from Tarapaca, doubtless after comparison with the type. *L. pallipes* is referred by

Thomas "more doubtfully" to the same species, but this conclusion is questionable, for the type of *pallipes*, supposed to be from Chile, is in reality from Argentina, "at an elevation of 4,000 to 5,000 feet,

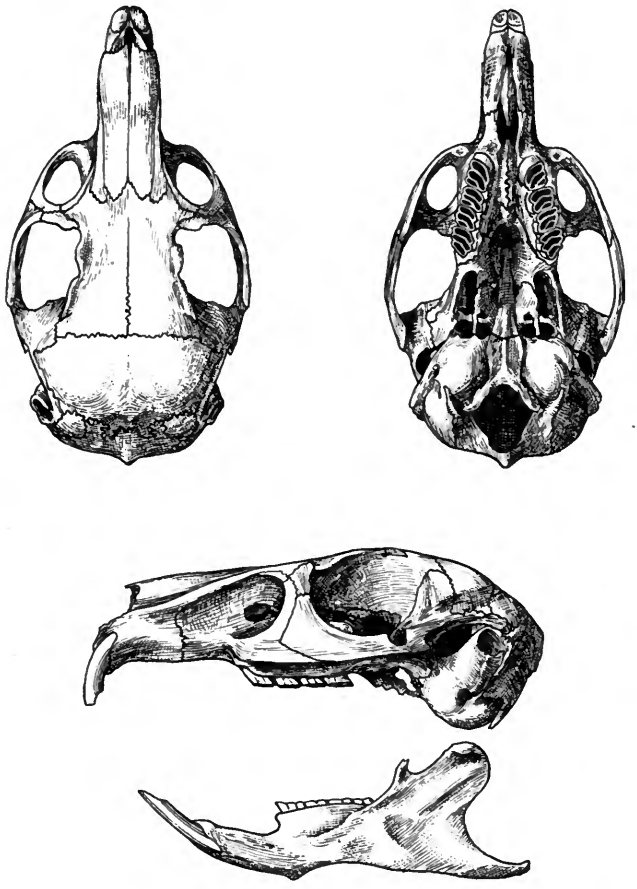


FIG. 19. *Lagidium viscacia cuvieri*. F.M. No. 24099. × ¾.

between Villavicencia and Uspallata," as very definitely stated by its collector, Bridges (1843, p. 132).

Another name for *cuvieri* is Philippi's *lutescens*, the type of which is well preserved, both skin and skull. The skin is mounted and identifiable by pose and color. The label states the date as 1885 and the collector as C. Rahmer. It is paler and more buffy than Philippi's plate, and the tail is longer and more slender. The dorsal stripe is rufous or chestnut and probably never was black. The

under parts are bright fulvous as he shows them, but the head is grayish buff or Isabella color, not reddish brown. The hind foot measures 95 and the ear from notch 60. The skull of the type agrees well with Philippi's figure (l.c., pl. 3, fig. 5).

Measurements of the skull are: greatest length 80.5; occipitonasal length 77.5; basilar length 64; zygomatic width 40.5; mastoid width 30; nasals 30 × 9.2; diastema 23; interorbital width 18.5; upper toothrow (alveoli) 19.

Among the specimens representing *cuvieri* in Field Museum are three from Silalo, Bolivia, a locality only a short distance from the Copacoya district in Chile from which the type of *lutescens* came. These serve to confirm the disposition of *lutescens* as a synonym of *cuvieri*. A further probable synonym is *V. lutea* (Thomas, l.c., p. 443), since the description offers nothing to distinguish it and since the locality (Esperanza, Sahama, Bolivia) is very near southwestern Tacna whence Field Museum has specimens of *cuvieri*.

As compared with other Chilean forms, *cuvieri* is rather small in size and "yellowish" in color. The hind foot is less instead of more than 100 mm. in length and the upper parts are suffused with the ochraceous tones which always prevail on the under parts. The skull has a short rostrum, the premaxillae are somewhat expanded behind and extend well beyond the nasals; the interlacrymal depression is very pronounced, the audital bullae small, the incisors unpigmented and somewhat proodont, and the cheekteeth rather narrow.

*Specimens examined.*—Total 9: Choquelimpie, near Lake Chungara, Tacna, 1 (skull); near Copacoya, Tarapaca, 1 (type of *lutescens* in Mus. Nac. Chile); 20 miles east of San Pedro, Antofagasta, 4 (skulls); Silalo, Bolivia, lat. 22° S., near Chilean boundary, 3 (1 skull only).

### **Lagidium viscacia famatinae** Thomas.

*Lagidium famatinae* Thomas, Ann. Mag. Nat. Hist., (9), **6**, p. 421, 1920—La Invernada, Famatina Range, Rioja, Argentina.

Between the ranges of *viscacia* and *cuvieri* in north-central Chile a form is found which differs quite markedly from either. It is represented in Field Museum by a fine adult male obtained by Sanborn at Paiguano in the Province of Coquimbo. It is a large animal with the upper parts Pale Smoke Gray, broken by a sharply defined black dorsal stripe. Except for somewhat larger audital bullae, its skull is essentially as in *L. viscacia*, but its color leaves little doubt that its closest affinities are with some of the Argentine forms. But

few specimens of these are at hand for comparison, so it has seemed best for the present to refer this specimen to *famatinae*, the one which is geographically nearest.

The series of names which Thomas has applied to Argentine mountain viscachas includes *vulcani* (Jujuy), *tucumana* (Tucuman), *lockwoodi* (Catamarca), *famatinae* (Rioja), *tontalis* (San Juan), and *viatorum* (Mendoza). This series, therefore, runs from north to south and there is one name for every province. The physical conditions under which the animals live in this region are fairly uniform and one finds it difficult to accept the assumption that all these names are well founded. At least, with the connection apparently established by the Paiguano specimen here recorded, it seems desirable to reduce all of these names to subspecific status. *L. viatorum* is almost certainly a synonym of *pallipes*, which came from the same region, and it would not be surprising to find that the specimen here referred to *famatinae* is very close to *pallipes*. Whether or not *pallipes* enters Chile is uncertain and further examination of its type will be necessary to establish its distinction from *cuvieri*.

**Lagidium viscacia boxi** Thomas.

*Lagidium boxi* Thomas, Ann. Mag. Nat. Hist., (9), **7**, p. 180, 1921—Pilcaneu, vicinity of Lake Nahuelhuapi, Argentina.

Some assumption is necessary for giving this form a place in the Chilean fauna but, since the international boundary follows the heights of the mountains and this is the very region inhabited by *Lagidium*, the probabilities are entirely favorable.

According to the original description, *L. boxi* is closely allied to *moreni*, "the colour above darker and more suffused with yellowish." From the next-named form on the north, *sarae*, it is also said to differ in its "buffy or yellowish suffusion." Ellerman (Fam. Gen. Rodents, **1**, p. 232, 1941) gives it specific rank with *sarae* as a subspecies, apparently on the basis of its short ears and dark feet.

**Lagidium viscacia sarae** Thomas and St. Leger.

*Lagidium sarae* Thomas and St. Leger, Ann. Mag. Nat. Hist., (9), **18**, p. 639, 1926—Piño Hachado Pass, Argentine-Chilean boundary, lat. 38° 30′ S.

This is said to be "distinguishable by its dark grey colour, short ears, large molars, and narrow mastoids." Apparently it stands between *boxi* on the south and *viatorum* (?=*pallipes*) on the north, being more grayish than *boxi* and slightly darker than *viatorum*.

In the southern Andes, as in the north, there is a name for practically every locality from which specimens of *Lagidium* have been received. Ranges and relationships are matters for future determination.

**Lagidium viscacia moreni** Thomas.

*Lagidium moreni* Thomas, Ann. Mag. Nat. Hist., (6), **19**, p. 467, 1897—"Chubut," Argentina.

In 1921 (Ann. Mag. Nat. Hist., (9), **7**, p. 181), Thomas remarked that "the exact locality of the type of *L. moreni* is unknown, as 'Chubut' is a province of considerable size, and there is no evidence as to where in it the specimen was obtained." This is indeed unfortunate, but it is doubtless safe to assume that if the specimen came from any part of Chubut, it was from the western mountainous part sufficiently near the Chilean boundary to justify the inclusion of the form in the Chilean fauna. The type and only known specimen is said to have the "general color above silvery or pale ashy gray, without yellowish suffusion." The name is one of the earliest in the group and doubtless will prove to be entitled to some sort of recognition.

**Lagidium viscacia wolffsohni** Thomas.

*Viscaccia wolffsohni* Thomas, Ann. Mag. Nat. Hist., (7), **19**, p. 440, 1907—Cerro Palique, Sierra de los Baguales y de las Viscachas, lat. 50° 50′ S., Argentine-Chilean boundary.

This form, from the region just south of Lake Argentino, is the southernmost member of the genus and quite removed from others thus far recorded. Its published measurements indicate the size to be about the same as in *moreni* and *boxi*, and the description of the skull offers no unusual characters, but the color is distinctive. It is said to be "readily distinguishable from all other members of the genus by its large size, rich colour, long fur, immensely bushy tail, and short black ears." It has recently been accorded full specific rank by Ellerman (Fam. Gen. Rodents, **1**, p. 232, 1941). Two much faded mounted specimens are in the Museo Regional Salesiano at Punta Arenas.

**Cavia (Microcavia) australis** Geoffroy and d'Orbigny. SOUTHERN CAVY.

*Cavia australis* Geoffroy and d'Orbigny, Mag. Zool., **3**, Cl. 1 (4 pp.), pl. 12, 1833—Patagonia, south of the Rio Negro, Argentina.

*Cavia (Caviella) australis* Osgood, Field Mus. Nat. Hist., Zool. Ser., **10**, pp. 194–195, 1915.

*Caviella australis* Thomas, Ann. Mag. Nat. Hist., (10), **4**, p. 44, 1929—Lower Rio Negro, Argentina (corrected type locality).

*Microcavia australis* Kraglievich, Anal. Mus. Nac. Hist. Nat., Buenos Aires, **36**, pp. 67, 92, pl. 10, fig. 3, pl. 11, figs. 3–4, 1930.

A plain grayish rodent with small rounded ears and no external tail; hind feet with only three toes. Total length 210–230; hind foot 49–52.

*Range.*—Pampas of central Argentina with racial representatives extending northward to Catamarca and southward to Santa Cruz.

This typically Argentine animal doubtless crosses the boundary line into Chilean territory at least in a few places along the eastern base of the Andes. It was not found at Casa Richards on the Rio Nirehuao, but some fifty miles east near the Rio Verde a specimen, now in Field Museum, was taken by Boardman Conover. This actual record is within a few miles of the boundary. The species is recorded by Allen (Mamm. Patagonia, p. 26, 1905) from the upper Rio Chico and the Mayer Basin, also but a short distance from the boundary.

**Oryzomys longicaudatus longicaudatus** Bennett. LONG-TAILED RICE RAT.

*Mus longicaudatus* Bennett, Proc. Zool. Soc. Lond., p. 2, 1832—Chile (probably Province of Valparaiso; type collected by Cuming).

*Mus exiguus* Philippi, Anal. Mus. Nac. Chile, Zool., Ent. 14a, p. 19, pl. 5, fig. 3 (col.), 1900—Andes of Province of Santiago, Chile.

*Mus macrocercus* Philippi, supra cit., p. 30, pl. 10, fig. 2 (col.), 1900—Province of Colchagua, Chile.

*Mus nigribarbis* Philippi, supra cit., p. 31, pl. 12, fig. 1 (col.), 1900—Talcaregue, near San Fernando, Colchagua, Chile.

*Mus saltator* Philippi, supra cit., p. 32, pl. 12, fig. 3 (col.), 1900—Peine, Province of O'Higgins, Chile.

*Mus melanizon* Philippi, supra cit., p. 39, pl. 16, fig. 2 (col.), 1900—no locality.

*Mus diminutivus* Philippi, supra cit., p. 43, pl. 17, fig. 7 (col.), 1900—Illapel and Province of O'Higgins.

*Mus agilis* Philippi, supra cit., p. 44, pl. 17, fig. 2 (col.), 1900—Illapel, Coquimbo, Chile.

*Mus pernix* Philippi, supra cit., p. 48, pl. 20, fig. 1 (col.), 1900—La Ligua, Province of Aconcagua, Chile.

*Mus peteroanus* Philippi, supra cit., p. 56, pl. 24, fig. 2 (col.), 1900—Andes of Peteroa, Curico, Chile.

*Oryzomys longicaudatus* Trouessart, Cat. Mamm., p. 527, 1897.

A mouse with the tail longer than the head and body, the ears small, hind feet long; color buffy with fine lines of blackish, under parts paler, tail bicolor. Total length 232 (218–243); tail vertebrae 131 (126–140); hind foot 28.5 (27–30).

*Range.*—West-central Chile, mainly in the Province of Valparaiso and northward through the Province of Coquimbo to the Copiapo Valley, Province of Atacama; extending through the Andes into western Argentina, at least in some localities. Passes insensibly into *O. l. philippii* in southern Chile.

A single species of *Oryzomys* is found throughout most of Chile except the deserts of the northwest. So far as known, no other species of this genus has been taken in the country. It belongs to the group of rather small long-tailed forms which probably has continuous distribution northward through the eastern Andes of northern Argentina, Bolivia, Peru, and perhaps still farther. The Peruvian form, long known as *stolzmanni*, has been referred to by Thomas as *Oryzomys longicaudatus destructor* (Ann. Mag. Nat. Hist., (10), **2**, p. 261, 1928). The group seems to be mainly western and Andean in distribution, but its relationship to eastern forms, such as *flavescens* and *eliurus*, remains to be worked out. These in general are smaller, but in every series there is much variation in size, and in the present state of knowledge individual specimens are rather puzzling. One form, *O. delticola*, of the lower Parana River, has been definitely regarded as an eastern representative of *longicaudatus*, but it is quite isolated and its increased size may be only a parallelism. Specimens from Chimpay, on the Rio Negro well east of the Andes in Argentina, are scarcely distinguishable from typical *longicaudatus*.

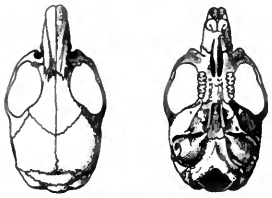


FIG. 20. *Oryzomys l. longicaudatus*. F.M. No. 23895. × 1.

In Chile, *longicaudatus* divides into three principal forms distinguished mainly by average differences in color and dimensions. The paler northern form, to which the name *longicaudatus* applies, naturally is palest in the extreme north in the provinces of Coquimbo and Atacama. Just where the line should be drawn between this form and the darker southern one is uncertain, for at present material is rather scanty from the provinces immediately south of Valparaiso and Santiago. In any case, the line will be a somewhat arbitrary one and as usual in such cases many specimens will fall so near it that their nomenclatural disposition is of no great consequence. In disposing of synonyms, localities in the provinces of Colchagua, O'Higgins, and Curico have been considered as representing the northern form and all those farther south have been assigned to the other.

With the fairly certain knowledge that only one *Oryzomys* inhabits Chile, the various names proposed by Philippi offer no great difficulty whether the types are still preserved or not. Those which may be referred to typical *longicaudatus* are *exiguus, macrocercus, nigribarbis, saltator, melanizon, diminutivus, agilis, pernix,* and *peteroanus.* At the time of my visit in Santiago, only the type of *macrocercus* could be found. My notes on this specimen are as follows: "Type existing in good condition. Skull inside. Unquestionably an *Oryzomys* of the *longicaudatus* group. The posture of the mounted specimen is entirely in agreement with that of the figure. It is labeled 'Raton. *Mus macrocercus* Ph. Colchagua.' Pencil number on top of stand 204; on bottom 336. Hind foot measures 28."

A cotype of *M. diminutivus* evidently was examined by Wolffsohn (1910a, p. 101), who shows clearly that it is an immature example of *longicaudatus* badly prepared and discolored by having been immersed in alcohol before it was stuffed. Wolffsohn also assigns *nigribarbis* and *saltator* to *longicaudatus* but does not indicate whether or not the actual types were in his hands.

The types of *melanizon, agilis, pernix* and *peteroanus* seem not to be in the Santiago museum at present, but the descriptions and figures at least indicate nothing known except *Oryzomys.* The figure of *M. exiguus* obviously represents an immature *Oryzomys* and there seems no better disposition of the name than as a synonym of *O. l. longicaudatus.* The very differently appearing figure of *M. melanizon* is less conclusive, but the proportions of the ears, feet, and tail also point to *Oryzomys,* although the measurements of the text and the figure do not agree.

*Specimens examined.*—Total 47: Baños de Cauquenes, Colchagua, 2; Buen Retiro, Calera, 3; Colchagua, 1 (type of *Mus macrocercus* in Mus. Nac. Chile); La Palmilla, Papudo, 4; Limache, Valparaiso, 1; Olmue, Valparaiso, 11; Paiguano, Coquimbo, 16; Quillota, 1; Ramadilla, Atacama, 5; Rio Maule, Talca, 2; Romero, Coquimbo, 1.

### **Oryzomys longicaudatus philippii** Landbeck.

*Mus Philippii* "Landbeck," Philippi and Landbeck, Arch. Naturg., **24**, (1), pp. 80–81, 1858; Philippi, Anal. Mus. Nac. Chile, Zool., Ent. 14a, p. 26, 1900[1]—Valdivia, Valdivia, Chile.

*Hesperomys (Calomys) coppingeri* Thomas, Proc. Zool. Soc. Lond., p. 4, 1881—Madre de Dios Island, Trinidad Channel, Chile.

[1] Cites "Landbeck, Anal. Univ. Chile, **14**, p. 360, 1857," a reference which has not been verified.

*Oryzomys Philippii* Trouessart, Cat. Mamm., p. 528, 1897.

*Mus dumetorum* Philippi, Anal. Mus. Nac. Chile, Zool., Ent. 14a, p. 14, pl. 3, fig. 1, 1900—Province of Valdivia.

*Mus commutatus* Philippi, supra cit., p. 25, pl. 8, fig. 1, 1900—Valdivia.

*Mus amblyrrhynchus* Philippi, supra cit., p. 36, pl. 25, fig. 1 (col.), 1900—Province of Valdivia.

*Mus (Rhipidomys) araucanus* Philippi, supra cit., p. 46, pl. 19, fig. 3 (col.), 1900—Concepcion.

*Mus glaphyrus* Philippi, supra cit., p. 51, pl. 21, fig. 3 (col.), 1900—"Praedio Coroney," Province of Maule.

*Mus melaenus* Philippi, supra cit., p. 62, 1900—Province of Maule.

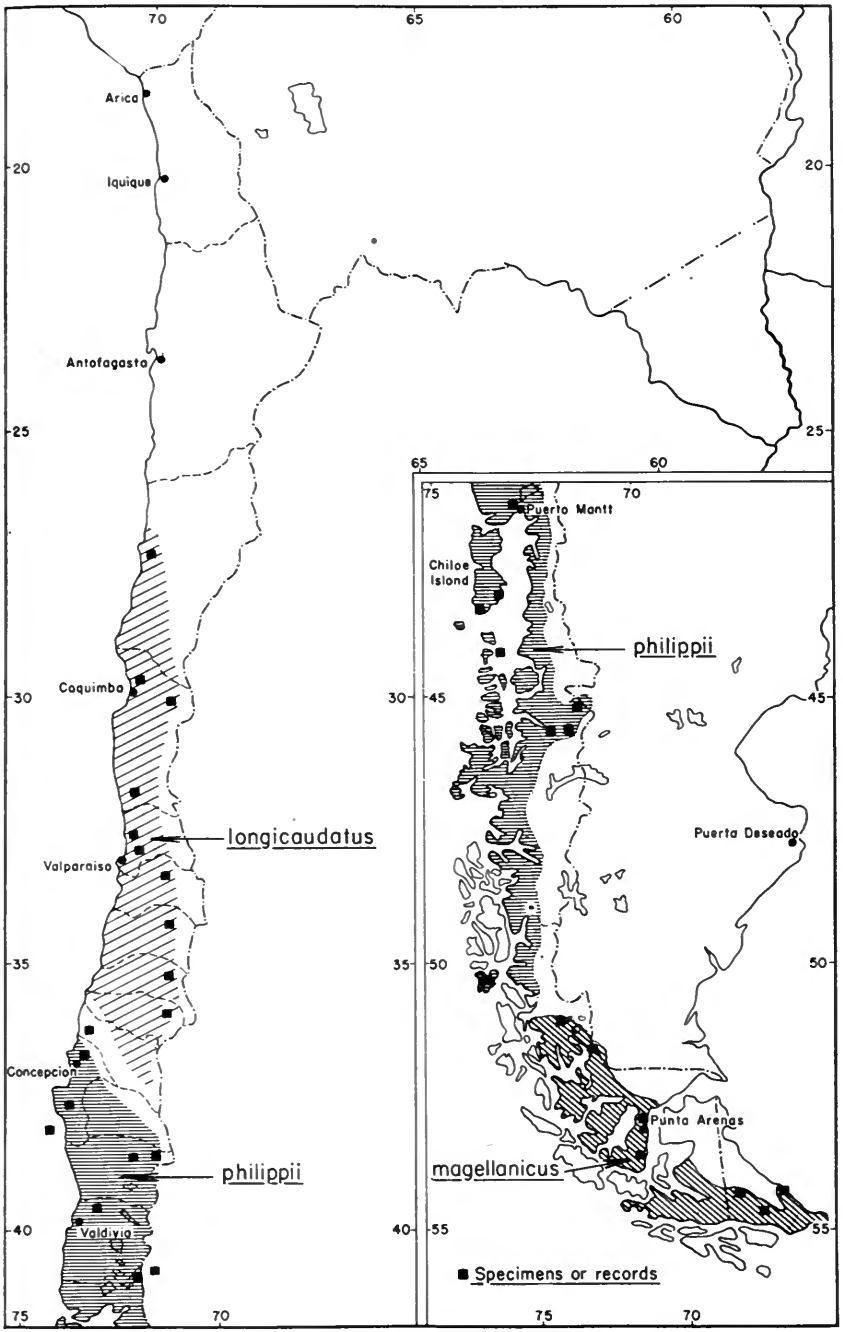
*Oryzomys magellanicus mizurus* Thomas, Ann. Mag. Nat. Hist., (8), **17**, p. 186, 1916—Koslowsky Valley, Chubut, Argentina.

Similar to *O. l. longicaudatus*, but averaging darker in color; under parts a deeper shade of buff; under side of tail often blackish toward the tip and frequently with a narrow median line as in *O. l. magellanicus*.

*Range.*—Valdivian forest district of south-central Chile at least through the provinces of Chiloe and Llanquihue and probably south along the coast to lat. 50° S. Eastward through the mountains to wooded parts of Argentina in the provinces of Neuquen, Rio Negro, and Chubut.

The southern form of *Oryzomys longicaudatus*, to which the name *philippii* applies, ranges through the southern provinces and crosses the Andes into Argentina. It is distinguished from typical *longicaudatus* mainly by darker color. Variation in size and length of tail is found in nearly every series and no local forms are definable. Occasional specimens have tails longer (140–150) than in *longicaudatus*, but averages do not differ greatly. Specimens from Chiloe Island (where it is relatively scarce) and the Guaiteca Islands show no appreciable differences from those of the mainland and the same is true of two from Mocha Island, although a larger series could be desired. Specimens from Concepcion are probably somewhat intermediate, but seem nearer *philippii* than *longicaudatus*.

The southernmost coastal locality represented in our collections is Aysen at about lat. 45° 50′ S. Between this locality and the Straits of Magellan no specimens from the coast are known except the type of *Hesperomys coppingeri* from Trinidad Channel in lat. 50° S. The published dimensions of this specimen indicate that it has the long tail of *philippii* so it seems safe to conclude that the form ranges south at least to Trinidad Channel. Since the shorter-tailed *magellanicus* extends northward at least to Ultima Esperanza, only two degrees farther south, there is left but a short distance in which to




MAP 5. Distribution of *Oryzomys longicaudatus* and subspecies.

expect intergradation. Specimens are at hand representing *O. m. mizurus* from the type region and these are indistinguishable from *philippii*. That the name would fall as a synonym was forecast by Thomas himself in 1929 (Ann. Mag. Nat. Hist., (10), **4**, p. 38).

Philippi's synonyms of the form which now bears his own name are *dumetorum, amblyrrhynchus, araucanus, commutatus, glaphyrus,* and *melaenus*. The type of *melaenus* was not found in the Santiago museum and doubtless was not preserved. It is not figured by Philippi and he states that it was received in alcohol in bad condition. His measurements indicate an *Oryzomys,* and his statement that it was entirely black in color is probably accounted for by its condition. Types of the others were found but, as explained below, that of *dumetorum* was in London and not in Santiago. The following is an exact transcript of notes made in Santiago:

"*Mus amblyrrhynchus* Philippi. Type in fair condition and identifiable by posture, which agrees with Philippi's figure. Label 'Raton. *Mus amblyrrhynchus,* San Juan, 1889,' to which Wolffsohn has added '*Oryzomys longicaudatus*' and 'Prov. Valdivia.' Pencil number on stand, 175. Darker than fresh examples and hair a bit soft from age and alcohol. Undoubtedly *Oryzomys* and equal to *O. longicaudatus* as concluded by Wolffsohn (Bol. Mus. Nac. Chile, **2**, No. 1, p. 97, 1910)."

"*Mus* (*Rhipidomys*) *araucanus* Philippi. From its posture, size and measurements, the probable type is a specimen labeled 'Raton. *Mus peteroanus* Ph. 1896, C.' on one side, and on the other (printed) 'Raton de Campo. *Oryzomys longicaudatus* Bennet, Obs. Sr. Muller, Concepcion, 1892.' The posture, the measurements, and the fact that the locality Concepcion and the collector's name Müller are still associated with the specimen, all go to show that it is the type of *araucanus*. It is obviously not the one described as *peteroanus* although perhaps related to it, for it does not agree in measurements or in posture. The name *peteroanus* was evidently written on its label later and without care. It is obviously an *Oryzomys* and our *Oryzomys* from Concepcion (No. 232, C.C.S.) are clearly of the same common species. Its tail is curved but measures as it is 110 mm. The hind foot is bent and not well accessible, but an estimate of its length gives 27–28 at least. A loose skull in a paper box, labeled *Mus araucanus,* seems to be of *Mus musculus* and is doubtless mixed."

"*Mus glaphyrus* Philippi. The type is still existing but in a very bad state of preservation. The size of the hind foot, the length of

the tail, as well as the color, which is not totally gone, indicate beyond reasonable doubt that this is an *Oryzomys* of the *longicaudatus* group—merely an immature specimen. It has a typewritten label, 'Raton, *Mus glaphyrus* Ph. Obs. S. Boedecker, Maule, 1895.' A penciled number, 195, is on the stand. There is no skull."

Only one specimen bearing the name *Mus dumetorum* was found in Santiago in 1923. The name is typewritten on its label but has been lined out and overwritten *Akodon longipilis*. Apparently this was done by Wolffsohn, who refers *dumetorum* to *longipilis* in his paper of 1910 (Bol. Mus. Nac. Chile, **2**, No. 1, p. 88). My own examination of this specimen leads to the conclusion that it is not the type of *dumetorum* but of *trichotis* (see p. 168), the latter a name which Wolffsohn correctly refers to *Akodon olivaceus* but apparently on the basis of another specimen that I was unable to find. The existing specimen is also an example of *Akodon olivaceus* and can scarcely be the type of *dumetorum* on account of its posture, which disagrees markedly from that shown in Philippi's figure. A further specimen, however, which may well be the true type of *dumetorum*, is now in the British Museum (No. 11.11.17.5) among the specimens received there from Santiago in 1911. This bears the name *dumetorum* and has the tail with the terminal half missing as indicated in Philippi's figure; the skull, which the figure shows to be inside the skin, is present with the notation by Thomas, "Extracted here." This specimen is an *Oryzomys* and careful examination of Philippi's figure leaves little doubt it was the one used in making the drawing. Measurements of the skull are: greatest length 23.2; width of braincase 10.9; nasals 7.9; interorbital constriction 3.5; palatine slits 4.2; cheekteeth 3.6.

A second specimen of *"araucanus,"* probably not the type, is in the British Museum (No. 11.11.17.4). Its label, of the usual kind, reads: "Raton. *Mus araucanus* Ph. Obs. S. Muller. Concepcion 92." It is a remade, discolored skin in poor condition, undoubtedly *Oryzomys*. The hind foot with claws measures 27. The tail, which is wired and not very straight, is about 101.

*Mus commutatus*, of which no type is available, may also be referred here on the basis of the description and figure and especially because Landbeck, who sent it to Philippi, considered it the same as his *philippii*.

*Specimens examined.*—Total 145: CHILE: Angol, 2 (A.M.N.H.); Campo Bandera, Coihoique, 2 (A.M.N.H.); Concepcion, 16 (including type of *M. araucanus* in Mus. Nac. Chile); Curacautin,

Malleco, 4; Lake Todos Santos, Llanquihue, 3 (A.M.N.H.); Mafil, Valdivia, 19; Province of Maule, 1 (type of *M. glaphyrus* in Mus. Nac. Chile); Melinka, Ascension Island, Guaiteca Islands, 6; Mocha Island, 2 (A.M.N.H.); Peulla, Lake Todos Santos, 14; Pilen Alto, Maule, 1; Puerto Montt, 1; Quellon, Chiloe Island, 2; Quirihue, Maule, 2; Rinihue, Valdivia, 8; mouth of Rio Aysen, 7; Rio Coihoique, Llanquihue, 5; Rio Maule, Talca, 2 (?approaching *longicaudatus*); mouth of Rio Inio, Chiloe Island, 5; Rio Nirehuao, Llanquihue, 17; Province of Valdivia, 1 (type of *M. amblyrrhynchus* in Mus. Nac. Chile); summit of Sierra Nahuelbuta, 20. ARGENTINA: Bariloche, 1; Epuyan, Chubut, 2; Puesto Burros, near Maiten, Chubut, 1; Yacobacci, F. C. Nahuelhuapi, 1.

### Oryzomys longicaudatus magellanicus Bennett.

*Mus magellanicus* Bennett, Proc. Zool. Soc. Lond., p. 191, 1835—Port Famine, Straits of Magellan; Waterhouse, Zool. Beagle, Mamm., p. 47, pl. 14, pl. 24, fig. 6, 1839.

*Hesperomys* (*Oryzomys*) *longicaudatus* Milne-Edwards, Miss. Scient. Cap Horn, **6**, Zool., Mamm., p. 27, fig. 1, 1890.

*Oryzomys magellanicus* Allen, Mamm. Patagonia, p. 47, pl. 9, fig. 2, pl. 10, figs. 4–5, 1905; Thomas, Ann. Mag. Nat. Hist., (8), **17**, p. 186, 1916; (9), **19**, p. 549, 1927 (lectotype designated); (10), **4**, p. 38, 1929.

Similar to *O. l. philippii* but with the tail decidedly shorter, only slightly longer than the head and body; tail usually with a narrow median blackish line dividing the light color of the under side. Total length 220 (209–227); tail vertebrae 110 (102–116); hind foot 29 (28–31).

*Range.*—Wooded parts of Tierra del Fuego and southern Patagonia north to the district of Ultima Esperanza.

This southernmost form of the widely distributed genus *Oryzomys* is distinguished from *longicaudatus* and *philippii* mainly by its shorter tail. The interesting dark line on the under side of the tail is uniformly present in specimens from Tierra del Fuego but is not always evident in specimens from the mainland. In *philippii* it may or may not be present.

That *magellanicus* should be only subspecifically distinguishable is perhaps an indication that the extension of *Oryzomys* to the tip of the continent and across the Straits of Magellan was accomplished within comparatively recent times. At some localities on Tierra del Fuego it was fairly common, but in the vicinity of Punta Arenas and northward in western Patagonia it was found with difficulty and only in small numbers. In the forest it is associated with *Akodon xanthorhinus*, but it does not follow that species into the light bush and open pampa.

*Specimens examined.*—Total 46: Eastern end of Lake Fagnano, Tierra del Fuego, 15; Lake Yerwin, Tierra del Fuego, 13; Estancia Via Monte, Tierra del Fuego, 2; Laguna Lazo, near Lake Sarmiento, Ultima Esperanza, 5; Lake Sarmiento, 3; Punta Arenas, 5; Puerto Natales, 3.

**Notiomys valdivianus valdivianus** Philippi. MOLE MOUSE; RATON TOPO.

*Oxymycterus valdivianus* Philippi, Arch. Naturg., **24**, (1), p. 303, 1858—Province of Valdivia, Chile.

[*Acodon*] *valdivianus* Thomas, Ann. Mag. Nat. Hist., (6), **14**, p. 363, 1894.

*Mus* (*Oxymycterus*) *valdivianus* Philippi, Anal. Mus. Nac. Chile, Ent. 14a, p. 21, pl. 6, fig. 1, 1900.

*Geoxus valdivianus* Thomas, supra cit., (9), **3**, p. 207, 1919—part.

*Notiomys valdivianus* Osgood, Field Mus. Nat. Hist., Zool. Ser., **12**, p. 115, pl. 10,[1] figs. 4–4*a*, 1925.

*Notiomys valdivianus araucanus* Osgood, supra cit., p. 117, pl. 10, figs. 5–5*a*, 1925—Tolhuaca, Malleco.

A small molelike mouse with dense, short pelage, short tail and elongated front claws. Under parts dark-colored, nearly or quite the same as upper parts. Length 146, 139; tail 39, 40; foot 21; toothrow 3.3.

*Range.*—Mainland of south-central Chile in the humid, forested region of Valdivia and adjoining provinces.

This was among the species especially sought by Mr. Sanborn in the Province of Valdivia within the restricted area from which doubtless came several of Philippi's types. Three specimens which he obtained at Mafil are the only existing well-prepared examples which represent the species in typical form.

"A single mounted specimen examined in the Museo Nacional of Santiago is probably Philippi's type. It was compared directly with the specimens from Mafil and found to be in substantial agreement with them. It carries a typewritten label, which, of course, is not the original one, with the following inscription: '*Mus valdivianus*, Ph. Obs. S. Landbeck, Valdivia.' In one corner of this label is the penciled number, 8. On top of the wooden block upon which the specimen is mounted is an impressed number, 117, and another, evidently fairly recent, in pencil, 239. This last corresponds to the number given in Quijada's Catalogue (Bol. Mus. Nac. Chile, **1**, No. 7, p. 113, 1909–10). The specimen is mounted with its tail more

[1] The legends on this plate for *N. valdivianus* and *N. v. araucanus* were accidentally transposed. The skull figured as 4–4*a* is that of *valdivianus* and 5–5*a* is *araucanus*.

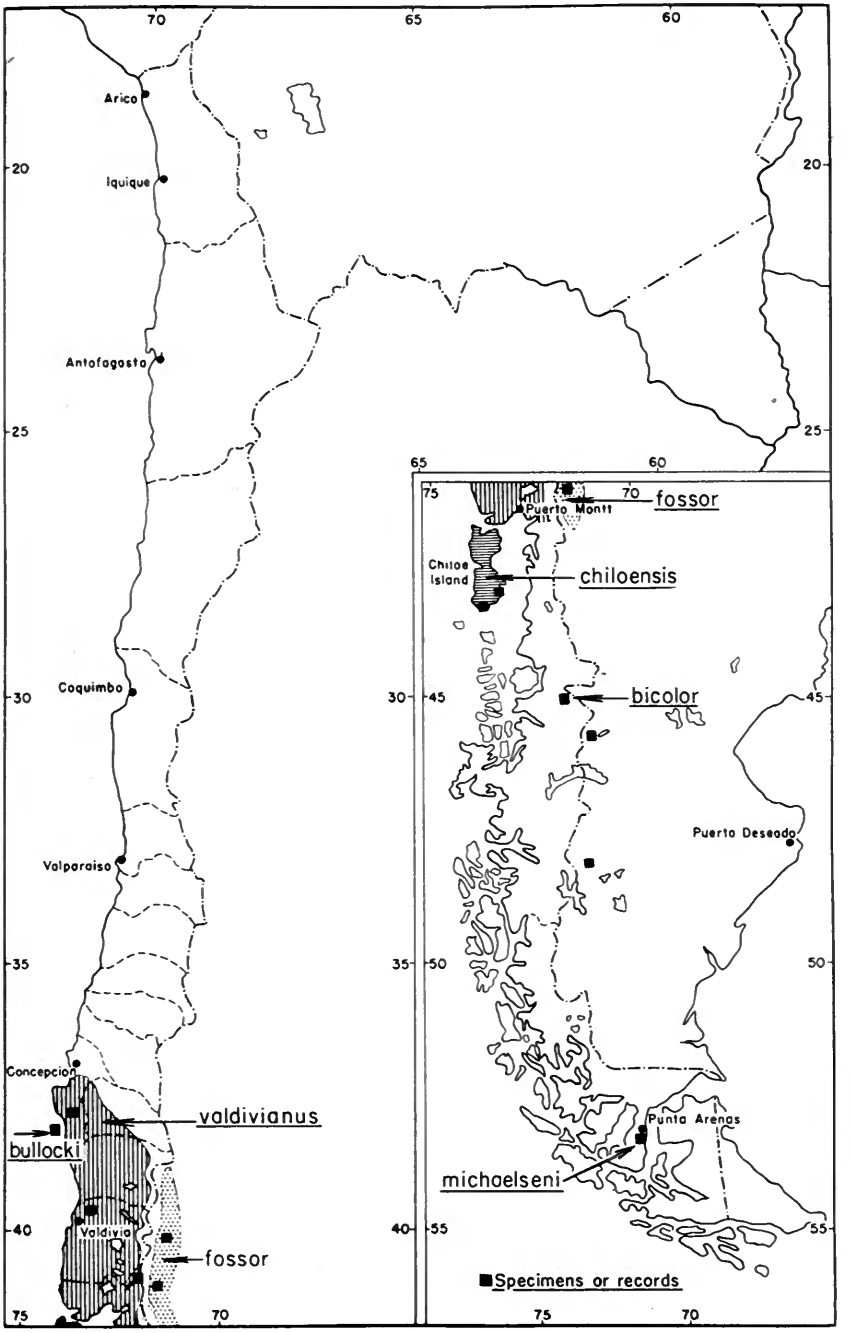
elevated than in Philippi's figure (l.c., 1900, pl. 6, fig. 1), but otherwise its posture is similar. It is of a faded brown color considerably lighter than in the published figure. Although described in 1858, the continued association of Landbeck's name with this specimen and the various numbers it has received seem to indicate that it has been preserved for a long period, and it may well be the actual type and basis of the name *valdivianus*. In any case, the application of the name is secure, for Philippi's description and figure are sufficiently accurate to leave no room for doubt."[1]

This was the first to be described of a considerable series of intergrading forms several of which are found in southern Chile, and the remainder in Argentina. The group is a southern one and has not been recorded north of the thirty-seventh parallel. One of its members (*fossor*) has been taken as type of the supposed genus *Geoxus*, but except in size it does not differ in any important respect from *megalonyx* and *vestitus* (*Chelemys* of Thomas et al.) and does not differ from *edwardsi* (type of *Notiomys*) except in color and very slight cranial characters.

In southern Chile it appears to be confined to heavily forested regions and is not especially common. As indicated by its external form, its habits are subfossorial and one collector (Budin) has stated that it "makes burrows in the earth like tuco-tucos." Its general appearance is often quite shrewlike, suggesting the North American *Blarina* or some of the dark-colored African forest shrews of the genus *Crocidura*.

Specimens from Beatriz, Nahuelhuapi, Argentina, regarded by Thomas (l.c., p. 207, 1919) as typical *valdivianus*, perhaps should be referred to subspecies *fossor*. However, two specimens from Lake Todos Santos, not far from Nahuelhuapi, seem referable to *valdivianus*, although their skulls are somewhat more attenuate than those from the type region. Two from the damp forest at the summit of the Sierra Nahuelbuta have very slightly paler under parts than typical, but racial separation does not seem to be indicated. The supposed form from eastern Malleco, described in 1925 under the name *araucanus*, seems, in the light of much new material, insufficiently characterized for recognition. Although it is slightly paler (browner) than in typical *valdivianus* and its skull is somewhat narrower, it is not unlikely that these characters are only evidence of gradation toward the better marked form *fossor* which Thomas (Ann. Mag. Nat. Hist., (9), **19**, p. 656, 1927) has recorded from San

[1] Reprinted from Field Mus. Nat. Hist., Zool. Ser., **12**, p. 116, 1925.




MAP 6. Distribution of *Notiomys valdivianus* and subspecies.

Martin de los Andes, Neuquen, Argentina, and other localities east of the Andes. So far there are no records of *fossor* within Chilean territory, but its occurrence there is not unlikely since it is found very near the boundary.

*Specimens examined.*—Total 17: Curacautin, Malleco, 1; Mafil, Valdivia, 3; Peulla, Lake Todos Santos, 2; Province of Valdivia, 1 (type in Mus. Nac. Chile); Rio Colorado, Malleco, 4; Sierra Nahuelbuta, 2; Tolhuaca, Malleco, 4.

**Notiomys valdivianus chiloensis** Osgood.

*Notiomys valdivianus chiloensis* Osgood, Field Mus. Nat. Hist., Zool. Ser., **12**, p. 117, pl. 10, figs. 6–6*a*, 1925—Quellon, Chiloe Island, Chile.

*Geoxus valdivianus chiloensis* Gyldenstolpe, Kungl. Svensk. Vet. Akad. Handl., **11**, No. 3, p. 125, 1932.

So far as known, this form is confined to Chiloe Island and is characterized by a slender, anteriorly compressed skull. Material from the mainland coast in the latitude of Chiloe would be of interest for comparison with it. Seven specimens from Quellon and Rio Inio, Chiloe Island, are in Field Museum. There is also a single old specimen in the British Museum marked "unstuffed," that is, dismounted and remade. It was received with others from Santiago some years ago and bears a label reading, "*Mus valdivianus* Ph. Obs. S. C. Fernandez, Chiloe."

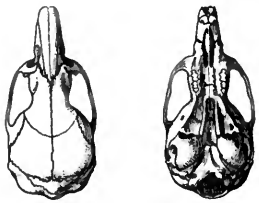


FIG. 21. *Notiomys valdivianus chiloensis.* F.M. No. 22518. × 1.

**Notiomys valdivianus bullocki** subsp. nov.

*Type* from Mocha Island, coast of southern Chile, Province of Arauco. No. 97742 American Museum of Natural History. Adult female. Collected December 7, 1932, by D. S. Bullock.

*Diagnosis.*—Similar to *N. v. valdivianus*, but darker in color, especially on the under parts, which are washed with a deeper shade of brown; arms and shoulders tending to be darker than surrounding parts; feet and tail wholly dark; skull as in *valdivianus*, but rostrum and nasals averaging longer; audital bullae slightly smaller; molariform teeth slightly larger.

*Measurements.*—Type measured by the collector: total length 157; tail 38; hind foot 20 (s.u.). Skull of type: greatest length 28.6; basilar length 23.2; zygomatic breadth 14.4; interorbital constric-

tion 5.4; breadth of braincase 13; nasals 11.1; interparietal 9.1 × 2.1; postpalatal length 10.5; diastema 7.6; upper toothrow 3.7.

*Remarks.*—Through the courtesy of Dr. H. E. Anthony of the American Museum of Natural History, a series of eleven specimens of this insular form has been available for study. In addition, two others have been lent by the British Museum through Dr. T. C. S. Morrison-Scott. These constitute a larger series than exists of any of the mainland forms. Variation in this series is not great and, although generally dark color seems characteristic, there are no specimens which are very dark (almost black) such as are found in several instances in *valdivianus* and *chiloensis*. The color of the upper parts is nearly uniform rich Prout's Brown very finely speckled, and the under parts, although showing silvery reflections, are washed with a deeper shade of brown than that seen in mainland forms. The teeth are indubitably larger than in *valdivianus*, but approach to *megalonyx* does not seem indicated.

**Notiomys valdivianus bicolor** subsp. nov.

*Type* from Casa Richards, Rio Nirehuao, Chile. Lat. 45° 3′ S. No. 22517 Field Museum of Natural History. Old male. Collected March 14, 1923, by Wilfred H. Osgood. Orig. No. 5690.

*Diagnosis.*—Similar to *N. v. fossor* and *N. v. michaelseni*, but differing from both in the uniform bright brown color (cinnamon brown of Ridgway) of the upper parts and the sharply contrasted grayish white under parts. Feet mainly light brown; tail sharply bicolor, cinnamon brown above, grayish white below. Skull much as in *N. v. fossor*, but with longer anterior palatal slits; less elongate than in *N. v. michaelseni*.

*Measurements.*—Type measured by the collector: total length 150; tail 38; hind foot 21. Skull of type: greatest length 26.7; basilar length 21.2; zygomatic breadth 13; breadth of braincase 12.4; nasals 9.8 × 2.8; interparietal 6 × 2; diastema 6.4; two anterior cheekteeth 2.9.

*Remarks.*—The single specimen forming the basis of the above description was doubtfully referred to *michaelseni* in 1925 when no specimens of either *michaelseni* or *fossor* were actually in hand. With both of these forms now represented in Field Museum it is clear that further division is necessary. The assumption that *michaelseni* was a brownish form was derived from Matschie's colored plate of the type specimen, which was preserved in alcohol and probably discolored. A modern series of *michaelseni* shows it

to be more grayish and dusky than brownish and the under parts are only slightly paler than the upper parts. *N. v. fossor* also is grayish with little contrast between upper and lower parts and its slight cranial characters appear in specimens from several localities.

Apparently standing somewhat between the present form and *michaelseni* are the specimens from the upper Rio Chico, Santa Cruz (about lat. 48° S.) for which Allen used the name *microtis*. At least they agree in the brown color of the upper parts if not in the sharply contrasted upper and lower parts. The name *microtis*, however, is not tenable in this connection and need not be considered. At present there is no material from the region extending some three degrees between Rio Nirehuao and Rio Chico, and until it is forthcoming the southward range of *bicolor* will remain uncertain.

**Notiomys valdivianus michaelseni** Matschie.

*Hesperomys* (*Acodon*) *michaelseni* Matschie, Hamb. Magal. Reise, p. 5, pl., figs. 1, 1*a–h*, 1898—Punta Arenas, Straits of Magellan, Chile.

*Oxymycterus microtis* Allen, Bull. Amer. Mus. Nat. Hist., **19**, p. 189, 1903; Mamm. Patagonia, p. 84, 1905—upper Rio Chico, Santa Cruz, Argentina.

*Notiomys michaelseni* Trouessart, Cat. Mamm., Suppl., p. 436, 1904; Osgood, Field Mus. Nat. Hist., Zool. Ser., **12**, p. 118, 1925.

*Acodon* (*Chelemys*) *michaelseni* Allen, Mamm. Patagonia, p. 80, 1905.

*Geoxus michaelseni* Thomas, Ann. Mag. Nat. Hist., (9), **3**, p. 209, 1919.

Similar to northern forms of *valdivianus*, but larger, with the skull more elongate and having a narrower braincase. Color olive brown to blackish, the under parts slightly paler; feet pale brownish; tail indistinctly bicolored. Total length 157 (153–162); tail 46 (39–51); hind foot 21.2 (20–22). Skull length 27.5; breadth of braincase 12.2; upper cheekteeth 3.3.

*Range.*—Southern Patagonia from the Straits of Magellan northward in forests along the eastern base of the cordilleras probably to the vicinity of S. lat. 50°.

A small series of this molelike mouse was taken in February, 1940, in the forested hills lying behind Punta Arenas and within ten miles of the city. Five out of six of these are dull olive brown in color and the sixth is sooty blackish. As topotypes of a rare form previously known only by the somewhat imperfect type they are of considerable interest. Although well distinguished from northern forms their general similarity to other members of the *valdivianus* series is such and so many localities are now represented by specimens that continuity of range seems fair to assume. Therefore, *michaelseni* is treated as a subspecies of *valdivianus*, and it is thus

brought into conformity with the other rodents found about the Straits, nearly all of which are likewise no more than subspecifically separable from northern forms.

It was obtained only at Punta Arenas although much trapping was done at nearby stations and northward to Ultima Esperanza. So far as known, it is one of the few small rodents that do not cross to Tierra del Fuego, but it is so elusive that its capture there at some future time is perhaps not unlikely. At certain times and places members of this genus are caught rather readily by ordinary methods of trapping, but usually they form only a very small percentage of large catches. Apparently they come to the surface most frequently in very wet ground and elsewhere are chiefly subterranean.

*Specimens examined.*—Punta Arenas, 6.

**Notiomys megalonyx megalonyx** Waterhouse.

*Hesperomys megalonyx* Waterhouse, Proc. Zool. Soc. Lond., p. 154, 1844—Lake Quintero, Valparaiso, Chile.

*Oxymicterus scalops* Gay, Hist. Chile, Zool., **1**, p. 108, 1847; Atlas, Mamm., pl. 6, figs. *a–b* (teeth), 1848—fields ("campos") of central provinces of Chile.

(?)*Oxymycterus niger* Philippi, Zeitsch. gesammt. Naturw., Berlin, Neue Folge, **6**, p. 445, 1872—Peine, Province of Santiago.

*Chroeomys*(?) *scalops* Thomas, Ann. Mag. Nat. Hist., (8), **18**, p. 340, 1916.

*Chraeomys scalops* Gyldenstolpe, Man. Neotr. Sig. Rodents, p. 123, 1932.

*Notiomys megalonyx* Osgood, Field Mus. Nat. Hist., Zool. Ser., **12**, p. 121, 1925.

*Chelemys megalonyx* Gyldenstolpe, Kungl. Svensk. Vet. Akad. Handl., **11**, No. 3, p. 126, 1932.

A medium-sized mouse with elongated front claws, thick pelage, and tail much shorter than head and body; upper side of feet brown; tail wholly brown; under parts lightly washed with brownish. Length 178, 170; tail 51, 56; foot 26, 28; toothrow 4.8.

*Range.*—Coast of central Chile, thus far recorded only from the Province of Valparaiso.

Present knowledge indicates only a very restricted range for this species, since wide gaps separate it from its nearest relatives, *macronyx* and *vestitus*. However, it is not readily obtainable except by intensive trapping and little of this has been done. It should be looked for in the region between the provinces of Valparaiso and Cautin.

The name *scalops* doubtless should be added to the synonymy of *Notiomys megalonyx*. Thomas has suggested that it might stand

among the strikingly colored species which he has brought under the name of *Chroeomys*. Modern collectors, however, have found nothing closely resembling them in Chile, certainly not in central Chile. The original description of *scalops* has a statement that there is a general tinge of "rojo canelo sucio" in the body color and that the end of the nose, the tail, and the feet are more particularly of this indefinite color. This is followed by the qualifying statement, "aunque sin embargo estas ultimas sean algo mas claras," which seems to indicate that the first statement was not intended to be taken so seriously as has been the case. Measurements, long claws, and locality all point to *Notiomys megalonyx* and without more knowledge than we now have, *scalops* should be referred to that species.[1]

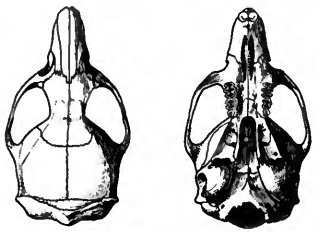


FIG. 22. *Notiomys m. megalonyx*. F.M. No. 22494. × 1.

Although this is one of the larger species of the genus, its dentition closely resembles that of some of the smaller forms. The reduction of the third molar, thought by Ellerman (Fam. Gen. Rodents, **2**, p. 423, 1941) to distinguish the smaller species, is carried almost or quite as far in *megalonyx* as in *valdivianus*.

*Specimens examined.*—Total 8: Lake Quintero, Valparaiso, 2 (lectoparatypes, B.M.); Olmue, 2; Las Rojas, near Quillota, 1; "Valparaiso Coast Hills," 3 (B.M.).

### Notiomys megalonyx microtis Philippi.

*Mus microtis* Philippi, Anal. Mus. Nac. Chile, Ent. 14a, p. 57, pl. 25, 1900—Province of Maule, Chile.

Similar to *N. megalonyx* but upper parts more richly colored (Prout's Brown instead of Snuff Brown); hind foot smaller. Hind foot (dry, in one specimen) 24; toothrow 4.7.

*Range.*—West-central Chile probably from the Province of Maule southward at least to central Cautin.

Mention of Philippi's name *Mus microtis* was inadvertently omitted when *Notiomys* was reviewed in 1925. Its reference to *Notiomys* is sufficiently attested by Philippi's description and figure. Moreover, the type specimen is still preserved. Notes

[1] Since this was written, the same conclusion has been published by Tate (Amer. Mus. Nat. Hist., Nov., No. 582, p. 19, 1932).

taken on this specimen are as follows: "A specimen labeled with this name is doubtless the type, although its posture is a little more humped than in the figure. It has the feet and claws of *Chelemys* [= *Notiomys*] and its color is close to that of an immature specimen [of *valdivianus*] taken by Sanborn at Mafil [F.M.N.H. No. 22525]. The under parts are a little paler and now are rather brownish buff. At least part of the skull is inside. Tail measures 34; hind foot 21–22."

The name *microtis* of Philippi antedates and invalidates *Oxymycterus microtis* J. A. Allen 1903, which was proposed for a *Notiomys* from Patagonia, allied to *michaelseni* and *bicolor*. On the basis of Philippi's description and figure as well as the examination of his type specimen, it was thought that the name might prove to be synonymous with *valdivianus*. In the absence of material from Maule, therefore, it was tentatively referred to *valdivianus*. Recently, however, a specimen from Temuco has been found in the British Museum (No. 8.3.1.15) indicating that the region immediately northwest of the Province of Valdivia is inhabited by a form more closely related to *megalonyx* than to *valdivianus*. That this form may range into Maule is not unlikely and, at least for the present, the name *microtis* may be applied to it. Its skull and teeth are notably larger than in *valdivianus* and little if any smaller than in *megalonyx*. Therefore, it is unlikely that it represents any gradation between *megalonyx* and *valdivianus*.

Sanborn made small collections in Maule at Cauquenes and Quirihue, in 1923, but failed to obtain any specimen of *Notiomys*. He reports that original conditions have been greatly changed there, the primitive forest having been removed and the ground largely devoted to vineyards. Evidences of recent erosion were numerous, and house rats were present in great numbers.

*Specimens examined.*—Total 2: Province of Maule, 1 (type in Mus. Nac. Chile); Temuco, 1 (B.M.).

### Notiomys macronyx macronyx Thomas.

*Acodon macronyx* Thomas, Ann. Mag. Nat. Hist., (6), **14**, p. 362, 1894—near Fort San Rafael, Province of Mendoza, Argentina.

*Acodon (Chelemys) macronyx* Thomas, Ann. Mag. Nat. Hist., (7), **12**, p. 242, 1903.

*Notiomys macronyx* Osgood, Field Mus. Nat. Hist., Zool. Ser., **12**, p. 122, 1925.

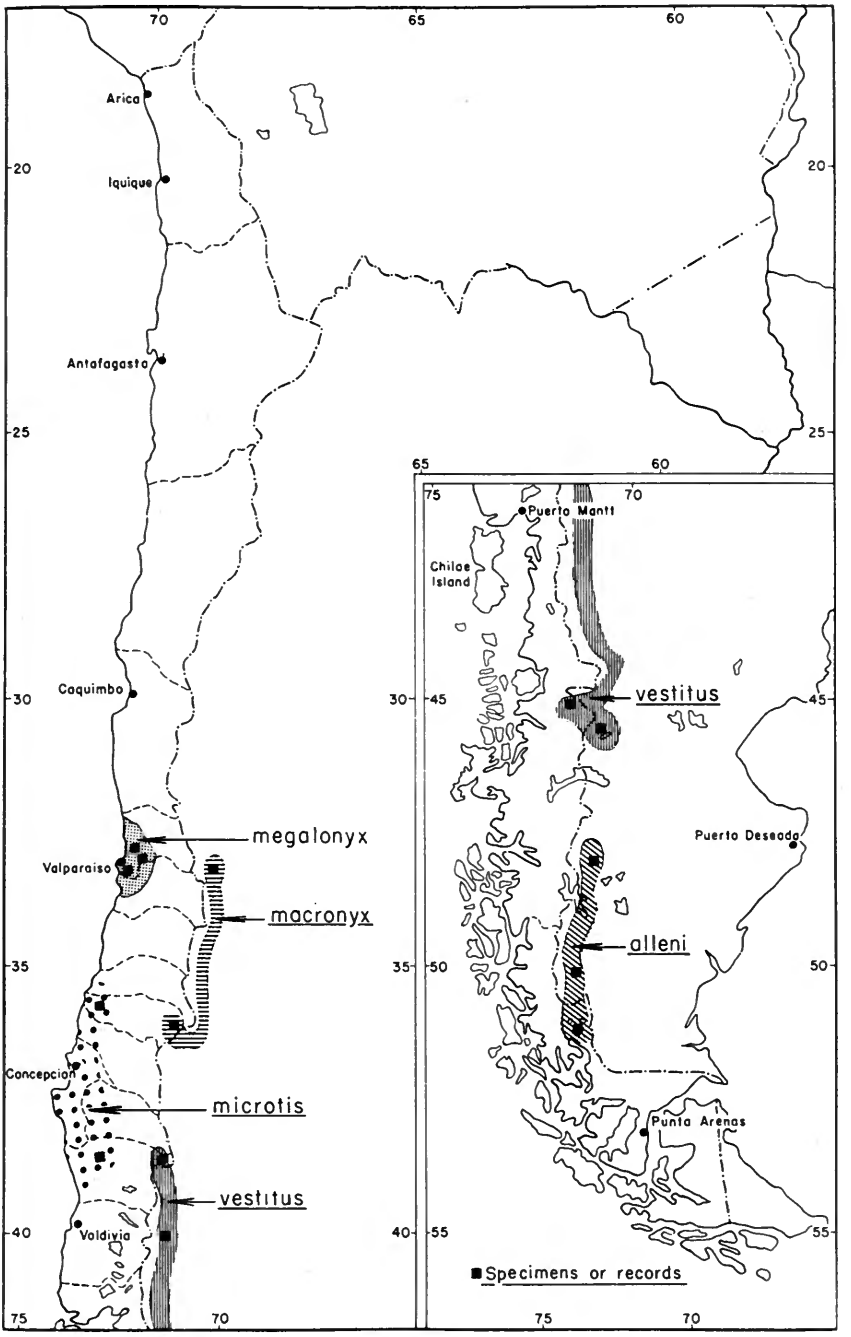
A stout-bodied, short-tailed mouse with elongated front claws and dense soft pelage nearly concealing small ears; upper parts Buffy Brown; feet and under parts white or nearly white; tail bicolored.

*Range.*—Known from two localities only, one east of the Andes in the Province of Mendoza, Argentina, and the other west of the Andes in the Province of Talca, Chile.

Four specimens, two old males and two young, obtained by Sanborn in 1939 at Arroyo del Valle, Talca, seem referable to *N. macronyx* although direct comparison with the type of that species has not been possible. They are much paler than *vestitus* and although equal to it in bodily size, their skulls are somewhat smaller, with the teeth very slightly smaller, the difference in this last respect being scarcely more than what might be due to individual variation. So far as can be judged from the original description these are the only important differences between *macronyx* and *vestitus* and they do not indicate more than subspecific differentiation. Doubtless *macronyx* cannot cross the Andes in the latitude of Mendoza but it might easily do so farther south, just as *vestitus* does. Therefore it seems reasonable to suppose that it ranges south from Mendoza along the eastern base until conditions permit it to pass westward into Chile. How far it may extend northward in Chile is still to be learned; as yet, the genus is not known from the west slope of the Andes north of Talca.

The type of *macronyx* is an old specimen collected by Bridges in 1860, and it is doubtful if the measurements published for it are reliable. With a head and body of 118 and tail of 47, it is said to have a hind foot, "moistened," of 24.5. The skull length, however, is given as 30, which would indicate an animal of somewhat larger external dimensions. Measurements of the two adults taken by Sanborn in Talca are: total length 190, 181; tail 66, 53; hind foot 26, 26.

Besides the four here referred to *macronyx*, a fifth specimen was taken in Talca at the same time. This was apparently associated with the others, but differs from them so markedly that its classification is doubtful. Its color is uniformly light grayish brown (slightly darker than Wood Brown) both above and below and, although it is an old female with worn teeth, its skull is somewhat smaller (length 28.3) than usual in this group. The possibility that it is some sort of mutant cannot be excluded and unless or until more like it have been obtained it may be so regarded. A relationship to *megalonyx* is not impossible. Sanborn reports that all these specimens were caught underground in abandoned burrows of *Ctenomys*, a further indication of the highly subterranean habits of the genus.




MAP 7. Distribution of the *macronyx* group of the genus *Notiomys*.

**Notiomys macronyx vestitus** Thomas.

*Akodon* (*Chelemys* subgen. n.) *vestitus* Thomas, Ann. Mag. Nat. Hist., (7), **12**, p. 242, 1903—Valle del Lago Blanco, Chubut, Argentina.

*Chelemys vestitus* Thomas, supra cit., (9), **3**, p. 207, 1919.

*Notiomys connectens* Osgood, Field Mus. Nat. Hist., Zool. Ser., **12**, p. 120, 1925—Villa Portales, Cautin, Chile.

*Notiomys vestitus* Osgood, supra cit., p. 123.

A mouse with elongated front claws, thick pelage nearly concealing small ears, and a relatively short tail; feet and under parts grayish white; tail sharply bicolor. Similar to *N. macronyx*, but decidedly darker; upper parts Fuscous rather than Drab; teeth heavier. Total length 187, 195; tail 50, 56; hind foot 27.

*Range.*—Valleys on both sides of the Chilean-Argentine boundary from west-central Chubut (lat. 46° S.) northward to the provinces of Cautin and Malleco, western Chile (lat. 38° 50′ S.).

In reviewing the genus *Notiomys*, I recorded this subspecies from the Chilean provinces of Cautin and Malleco and gave the new name *connectens* to a single specimen from the same region supposed to represent a distinct species. Subsequent study of other rodents from the region has led to the disconcerting discovery that I was in this case victimized by a transposition of skins and skulls. The skin of *N. connectens*, which I now designate as the unique type, proves to be that of a somewhat immature example of *N. m. vestitus*, quite like others from the same region. The skull erroneously associated with it is that of an *Abrothrix* and its proper skin has now been found in the collection as well as the skull belonging with the skin of *N. connectens*. In selecting the skin as the type, I am proceeding on the principle that the skin is the primary part of the specimen and that which originally contained the skull. Such a principle, perhaps, could not always be followed but, other things being equal, it seems to have general merit. In this case, it is especially desirable in order that the name may at once sink into synonymy and cause no further confusion.

Since the review mentioned above was issued, a few additional records of *Notiomys* have appeared and two further names have been proposed.

*Chelemys angustus* Thomas (Ann. Mag. Nat. Hist., (9), **19**, pp. 654–655, 1927), described from a skull without skin, taken near Bariloche, Lake Nahuelhuapi, Argentina, will require careful and expert examination before its status can be determined. The statement of Thomas that this skull resembles the one described under the name *connectens* (not examined by Thomas) leads to the suspicion that here also we may be dealing with a skull of *Abrothrix*

rather than *Notiomys*. The common *Abrothrix* of the region is *suffusa* (or *hirta*) and in series of this form skulls may easily be found with measurements closely approximating those given for the type of *angustus*. If both Thomas and myself have mistaken skulls of *Abrothrix* for *Notiomys*, it furnishes a striking demonstration of the slight basis on which generic divisions have been attempted among South American rodents. As stated elsewhere, the recognition of *Abrothrix* as a subgenus is convenient at the present time, but its proper characterization awaits a state of knowledge in which specific and supposed generic characters are not so confused as now.

Without considering northern forms which may be related, the opinion can be ventured that *Oxymycterus* and *Notiomys* are connected with *Akodon* through *Abrothrix*. *Oxymycterus* contains both short-clawed and long-clawed forms, *Notiomys* only long-clawed, and *Abrothrix* only short-clawed. In dentition *Oxymycterus* shows pronounced division of the anterior lamina of the first upper molar, *Notiomys* shows less and this soon obliterated, while *Abrothrix* shows a range of variation leading to *Akodon*. In one young specimen of *Notiomys vestitus* examined, the lamina is clearly divided in the molar of the right side and quite entire in the one on the left. The infraorbital plate reaches extremes in *Oxymycterus*, but these are approached in both *Notiomys* and *Abrothrix* and there is such variation in all three that this character is scarcely serviceable for more than specific or subspecific distinction. As stated elsewhere, *Microxus* is probably assignable to *Abrothrix*.

In view of the above, it is perhaps surprising to find Thomas (Ann. Mag. Nat. Hist., (9), **19**, pp. 655–656, 1927) still contending for the recognition of much finer divisions as represented by *Chelemys* and *Geoxus*, both of which it seems to me are clearly synonyms of *Notiomys*. Although his knowledge of South American rodents was vastly superior to that of any other mammalogist, his standards for generic division were somewhat peculiar and, in many cases, it is unlikely that subsequent workers will be inclined to follow him. During a visit to London in 1930, unfortunately too late for personal conference with Thomas, I had the opportunity to examine the original type of *Notiomys edwardsi* as well as a modern specimen of the same species which proved to be still more important. The latter was recorded by Thomas in one of the last papers to come from his pen (Ann. Mag. Nat. Hist., (10), **4**, p. 42, 1929). In his comment upon it, he makes no reference to the skull, although this is most important in connection with his previously expressed opinion

as to the generic position of the species. This skull, while obviously conspecific with that of the type, shows much less departure from the usual form in *valdivianus, michaelseni,* and others of that series. It indicates that the type is somewhat extreme or perhaps abnormal in what Thomas has called its "short, dumpy" shape and its short broad rostrum. *Notiomys edwardsi,* therefore, cannot be separated generically, although it is a very distinct species notably characterized externally by its small ears and very pale and delicate coloration.

While the subject of transposed skulls is under discussion, it may be well to refer to another possible case, and one in which the genus *Notiomys* is again involved. This is the type and only known specimen of *"Reithrodon" fossor* described by Thomas in 1899 (Ann. Mag. Nat. Hist., (7), **4,** p. 280) from a skin which he states to be "precisely similar" to that of *Notiomys macronyx.* He is even emphatic in commenting that "its external resemblance amounts practically to identity, there being absolutely no single character, of size, proportions, or colour, which would make the keenest-eyed 'splitter' suppose that the skin of *R. fossor* did not belong to *Akodon* [i.e. *Notiomys macronyx*], though in the skull the difference is complete." The possibility that skin and skull were not properly associated was mentioned in a footnote to the original description as follows: "The skull should be taken as type if it were hereafter shown not to belong to the skin; but it was extracted in the Museum on arrival, so that any mistake seems quite impossible."

Such mistakes, however, are quite possible, as has been shown in other cases and, in view of the failure of collectors to obtain the species again during the past thirty years of activity, it seems more than probable that the type of *fossor* is composite, the skin being *Notiomys* and the skull *Euneomys.* The type is an old specimen "presented by the La Plata Museum through Dr. F. P. Moreno" and said to have proceeded from Salta Province, Argentina, without exact locality. It is perhaps ungracious to discredit it without actual examination of the specimen, but the general evidence seems very much against it. The genus *Chelemyscus,* which is based exclusively upon it, has no characters except those that might be the result of a transposed skull; that is, *Chelemyscus* has no characters of its own, its external characters being strictly those of *Notiomys* and its cranial characters those of *Euneomys.* Unless additional specimens are forthcoming, therefore, this genus is suspect and deserves no better position than in a "hypothetical" list.

What appears to be a local form of *vestitus*, quite restricted in distribution, has been described from the western slope of the Andes in the Province of Neuquen, Argentina. This is *Notiomys vestitus fumosus* (Thomas, Ann. Mag. Nat. Hist., (9), **19**, p. 654, 1927), which was taken at some 6,000 feet in the Sierra de Pilpil and at San Martin de los Andes, about 15 km. farther north. It differs from typical *vestitus* in generally darker color, with the hands, feet and forearm dusky or at least grayish instead of white as in *vestitus*. Apparently *vestitus* ranges around it or below it for this form is found south of it in Chubut, and north of it at least as far as the Province of Cautin in Chile. This apparent interruption in the distribution of *vestitus* may be due to some habitat preference or factor of altitude. So far as known, typical *vestitus* has been found in relatively open places in light forest or grassland, near the eastern base of the Andes at moderate elevations. The collector of the type series of *fumosus*, E. Budin, states that it was "found in the highlands up to the limit of snow." If this is true, it may occupy a higher zone or a more heavily forested region than *vestitus* and it is not unlikely that its range may extend into Chile, although specimens so far taken are all from Argentina.

*Specimens examined.*—Total 29: Casa Richards, Rio Nirehuao, Llanquihue, 8; Lake Galletue, Cautin, 2; Lonquimai, 16; Rio Colorado, Malleco, 2; Villa Portales, Cautin, 1.

**Notiomys macronyx alleni** Osgood.

*Notiomys vestitus alleni* Osgood, Field Mus. Nat. Hist., Zool. Ser., **12**, p. 124, 1925—upper Rio Chico, Santa Cruz, Argentina.

Similar to *N. m. vestitus*, but color paler, brownish rather than sooty or grayish; upper parts Dresden Brown sharply distinguished from under parts, which are creamy white; skull with the infraorbital plate somewhat shortened. Total length 173 (168–180); tail 50 (45–57); hind foot 25.3 (25–26).

*Range.*—East base of the Andes from lat. 48° to 51° S. on both sides of the Chilean-Argentine boundary.

This form is considerably lighter-colored than *vestitus*, although not so pale as *macronyx*. Thus *vestitus* has paler forms on either side of it, one to the north and the other to the south.

Four specimens collected by J. M. Schmidt, in 1940, at Laguna Lazo near the south side of Lake Sarmiento, are indistinguishable from the original series from the Rio Chico. The range is thus extended several degrees farther south. Conditions about Lake Sarmiento are considerably different from those at Punta Arenas

and the immediate vicinity of the Straits, and the extension of this form to that region is doubtful. Thomas (Ann. Mag. Nat. Hist., (10), **4**, p. 42, 1929) has recorded three specimens from Alta Vista, Lake Argentino.

*Specimens examined.*—Total 10: CHILE: Laguna Lazo, near Lake Sarmiento, Ultima Esperanza, 4. ARGENTINA: Upper Rio Chico, Santa Cruz, 6 (A.M.N.H.).

**Notiomys delfini** Cabrera.

*Oxymycterus delfini* Cabrera, Rev. Chil. Hist. Nat., **9**, pp. 15–16, 1905—Punta Arenas, Straits of Magellan.

[*Notiomys?*] *delfini* Osgood, Field Mus. Nat. Hist., Zool. Ser., **12**, p. 125, 1925.

*Chelemys*(?) *delfini* Gyldenstolpe, Man. Neotrop. Rodents, p. 128, 1932.

*Microxus delfini* Tate, Amer. Mus. Nat. Hist., Nov. No. 582, p. 27, 1932.

So far as can be judged by the original description, this falls in the *macronyx* group of the genus *Notiomys*. The description states that the claws are very long, sharp, and curved, and the ears rounded and very short. These characters apply to *Notiomys* better than to any other known rodent of the region. The published measurements, taken from the alcoholic type, are as follows: head and body 106; tail 63; hind foot without claw 22; ear 11. A specimen of *vestitus* in Field Museum has a tail length of 62, so this measurement is not discrepant. The measurement of 22 for the foot is less than in *vestitus* and may be due to the condition of the specimen. The skull length is given as 30, which is right for the *macronyx* group, and which, moreover, indicates an animal likely to have a foot somewhat longer than 22. Tate (l.c.), who refers the species to *Microxus*, gives no reason for doing so and I am unable to find any. The type was supposed to be in the collection of the museum at Valparaiso, but it is not mentioned in the catalogue of this collection published by Wolffsohn and Porter (1908) and I am informed by its describer that it was probably destroyed or lost as a result of one of Chile's disastrous earthquakes.

During our work in 1939–40, we did not find any member of the *macronyx* group nearer Punta Arenas than Ultima Esperanza, some 200 miles to the north. Mice of this genus, however, may easily be missed, and it is still possible that a recognizable form, to which the name *delfini* would apply, may occur at Punta Arenas. On the other hand, the type may have been brought to Punta Arenas from considerable distance, and being preserved in alcohol, its dark colors, which apparently distinguish it from *alleni*, would be accounted for.

**Akodon olivaceus olivaceus** Waterhouse. OLIVACEOUS AKODON.

*Mus olivaceus* Waterhouse, Proc. Zool. Soc. Lond., p. 16, 1837—Valparaiso, Chile.

*Mus Renggeri* Waterhouse, Zool. Voy. Beagle, Mamm., p. 51, pl. 15, fig. 1 (col.), 1838—substitute name, not tenable.

*Acodon olivaceus* Thomas, Ann. Mag. Nat. Hist., (6), **14**, p. 363, 1894; (*Akodon*), (9), **19**, p. 550, 1897 (lectotype designated).

*Mus lepturus* Philippi, Anal. Mus. Nac. Chile, Zool., Ent. 14a, p. 17, pl. 4, fig. 2, 1900—Peine, Province of O'Higgins.

*Mus psilurus* Philippi, supra cit., p. 17, pl. 4, fig. 3, 1900—Province of Colchagua.

*Mus trichotis* Philippi, supra cit., p. 18, pl. 5, fig. 1, 1900—Andes of Province of Santiago.

*Mus vinealis* Philippi, supra cit., p. 24, pl. 7, fig. 3, 1900—Province of Santiago.

*Mus (Oxymycterus) Landbecki* Philippi, supra cit., p. 26, pl. 8, fig. 2, 1900—near Illapel and Choapa, Province of Coquimbo.

*Mus (Oxymycterus) senilis* Philippi, supra cit., p. 27, pl. 8, fig. 3, 1900—Valle del Yeso, Andes of Province of Santiago.

*Mus Germaini* Philippi, supra cit., p. 32, pl. 12, fig. 2, 1900—Province of Santiago.

*Mus nasica* Philippi, supra cit., p. 38, pl. 15, fig. 3, 1900—no locality.

*Mus ruficaudus* Philippi, supra cit., p. 40, pl. 17, fig. 1, 1900—Province of O'Higgins (fide Wolffsohn).

*Mus macronychos* Philippi, supra cit., p. 40, pl. 17, fig. 2, 1900—central provinces of Chile.

A small grayish brown mouse with whitish or brownish under parts, small ears, and the tail about one-third shorter than the head and body. Total length 173 (166–182); tail 71 (66–80); hind foot 22.3 (22–23); ear 12–14.

*Range.*—Central Chile, mainly on the coast and in neighboring valleys from Caldera in the Province of Atacama south at least to Valparaiso and thence east to Santiago and south along the base of the Andes at least to the Province of Talca.

The common small *Akodon* of Chile is divisible into several races of which the typical one, that is, the one first discovered and described, is the one found in the most populous part of the country. It occupies the moderately watered and fertile part of Chile, lying between the deserts of the north and the wet forests of the south. Most available specimens are from coastal localities, but Philippi's records include several from the vicinity of Santiago and southward along the western side of the Andes. The southernmost record from this region, where the species appears to be relatively rare, is that of a single specimen from the Province of Talca obtained by Sanborn

in 1939. From the central valley, where it may occur, there are no records. In the north it penetrates a considerable distance into relatively arid regions, but apparently its occurrence there is very local and perhaps is due to its having followed the development of irrigation. Southerly in the coast region it doubtless meets the slightly smaller subspecies *pencanus* somewhere between the provinces of Valparaiso and Maule.

Names proposed by Philippi which seem applicable to this form are *lepturus, psilurus, trichotis, vinealis, Landbecki, senilis, Germaini, nasica, ruficaudus,* and *macronychos.* The type of *trichotis* was found and examined in the museum in Santiago in 1923. It bears the name *Mus dumetorum,* but since it is mounted in an attitude closely approaching that figured by Philippi for *trichotis* and very different from that of *dumetorum,* there seems little doubt it is in reality the basis of the name *trichotis.* In all the types examined, the attitudes correspond so closely with the figures that it is practically certain the drawings were made directly from the mounted specimens. This specimen, probable type of *trichotis,* is clearly one of the common small Akodons and, although it is darker-colored, may be synonymized with *olivaceus* on the basis of locality.

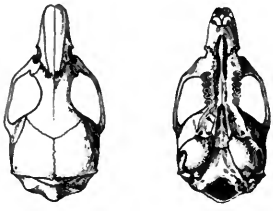
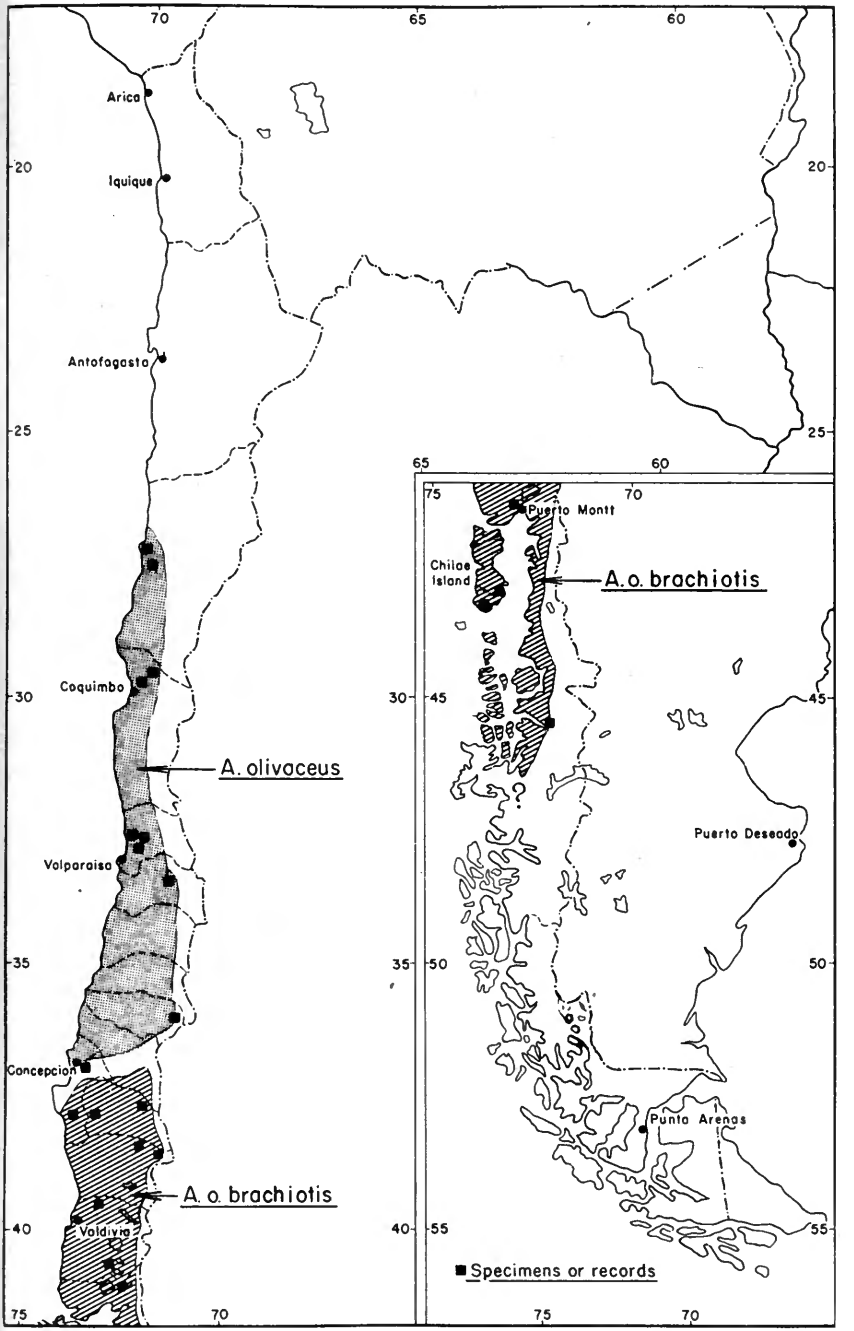


FIG. 23. *Akodon o. olivaceus.* F.M. No. 24068. × 1.

The types of *lepturus, vinealis, Germaini, nasica,* and *ruficaudus* were studied by Wolffsohn and examination of his notes in regard to them (1910a, pp. 89, 95, 98) leaves no room for doubt as to the correctness of his conclusions that all belong to one and the same common species. Wolffsohn also mentions (l.c., p. 93) *Mus landbecki* as a synonym of *olivaceus,* but it is not clear whether its type was available to him. His determination in this case also may be accepted, for Philippi's description and figure clearly indicate a small *Akodon,* probably one in brownish worn pelage.

The types of *M. psilurus* and *M. macronychos* were not found. With due reference to inaccuracy in other cases, these names may be referred to *olivaceus* with a fair degree of assurance on the basis of the descriptions and figures, although these are not wholly conclusive.

*Specimens examined.*—Total 42: Caldera, Atacama, 3; Coquimbo, 2 (Darwin specimens in B.M.); La Laguna, Valparaiso, 1 (B.M.); Olmue, Valparaiso, 5; Papudo, Aconcagua, 8; Quillota, Valparaiso,




MAP 8. Distribution of *Akodon o. olivaceus* and *A. o. brachiotis* (*A. o. pencanus* not distinguished).

2; Quilpue, 4 (B.M.); Ramadilla, Copiapo Valley, Atacama, 2; Romero, Coquimbo, 4; Province of Santiago, 1 (type of *Mus trichotis* in Mus. Nac. Chile); Puente Alto, Santiago, 1 (B.M.); Valparaiso, 1 (lectoparatype in B.M.); "Coast Hills," Valparaiso, 8 (B.M.).

**Akodon olivaceus pencanus** Philippi.

*Mus pencanus* Philippi, Anal. Mus. Nac. Chile, Zool., Ent. 14a, p. 46, pl. 19, fig. 2, 1900—Concepcion, Chile.

*Mus atratus* Philippi, supra cit., p. 57, pl. 25, fig. 3, 1900—Province of Maule.

Generally similar to *Akodon o. olivaceus*, but averaging slightly darker and smaller in size; skull smaller with audital bullae especially small. Total length 162 (151–174); tail 65 (57–76); hind foot 21–22.

*Range.*—Coast region from the Province of Maule south to Concepcion and the Sierra Nahuelbuta, thence westward to the Andes in the provinces of Malleco and Cautin.

This form stands between typical *olivaceus* and the dark-colored and long-tailed *brachiotis* of the Valdivian humid forest district. If only a few specimens or localities were represented they might be dismissed as mere evidences of intergradation. However, many specimens are in hand and they cover a considerable geographic range throughout which the same characters are maintained. Moreover, these characters are readily recognizable since they consist of the combination in which the color of *olivaceus* is approximated on the one hand and the cranial characters of *brachiotis* on the other. Although it shows no approach to *brachiotis* in length of tail, there is little doubt that it merges into that form. Further collecting along the northern border of the humid forest district, therefore, would be of interest.

*Mus pencanus* Philippi is represented in the museum at Santiago by two specimens, either or both of which may have furnished the basis of Philippi's figure (l.c., pl. 19, fig. 2). They are mounted in similar attitudes, both very like the figure except that the tails have been bent into new positions. They are clearly of one species and direct comparison with other specimens from Concepcion leaves scarcely any doubt that they are the same. They are now darker and browner than the modern specimens, but this is probably due to age and discoloration from fluid preservation, mounting, etc. In both, the pelage of the under parts is still stringy from wetting. Philippi gives a measurement of 26 for the hind foot, but this is evidently erroneous. The feet are well preserved and now measure exactly 22. It is to be noted also that the feet in his figure measure only 21. His statement "cuerpo i la cabeza por encima casi negros"

is not well borne out, for there was evidently considerable of the "viso amarillo" which he mentions later. The specimens should be regarded as cotypes. Both have the typewritten label, "Raton. *Mus pencanus*, Ph. Obs. S. Muller, Concep., 1892." One has a pencil number, 216, on the top of its stand and on the bottom, rather faintly, 382. The typewritten name *Mus pencanus* has been scratched and overwritten in ink with *"Akodon longipilis"* in handwriting which was not positively recognized. This identification is obviously mistaken, although it might easily have been derived from the description and figure. Two loose skulls labeled *pencanus* also were found in the Santiago museum. These probably are the original skulls and, although only partly cleaned, their general characters are plainly observable.

The type of *atratus* was found existing in fair condition. The tail is "telescoped" and this accounts for its supposed shortness. Like that of *trichotis*, the color is darker than in typical *olivaceus*, but without any other reason for denying the locality alleged by Philippi it seems best to place the name as a synonym of *pencanus*. After giving the name *atratus* and a diagnosis consistent with it, the describer makes the naive "observation" that although black when received, the specimens later turned gray.

*Specimens examined.*—Total 69: Angol, 4; Concepcion, 21 (including cotypes in Mus. Nac. Chile); Curacautin, Cautin, 4; Pilen Alto, Maule, 2; Province of Maule, 1 (type of *Mus atratus*, Mus. Nac. Chile); Quirihue, Maule, 1; Rio Lolen, Cautin, 1; Sierra Nahuelbuta, 32; Villa Portales, Cautin, 3.

**Akodon olivaceus mochae** Philippi.

*Mus Mochae* Philippi, Anal. Mus. Nac. Chile, Zool., Ent. 14a, p. 42, pl. 17, fig. 5, 1900—Mocha Island, Chile.

*Irenomys mochae* Gyldenstolpe, Kungl. Svensk. Vet. Akad. Handl., (3), **11**, p. 84, 1932.

Similar to *A. o. pencanus*, but tail usually unicolored, the under side nearly or quite as dark as the upper; breast usually somewhat fulvous. Skull with audital bullae small as in *pencanus*.

*Range.*—Mocha Island, off coast of Province of Arauco, southwest of Concepcion, Chile.

There seems little doubt that the name *mochae* applies to an *Akodon* of the *olivaceus* series, although this conclusion requires some allowance for inaccuracies in Philippi's description and figure. So far as known, it is the only rodent found on Mocha Island to which

the name could possibly apply, and at least its general characters of small size and yellowish color are as indicated by Philippi.

For an important collection of mammals from Mocha Island, we are indebted to the interest and enterprise of Dr. Dillman S. Bullock of Angol, Chile. This collection (now in the American Museum of Natural History) includes representatives of the four common small rodents of the mainland, *Akodon*, *Abrothrix*, *Notiomys*, and *Oryzomys*. This is what might well have been expected, and any assumption that the island harbors some other mouse approximating *Akodon* in size makes it necessary to find a mainland relative for it, and there is none. Therefore, unless Philippi's *mochae* was not from the island, it was in all probability the small *Akodon* which proves to be common there.

Philippi's measurements, as published, are: head and body 70; tail 70; hind foot 17. These agree with nothing known from Chile and must be considered erroneous. The length of the tail is right for the *Akodon* from Mocha, but the other dimensions are too small, although they might be approached in immature specimens. The figure agrees with the description fairly well and leads to the suspicion that it may have been based on the description rather than directly on a specimen. In various cases this seems to have happened, since details are introduced which do not exist and which can only be explained on some mental basis. Therefore, where no types exist, application of names rests mainly on general characters and on localities. Nevertheless, one feature of the description of *mochae* seems significant and since it is italicized it may be that in this instance Philippi stumbled on a real character of the island form, perhaps the only one. This is the color of the tail, which he states is "concolor, sublutea." A concolor tail appears to be at least an average character of the form although it is blackish instead of yellowish. It is found in five out of the seven specimens available.

The material from Mocha Island is perhaps not sufficient to demonstrate with certainty the existence of a well-differentiated insular form there, but at least provisional recognition seems justified. This conclusion is somewhat influenced by the fact that the name *mochae* may be entitled to establishment in any case. It has page priority over *pencanus* and *atratus*, and if the supposed characters of an island form prove unstable it would replace *pencanus*.

No specimen purporting to be the type of *mochae* could be found in Santiago during my first visit there. Since then (1930), however, I have examined one in the British Museum which may have some

claims. The skin of this specimen (No. 11.11.17.6) has the word "Type" in red ink written on its label, apparently by Thomas, and it is the only one of the entire lot received from Santiago in 1911 which is so marked. Whether or not Thomas had some special reason for this does not appear. He has also noted on the skin label the words, "skull sent separate." The label is typewritten and of the style usual on many other specimens from Santiago. The skull with it has a very different label, handwritten, faded, soiled, and evidently very old. It bears the number 979 and the inscription "Mus moschae isla de la Mocha."

My notes on the skin are not very detailed and state merely that it seems too small for the skull, that it is dirty brown without much indication of pattern or original color, and that it has the general appearance of a small, immature *Akodon*. The skull, on the other hand, was examined closely and, to my surprise, it was found to have the distinctly grooved incisors and simple, prismatic molars of *Irenomys*. It is immature, the last molars not being erupted, but there is nothing to distinguish it from the one known species of *Irenomys*. This seemed so important that I made a penciled note on the label which perhaps served to call it to the attention of Gyldenstolpe, who has referred *mochae* to *Irenomys*.

That the skin and skull are improperly associated is very evident, not only on account of their different labeling and their separate receipt at the British Museum, but because they clearly belong to different genera. That even the skin served as the basis of the original description or figure is doubtful and that the skull was concerned in any way is scarcely possible, for the long-eared, long-tailed, big-footed and dark-colored *Irenomys* has not even general resemblance to the description and figure. Comparison of the skin with specimens of *Akodon* from the island would be desirable when opportunity permits. The skull, however, should be relegated to the limbo of misfits. Nothing except its label has any suggestion of *Mus mochae* and a transposed skull label in Philippi's material is more probable than otherwise. The skull may, in fact, be that of the type of *Irenomys tarsalis* since there is no more authentic one; if not this, it may be that of *longicaudatus*, which is also missing.

*Specimens examined.*—Mocha Island, 9 (A.M.N.H. 7; B.M. 2).

**Akodon olivaceus brachiotis** Waterhouse.

*Mus brachiotis* Waterhouse, Proc. Zool. Soc. Lond., p. 17, 1837; Zool. Voy. Beagle, Mamm., p. 49, pl. 14, pl. 34, figs. 8*a*, 8*b*, 1839—small island in Midship Bay, Chonos Archipelago, Chile.

*Mus brevicaudatus* Philippi, Zeitschr. gesammt. Naturw., Berlin, Neue Folge, **6**, pp. 446–447, 1872—Puerto Montt, Chile.

*Akodon brachiotis* Trouessart, Cat. Mamm., p. 537, 1897.

*Akodon brevicaudatus* Trouessart, supra cit., p. 538.

*Abrothrix brachiotis* Thomas, Ann. Mag. Nat. Hist., (9), **3**, p. 204, 1919; (9), **19**, p. 551, 1927 (lectotype designated).

*Mus Foncki* Philippi, Anal. Mus. Nac. Chile, Zool., Ent. 14a, p. 20, pl. 5, fig. 4, 1900—Puerto Montt, Chile.

*Mus chonoticus* Philippi, supra cit., p. 24, pl. 7, fig. 2, 1900—Chonos Islands, southern Chile.

*Mus xanthopus* Philippi, supra cit., p. 41, pl. 17, fig. 4, 1900—near Osorno, Valdivia, Chile.

*Mus nemoralis* Philippi, supra cit., p. 49, pl. 20, fig. 3, 1900—near Valdivia, Chile.

Similar in general to *A. o. olivaceus* and *A. o. pencanus*, but differing markedly in color and proportions. Upper parts rich dark brown (Prout's Brown). Tail about three-fourths the length of the head and body. Skull slender with small audital bullae and the rostral part somewhat compressed and attenuated. Total length 178 (170–180); tail 80 (78–84); hind foot 22.2 (22–24).

*Range.*—Humid forested region of south-central Chile from Valdivia through the lake region to the Argentine boundary and southward through the Chonos Islands and on the adjacent mainland at least to Aysen.

This mouse, which differs from typical *olivaceus* so markedly as almost to suggest specific distinction, was found in abundance at the mouth of the Rio Aysen in lat. 45° 30′ S. at a point about opposite the type locality in the Chonos Islands. No specimens are available from points farther south, but doubtless it extends in that direction for a considerable distance; in the extreme south about the Straits of Magellan it appears to have no representative other than *A. xanthorhinus* from which it is obviously very distinct. Throughout the provinces of Valdivia and Llanquihue it is the most abundant small rodent. Its characters seem best developed in specimens from Chiloe Island, but there is considerable variation, especially in cranial characters, among mainland specimens, and it does not appear possible to differentiate an insular form.

Philippi's names referable to this form are *brevicaudatus*, *Foncki*, *chonoticus*, *xanthopus*, and *nemoralis*. Specimens representing *xanthopus* and *chonoticus* were found in the museum at Santiago, and although no very satisfactory comparisons were possible, the following notes made at the time seem fairly conclusive as to their identity:

"*Mus chonoticus* Philippi. Type existing in fair condition. Skull inside. It has considerable resemblance to Philippi's figure. The tip of the tail is gone. The color is chiefly brownish, the grayish or plumbeous area being on the under parts entirely. The tail seems to have been blackish all around. The hind foot now measures 21."

"*Mus xanthopus* Philippi. The probable type of this is in the museum and labeled 'Laucha. Mus infans Ph. Osorno.' Its color, pose, and measurements, added to the fact that it still carries the locality Osorno, indicate that it is the original of *xanthopus* and not of *infans*. Its hind foot is twisted and not accurately measurable, but an estimated measurement gives 17–18. The skull is gone from the skin, but a skull is preserved labeled with the same name and number, about the right size, and having the occipital part of the cranium missing, practically as in the one figured by Philippi for *xanthopus*. This seems to be a skull of a young *Akodon*. The third molar has not appeared, but the others are in place and have the akodont characters. Hence I believe this is the common *Akodon* of the region, although its feet are small and its color rather reddish. It had been in alcohol before mounting, the tail vertebrae remain inside, and it has been distorted, besides being very young. It is much darker than Philippi's figure, but still carries a dark reddish brown tone."

*Mus Foncki*, *Mus brevicaudatus*, and *Mus nemoralis* are regarded as synonyms of *brachiotis* on the basis of Philippi's descriptions, measurements, and figures, together with his statement of localities. In none of them is the evidence wholly conclusive, but with allowance for the author's usual inaccuracies, nothing appears which suggests any better disposition of these names. Unless the types are found and demonstrate something to the contrary, therefore, no alteration of this conclusion seems possible. The short tail alleged for *brevicaudatus* may be disregarded since it has been found in other cases where the types still exist that Philippi made no allowance for the "telescoping" of a tail to scarcely half its original length.

One of Waterhouse's specimens of *Mus brachiotis* in the British Museum has been regarded by Thomas (1919, l.c.) as belonging to *Abrothrix* rather than *Akodon*. He offers no explanation of this conclusion beyond a bare statement of opinion, but I am unable to find justification for it in Waterhouse's description and figures. Both plate and description indicate an animal with a bicolored tail and if any *Abrothrix* should be found in the Chonos Islands, it would probably have a wholly black tail. His colored figure of the animal

has the brownish shades of *Akodon* and the figures of the teeth show them to be in a well-worn stage in which no distinction between *Abrothrix* and *Akodon* is possible. It may be, therefore, that Thomas was influenced by the slender muzzle which in many cases distinguishes *Abrothrix* from *Akodon*, but is here only one of the subspecific characters of *brachiotis* in which it differs from *olivaceus* and *pencanus*, its nearest relatives.

While passing through London in June, 1937, I made a very hasty examination of the two specimens that formed the basis of Waterhouse's *brachiotis*. Owing to the absence of good comparative material, this examination was not wholly conclusive, but I am satisfied that only one form is represented and that obviously the common *Akodon* of the Chilean rain forest. Rough notes taken at the time are as follows:

"Two lectoparatypes slightly faded brownish in color with paler under parts and not sharply bicolored tails, the two exactly alike in color. Laid on side well fastened. Nos. 55.12.24.166 and 55.12.24.167. Feet light brownish or may have been lighter once. On one (No. 166), he [Thomas] has written, 'An Akodon, not Abr. brachiotis.' On the other he has written *Abrothrix* above the name '*Hesp. brachiotis* Waterh.' Do not find but one skull, that of No. 167, which O.T. has marked Lectotype. The upper teeth are present only on right side and are fairly worn, too worn to show whether first lamina was divided or not. The nasals are rather long, longer than in *olivaceus*, but there are no southern skulls here to compare. There is no lower jaw."

*Specimens examined.*—Total 274: Chonos Islands, 1 (type of *Mus chonoticus*, Mus. Nac. Chile); Aysen, 27; Rio Inio, Chiloe Island, 46; islet in Midship Bay, 1 (lectotype, B.M.); islet off east coast of Chiloe, 1 (lectoparatype, B.M.); Lake Todos Santos, 14 (A.M.N.H.); La Picada, Mount Osorno, 9; Mafil, Valdivia, 40; Osorno, 1 (type of *Mus xanthopus*, Mus. Nac. Chile); Peulla, Lake Todos Santos, 48; Puerto Montt, 23; Quellon, Chiloe Island, 37; Refugio, Mount Osorno, 1; Rinihue, Valdivia, 25.

**Akodon olivaceus beatus** Thomas.

*Akodon beatus* Thomas, Ann. Mag. Nat. Hist., (9), 3, p. 204, 1919—Beatriz, Nahuelhuapi, Argentina.

*Akodon arenicola beatus* Gyldenstolpe, Man. Neotr. Sig. Rodents, p. 103, 1932.

A small and somewhat variable series of Akodons from the eastern base of the Andes may be assigned to the form called *beatus*,

with the description of which they essentially agree. This form was described from Nahuelhuapi and has since been recorded from Zapala, San Martin de los Andes, and Sierra de Pilpil, Neuquen. If the specimens in hand are correctly referred, *beatus* is not especially related to *arenicola*, with which Thomas compared it, but it is very closely allied to *A. olivaceus brachiotis*. It differs from *brachiotis* from Rio Aysen on the west coast of Chile mainly in somewhat paler, less saturate coloration. There is less blackish on the under side of the terminal half of the tail and in series the percentage of specimens with wholly light under parts is greater. The skulls seem to be indistinguishable, but in *beatus* there is apparently a tendency to obsolescence of the cleft in the anterior lamina of the first upper cheektooth. This is usually present and fairly persistent in *brachiotis*, but in *beatus*, so far as examined, it rarely appears. In one very young specimen it is present on the right side and absent on the left.

That there is continuous distribution of *Akodon* from the mouth of Rio Aysen on the west coast to Rio Nirehuao east of the mountains I have little doubt. On the route between these points, which I myself traversed, conditions are wholly favorable for this, but trapping was only practical at one point, Rio Coihoique, and there no thorough test was possible. Specimens in the American Museum from Campo Bandera, Coihoique, are light colored and apparently the same as those from Rio Nirehuao, but the two series have not been actually compared. It is probable, also, that there is connection between *beatus* and *brachiotis* in the passes between Nahuelhuapi and Lake Todos Santos.

*Specimens examined.*—Total 21: Campo Bandera, Coihoique, 5 (A.M.N.H.); Rio Nirehuao (Casa Richards), 16.

**Akodon andinus andinus** Philippi.

*Mus andinus* Philippi, Arch. Naturg., **24**, (1), p. 77, 1858—high Andes, Province of Santiago, Chile.

*Akodon andinus* Trouessart, Cat. Mamm., p. 535, 1897; Thomas, Ann. Mag. Nat. Hist., (8), **11**, p. 140, 1913.

*Mus andinus* "Ph. et Landb.," Philippi, Anal. Mus. Nac. Chile, Ent. 14a, pp. 16, 18, 19, 22, 44, pl. 6, fig. 2 (col.), 1900.

*Akodon (Chelemys) andinus* Wolffsohn, Bol. Mus. Nac. Chile, **2**, p. 90, 1910.

*Akodon gossei* Thomas, Ann. Mag. Nat. Hist., (9), **6**, p. 418, 1920—Puente del Inca, Mendoza, Argentina.

*Bolomys andinus* Tate, Amer. Mus. Nat. Hist., Nov. No. 582, p. 23, 1932.

A very small mouse mainly light buffy in color both above and below; skull with relatively large rounded audital bullae; toothrow about 3.8. Total length 155; tail 64; hind foot 20.

*Range.*—High altitudes (8,000 feet upwards) of the Andes of central Chile and thence into Argentina in the provinces of Mendoza, San Juan (probably), and Rioja.

The probable type of this species was found in Santiago in a fair state of preservation. The position of the tail has been changed, as it is now bent to one side, but the head and body are posed as in Philippi's figure. The color is light grayish suffused with brownish, somewhat more brownish than the color on Philippi's plate. The tail is definitely bicolored and the under parts are fairly distinguished, the tips of the hairs being light buffy. The tail measures 55, which is what Philippi gives. The hind foot (with claws), which can be taken very accurately, is just 21. The longest front claw is about 2.5. The label reads: "Raton. *Mus andinus* Ph. Cord. Santiago, 1857." If these data are correct, the specimen can only be regarded as the type. At least, it quite certainly was the basis of the colored figure of 1900. The description given at that time is no more than a Spanish translation of the original one which appeared in German and the specimen fits it fairly well.

A second specimen belonging to Philippi's material evidently is in the British Museum, since Thomas has mentioned it in his descriptions of *A. jucundus* and *A. gossei*. Under *A. gossei* he states: "This species has long been known to me but under the name of *andinus*, Phil., for there is a young specimen of it in the small collection, received, as I believe, from Dr. Philippi himself, with the name '*Mus andinus*' upon it, a determination I had hitherto accepted." This specimen Thomas found to be smaller and browner than *andinus* as described and figured by Philippi, and he, therefore, referred it to his supposed new form *gossei* from Andean localities in Argentina in the same latitude as the type locality of *andinus*. In this he was right in one respect and wrong in another. Philippi's specimens are obviously the same as "*A. gossei*," but as in so many other cases his description and his specimens do not fully agree. The color differences are negligible, since there is considerable variation, and Philippi's measurement of 23 for the hind foot may be regarded as an error. Therefore, *A. gossei* becomes a synonym of *andinus*.

Wolffsohn (l.c.) has a passing mention of his belief that *andinus* should be referred to *Chelemys* (= *Notiomys*), but whether this opinion was based on examination of a specimen or on Philippi's reference to long claws does not appear. The elongation of the claws, in fact, is very slight, far too slight to signify any near rela-

tionship to *Notiomys*. It is about equal to that shown by some of the species which have been referred to *Bolomys*. Among these species, however, there is such divergence in cranial characters that it is much to be doubted that the claws are in all cases indicative of real relationship. The audital bullae in *A. andinus* are considerably enlarged, also as in some species of *Bolomys*. Thomas has referred to *Bolomys* the following species: *amoenus* (type), *berlepschi*, *albiventer*, *orbus*, and *lactens* (including *negrito*). At least two of these are species of marked peculiarity and all of them live at very high altitudes, but I am unable to find any important common character by which all of them can be distinguished from *Akodon*. The addition of *andinus* to the series would perhaps be as well justified as the inclusion of some of the others. The skull of *andinus*, although smaller, has general similarity to that of *albiventer*, but it is widely different from that of *lactens*. Apparently *berlepschi* is scarcely distinguishable, if at all, from *albiventer*. The type species *amoenus* is not available to me and, until further study is possible, it seems best to retain *andinus* in *Akodon* and to hold *Bolomys* for redefinition especially as to its limits and perhaps also as to its validity.

**Akodon andinus dolichonyx** Philippi.

*Hesperomys dolichonyx* Philippi, Anal. Mus. Nac. Chile, Zool., Ent. 13a, pp. 21–22, pl. 2, figs. 1*a* (col.), 1*c*–1*f* (skull, teeth, and claws), 1896—San Pedro de Atacama, Province of Antofagasta, Chile.

*Hesperomys dolichonyx cinnamomea* Philippi, supra cit., p. 22, pl. 2, fig. 1*b* (col.), 1896—Oasis of Leoncitos, Antofagasta, Chile.

*Mus dolichonyx* and *Mus dolichonyx cinnamomea* Philippi, supra cit., Ent. 14a, pp. 58–59, 1900.

*Akodon jucundus* Thomas, Ann. Mag. Nat. Hist., (8), **11**, p. 140, 1913—Cerro Lagunita, near Maimara, Jujuy, Argentina.

Similar to *A. a. andinus*, but slightly smaller and paler. Toothrow about 3.5 instead of 3.8. Total length 140 (135–143); tail 55 (48–60); hind foot 20.4 (20–21).

*Range.*—Arid and semi-arid mountains of northern Chile from the Province of Tacna south at least to the Province of Coquimbo; eastward in Argentina to central Jujuy. Found mainly at high altitudes.

A good series of these pale, buffy mice from the vicinity of the type locality agrees essentially with Philippi's description and figure. Specimens of *dolichonyx* and *cinnamomea* were examined in Santiago and notes made at the time are as follows:

"*Hesperomys dolichonyx*. Type or cotype existing but in rather poor condition. Skull has been removed. Philippi's figure gives not

such a bad idea of it, although the tail should be more tapering and not so hairy. It is not so much larger than *cinnamomea* as would appear from Philippi's plate. The front claws are slender but fairly long. The tail is not very long and the ears are small. *Hesperomys dolichonyx cinnamomea.* Somewhat smaller than *dolichonyx,* but otherwise similar."

Philippi's second specimen, which perhaps should be regarded as a cotype, is now in the British Museum (No. 11.11.17.7). The skin has been remade and the skull is somewhat crushed.

The color in this form averages slightly paler than in *a. andinus* and the size slightly smaller. The toothrow in *andinus* is about 3.8 and in *dolichonyx* about 3.5. A specimen in Field Museum from Jujuy, Argentina, is not distinguishable from some of the series from Chile. Therefore, *A. jucundus,* described from Jujuy, is regarded as a synonym.

A single specimen from Choquelimpie, Tacna (alt. 15,000 ft.), is a little pale and short-tailed but doubtless belongs here.

*Specimens examined.*—Total 25: Banos del Toro, Coquimbo, 5; Choquelimpie, Tacna, 1; Leoncitos, Antofagasta, 1 (type of *cinnamomea* in Mus. Nac. Chile); twenty miles east of San Pedro de Atacama, Antofagasta, 14; San Pedro de Atacama, Antofagasta, 2 (cotypes in B.M. and Mus. Nac. Chile). Tres Cruces, Jujuy, 2.

**Akodon xanthorhinus xanthorhinus** Waterhouse. YELLOW-NOSED AKODON.

*Mus xanthorhinus* Waterhouse, Proc. Zool. Soc. Lond., p. 17, 1837; Zool. Voy. Beagle, Mamm., p. 53, pl. 17, fig. 1, 1839—Hardy Peninsula, Tierra del Fuego.

*Hesperomys (Abrothrix) xanthorhinus* Thomas, in Milne-Edwards, Miss. Scient. Cap Horn, **6**, Zool., Mamm., p. 28, pl. 6, fig. 1, 1890.

*Mus infans* Philippi, Anal. Mus. Nac. Chile, Ent. 14a, p. 41, pl. 17, fig. 3, 1900—no exact locality.

*Akodon xanthorhinus* Allen, Mamm. Patagonia, p. 71, pl. 11, figs. 1–1*b*, pl. 12, figs. 1–1*a*, 2–2*a*, 1905; Thomas, Ann. Mag. Nat. Hist., (9), **3**, p. 205, 1919; (10), **4**, p. 42, 1929.

A small *Akodon,* with the tail shorter than the head and body; coloration predominantly rufescent, except the under parts, which are usually light colored and contrasted; sides of nose Ochraceous Tawny, not always but frequently contrasted; upper side of hind feet, at least medially, always pale or often quite bright Ochraceous Tawny. Skull small and light, the rostral part rather elongate; first lamina of anterior upper cheektooth with a slight notch obliterated in early stages of wear. Total length 156 (148–170); tail 53 (48–65); hind foot 21.3 (20–22).

*Range.*—Forested parts of southern and western Tierra del Fuego and some adjacent islands; also western Patagonia from the vicinity of Punta Arenas northward at least to the southern part of the district of Ultima Esperanza; also possibly farther north discontinuously to lat. 45° S.

The most obvious character of this species is the rusty color of the hind feet. Regardless of other variations, this seems to be constant. Throughout its range it is the most abundant small mammal and in some localities apparently the only one. During Field Museum's expedition in 1939–40 its ascendancy over all other species was apparent at practically every collecting station. It is so nearly ubiquitous that a habitat preference is scarcely evident. In swampy areas, like its northern relatives of the same genus, and in grassy spots surrounded by forest, it is likely to be most numerous, and in such places well-used runways, somewhat like those of northern voles, reveal its presence. It is also to be found under logs and roots in light forest and thence in undiminished numbers it ranges out into the low bush beyond the forest.

In its typical form, which is rather dark and richly colored, it does not extend far to the eastward but merges into a slightly paler subspecies, and its northward distribution also seems to be limited although information in regard to this is not wholly satisfactory.

In the great majority of specimens the under parts are practically white or slightly tinged with creamy in pronounced contrast to the upper parts, but in almost every considerable series one or more specimens occur in which the under parts are wholly ochraceous merging insensibly with the color of the upper parts. Occasionally one appears showing an intermediate condition but in most cases the distinction is abrupt. Among seventeen from Lake Fagnano, Tierra del Fuego, only one has the colored under parts; among twenty-five from Estancia Via Monte there are only two, and two others are intermediate; and among twenty-five from Punta Arenas there are as many as ten showing varying degrees of buffiness rather than white. Apparently this is a mutation disappearing in some localities and having fair chances of establishment in others. It appears only very rarely in the subspecies *canescens*.

Philippi's name *Mus infans* may be disposed as a probable synonym of *A. x. xanthorhinus*.[1] The type specimen is not available and doubtless has been lost, but the colored figure, with its ochra-

[1] Since this was written, this action has been taken by Gyldenstolpe (Man. Neotr. Sig. Rodents, p. 107, 1932).

ceous ears and muzzle, its small size, etc., can apply only to this species. Philippi did not know its source and queries the locality (central provinces of Chile) where no other mouse of this character has been taken. It may well have come to him from extreme southern Chile since it is well known that he received certain material from that region.

*Specimens examined.*—Total 124: Cabo Negro, near Punta Arenas, 1; east end of Lake Fagnano, Tierra del Fuego, 17; Mina Rica, near Punta Arenas, 13; Punta Arenas, 25; east end of Riesco Island, 8; Rio Rubens, about lat. 52° S., 1; Rio Verde, east end of Skyring Water, 15; Estancia Via Monte, Tierra del Fuego, 25; Lake Yerwin, Tierra del Fuego, 19.

**Akodon xanthorhinus canescens** Waterhouse.

*Mus canescens* Waterhouse, Proc. Zool. Soc. Lond., p. 17, 1837; Zool. Voy. Beagle, Mamm., p. 54, 1839—Puerto Deseado, Santa Cruz, Argentina.

*Akodon canescens* Thomas, Proc. Zool. Soc. Lond., p. 211, 1898; Allen, Mamm. Patagonia, p. 73, 1905.

Similar to *A. x. xanthorhinus* but averaging considerably paler in color, more grayish than rufescent in general appearance.

*Range.*—Unforested pampa and low bush of northern and eastern Tierra del Fuego and southeastern Patagonia, north along the Argentine coast at least to Pico Salamanca, Chubut, and inland to the edge of the forested mountains from Ultima Esperanza to Chubut and Rio Negro.

Allen in 1905 (l.c.) considered *xanthorhinus* and *canescens* as wholly distinct species, while Thomas in 1929 (Ann. Mag. Nat. Hist., (10), **4**, p. 41) stated that he was "now satisfied that *A. canescens* should be united with *A. xanthorhinus*," denying even subspecific distinction. In both cases it is evident that sufficient material for sound conclusions was lacking. With large series of fresh, well-prepared specimens, supplemented by personal field experience, it is quite clear that two intergrading subspecies are concerned, one occupying the relatively humid and at least partially forested areas of Tierra del Fuego and western Magallanes, the other ranging eastward to the Atlantic coast over an open, unforested, and less humid region.

Even in Tierra del Fuego, specimens from southern and western localities in the forest are easily distinguishable from those of the northern and eastern coast where conditions are essentially the same as those of eastern Santa Cruz on the continent. Individual speci-

mens may be quite similar, especially when seasonal changes are not considered, but when series are compared a difference in shade of color corresponding to the difference in environment is plainly evident.

Apparently *xanthorhinus* in typical form ranges northward a relatively short distance, perhaps no farther than lat. 52° S., for practically all material from farther north is referable to *canescens*. This includes our own specimens from Ultima Esperanza, the large series from upper Rio Chico and other localities in western Santa Cruz obtained by the Princeton expeditions, as well as scattered specimens from Chubut and Rio Negro. The northernmost record is from Pilcaneu, Rio Negro. A single specimen from this locality, now in Field Museum, is unusually grayish and the hind feet are almost wholly white. On the other hand, four specimens from Rawson, Chubut, include one with a wholly ochraceous belly, and two from Rio Nirehuao, where the species is rare, have similar dark-colored under parts. It is possible, therefore, that a division of dark and light forms may be found in the north as well as in the south, but present material, although somewhat suggestive, is not sufficient to demonstrate it.

It is doubtful if *xanthorhinus* and *canescens* are directly connected by gradations with any other members of the genus, but further work in the Argentine provinces of Chubut, Rio Negro, and Buenos Aires will be necessary before positive conclusions are justified. Under the name *Akodon iniscatus* Thomas has described a species which appears to inosculate with *canescens* over a considerable area in which the two are found together but each maintaining its distinctions. Specimens in Field Museum, received from the British Museum as *iniscatus*, indicate that it is quite unlike *canescens*, but its relationship to *A. nucus* is obviously close. Two topotypes of *nucus* which are at hand are only slightly larger than *iniscatus* and both show the white on the throat mentioned as characterizing the type of *iniscatus* but not found on various specimens subsequently referred to it.

*Specimens examined.*—Total 92: CHILE: Laguna Lazo, near Lake Sarmiento, 12; Lake Sarmiento, 8; Puerto Natales, Ultima Esperanza, 5; Rio Ciaike, eastern Magallanes, near Argentine boundary, 26; Rio Nirehuao, Aysen, 2. ARGENTINA: Arroyo Beta, Tierra del Fuego, 11; Estancia Cullen, Tierra del Fuego, 15; Cape Fairweather, 1; Pilcaneu, Rio Negro, 1; Rawson, Chubut, 4; upper Rio Chico, Santa Cruz, 2; Rio Coy, Santa Cruz, 2; Province of Santa Cruz, 3.

**Akodon (Abrothrix) longipilis longipilis** Waterhouse.

*Mus longipilis* Waterhouse, Proc. Zool. Soc. Lond., p. 16, 1837; Zool. Voy. Beagle, Mamm., p. 55, pl. 16 (col.), pl. 33 (teeth), 1839—Coquimbo.

*Akodon longipilis* Thomas, Ann. Mag. Nat. Hist., (6), **16**, p. 370, 1895.

*Mus porcinus* Philippi, Arch. Naturg., **24**, (1), p. 78, 1858; Anal. Mus. Nac. Chile, Zool., Ent. 14a, pp. 22–23, pl. 6, fig. 3, 1900—Angostura, Santiago.

*Mus brachytarsus* Philippi, supra cit., pp. 37–38, pl. 15, fig. 2 (col.), 1900—Santiago (fide Wolffsohn, 1910a, p. 100).

*Mus fusco-ater* Philippi, supra cit., pp. 45–46, pl. 19, fig. 1 (col.), 1900—Santiago (fide Wolffsohn, 1910a, p. 100).

*Mus melampus* Philippi, supra cit., pp. 49–50, pl. 20, fig. 4, 1900—Cartajena, Valparaiso.

*Abrothrix longipilis* Thomas, Ann. Mag. Nat. Hist., (8), **18**, p. 340, 1916.

*Akodon longipilis* Ellerman, Fam. Gen. Rodents, **2**, p. 416, 1941—subgenus *Abrothrix*.

A rather large, heavy-bodied mouse with small, thinly haired ears, long, loose pelage, and tail not exceeding three-fourths the length of the head and body. Color mainly light brownish rather coarsely mixed with grayish, the sides only slightly or not at all more grayish than the back; under parts wholly gray; feet and tail dark. Skull large and heavy, with long nasals, narrow interorbital region without sharp edges, and a broad, nearly upright infraorbital plate. Dentition akodont, but first lamina of anterior upper cheektooth undivided even in very young teeth. Total length 220 (213–234); tail 91 (83–96); hind foot 29.3 (28–30).

*Range.*—West-central Chile mainly in the central provinces of Coquimbo, Aconcagua, Valparaiso, and Santiago.

This mouse is easily recognized among Chilean species by its rather heavy build, relatively short tail, large feet, and grayish coloration overcast with rusty. The typical form appears not to be abundant and has been taken mainly in the region between and just north or south of Valparaiso and Santiago. Except the type, specimens from the type locality are lacking, and it is probable that Coquimbo is near its northern limit. Southward from Valparaiso it will probably be found, at least for some distance, in the coast region, since a closely related form occurs at Concepcion and the differences between the two forms are nearly covered by individual variation.

The relative scarcity of the species is attested by the small number of synonyms for it produced by Philippi. These are *brachytarsus*, *fusco-ater*, *melampus*, and *porcinus*. I was unable to find specimens in Santiago which might be considered as types of *brachytarsus* and *fusco-ater*, but such specimens evidently were examined by Wolffsohn (1910a, pp. 97, 100), who gives measurements and details justifying his conclusion that both are typical examples of *longipilis*.

The name *porcinus* was first given in 1858 and it is doubtful if the type still exists. However, a specimen which is still preserved in Santiago evidently was the basis of Philippi's figure of 1900 and at least part of his description. Its label reads "Raton. *Mus porcinus*, Ph. Santiago, 1857," and perhaps, since it is dated 1857, it should be given the benefit of the doubt and regarded as the type. It is in good condition except as to color, which is obviously quite unreliable, being mainly reddish brown and probably due to immersion in impure alcohol. In size and proportions it agrees with *longipilis*. The hind foot measures 29, and the tail (estimated along curves) is about 90. The pelage is quite full and thick. Philippi's figure shows a large gray mouse fairly representing *longipilis*.

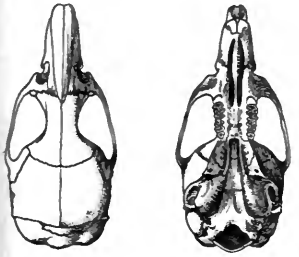


FIG. 24. *Akodon l. longipilis*. F.M. No. 23123. × 1.

No type of *Mus melampus* has been found, but fortunately the description and figure are quite diagnostic, this being one of the few cases among Philippi's species in which this is true.

*Mus dumetorum* of Philippi also has been referred to *longipilis* by Wolffsohn (p. 88), but the specimen examined by him apparently was not the type and, as explained elsewhere (p. 149), it seems probable that *dumetorum* was an *Oryzomys* with an incomplete tail.

Waterhouse's type of *longipilis*, collected by Darwin, is preserved in the British Museum. The following notes in regard to it were made in June, 1937: "No. 55.12.24.177. Type, skin and skull. Skin laid on side, quite faded; upper parts pale brown with little or no distinction between back and sides. Patch of hair gone from right side. Skull very imperfect; lacks braincase and most of lower jaw; nasals, interorbital region, upper left and lower right teeth present."

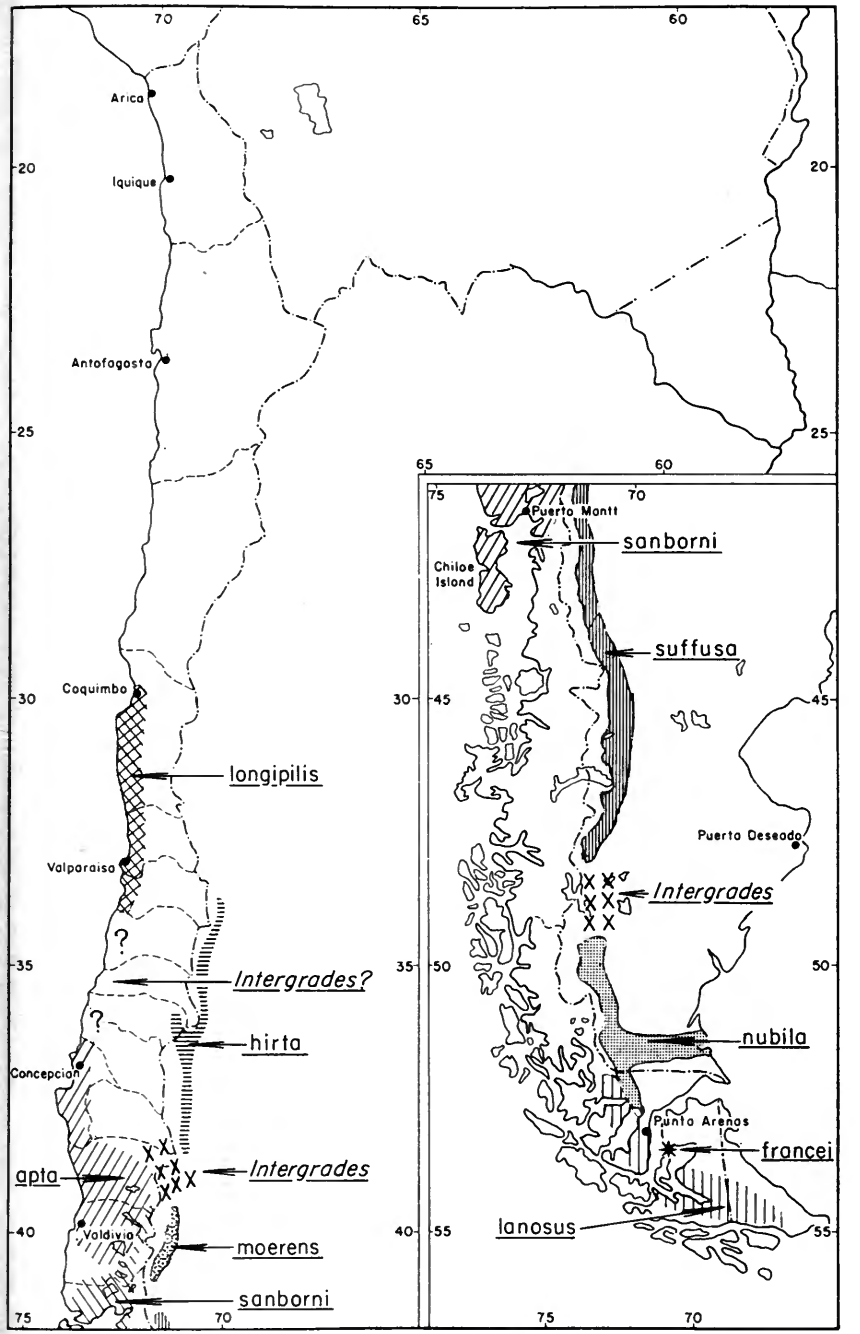
As early as 1837, when Waterhouse gave several generic or subgeneric names to South American rodents, the species *longipilis* was made the type of the subgenus *Abrothrix*. Since then it has been most frequently referred to *Akodon*, but in 1916 Thomas (op. cit., pp. 336–340) published a synopsis of South American Muridae "commonly referred to *Akodon*" in which *Abrothrix* appeared as one of seven groups proposed for recognition as full genera. Most of these groups were monotypic or practically so and his conclusions were admittedly based on inadequate material. *Microxus* was left out

of consideration although its connection is obviously closer than some of those included. As more material accumulates it becomes increasingly evident that the classification proposed by Thomas was not a natural one and will require considerable modification. The time is not yet here for positive conclusions, but it is clear that many species combine the characters assigned to his groups and do not fall readily into any of them. In the case of *Abrothrix*, it seems impossible to find characters which are not repeated elsewhere in the akodont group or which, still more significantly, do not grade almost or quite insensibly from one species or subspecies to another. Therefore, *Abrothrix* as a genus seems indefensible, and even as a subgenus its position is doubtful. For the present it may be accepted as a subgenus at least to maintain connection with previous concepts until thorough studies have been made.

The extensive material obtained by Field Museum's Chilean expeditions indicates that most of the forms[1] heretofore assigned to *Abrothrix* are no more than intergrading subspecies of *longipilis*. The connection is made through *A. l. apta*, described below, which extends westward from the coast at Concepcion and passes through the Andes into Argentina, gradually becoming more and more similar to the forms long known from the eastern side of the mountains. Therefore the names *hirta*, *moerens*, *suffusa*, *modestior*, and *nubila* all unquestionably refer to a single species either as synonyms of each other or as designations for subspecific groups connected by gradations with *longipilis*. Belonging in the same series and doubtfully distinct is *A. francei* from Tierra del Fuego, known only from the type specimen. This means that what was formerly thought to be a group under the name *Abrothrix* is in reality only one wide-ranging and locally variable species. Its distribution coincides rather closely with that of *Notiomys* and it is possible that *longipilis*, as seems to be the case with *Notiomys megalonyx*, is distinct from the other members of the series, but present material seems to point to the last degree of gradation.

*Specimens examined.*—Total 39: Buen Retiro, Aconcagua, 1; coast hills, Valparaiso, 16 (B.M.); Coquimbo, 1 (type, B.M.); La Laguna, Valparaiso, 1 (B.M.); La Rojas, Quillota, Valparaiso, 1;

[1] The only one not examined is *A. illutea* from Tucuman, Argentina, described from a single specimen thought to indicate a great extension of range for the group. It seems not improbable that this may be more closely related to *Hypsimys* than to "*Abrothrix*." Although it has dental peculiarities, the skull of *Hypsimys* is very similar to that of *Abrothrix* and the mention of a white chin spot, usually present in *Hypsimys* but not in *Abrothrix* leads to the suspicion that this form has not been properly allocated.




MAP 9. Distribution of *Akodon* (*Abrothrix*) *longipilis* and subspecies with *A. sanborni* and *A. lanosus*.

Limache, Valparaiso, 1; Olmue, Valparaiso, 9; Palmilla, La Cruz, 1; Papudo, Aconcagua, 4; Quilpue, 4 (B.M.).

**Akodon (Abrothrix) longipilis apta** subsp. nov.

*Type* from Piedra de Aguilas, Sierra Nahuelbuta, Malleco, Chile. Altitude about 4,000 feet. Adult male. Collected November 4, 1939, by John M. Schmidt. Orig. No. 193.

*Diagnosis.*—Similar to *A. l. longipilis*, but smaller; color less uniform, the sides more grayish and more contrasted with back; under parts averaging paler and tail more frequently bicolored. Skull with a narrower braincase and a markedly shorter infraorbital plate; audital bullae and teeth smaller.

*Measurements.*—Average of ten adult paratypes: total length 224 (217–230); tail 95 (87–102); hind foot 28.4 (27.5–29). Skull of type: greatest length 32.1; basilar length 25; zygomatic breadth 16.3; nasals 11.2 × 4.1; interorbital constriction 5.4; antero-posterior width of infraorbital plate 2.3; diastema 18.1; postpalatilar length 11.1; palatine slits 7.5; width of braincase 13.7; upper cheekteeth 4.5.

*Range.*—South-central Chile from the coast at Concepcion south at least to Nahuelbuta and westward through the Province of Valdivia to the western side of the Andes in the provinces of Malleco, Valdivia, and Llanquihue, where intergradation with east Andean forms is variously evident.

*Remarks.*—This is quite well distinguished from typical *longipilis* both in color and in cranial characters, but it seems altogether probable that full intergradation will be found in the region between Concepcion and Valparaiso where records of the species at present are lacking. Apart from size, its most obvious cranial character is its narrowed (shortened) infraorbital plate. This is quite pronounced in the large series from Nahuelbuta but is less so in six specimens from a little farther north at Concepcion and these, therefore, may be significant of a more complete gradation that will be evident when more material is obtained.

Delimitation of the westward range of this form offers considerable difficulty. In general all western specimens have tendencies to smaller size and narrower braincases and especially in the western part of the provinces of Malleco and Cautin every local series is variable or obviously tending toward the characters of east Andean forms (*hirta, moerens, suffusa*). Since material from this region is relatively abundant and since individuals or series seldom agree in detail with either western or eastern extremes, the impression is

easy to form that a recognizable race is concerned. Externally this would be smaller and paler than *apta* but larger and darker than *hirta*. Careful examination of skulls, however, shows such variation that confidence in the reality of such a race is not gained. A further complication is the occurrence of occasional specimens externally similar to *apta*, but with skulls so narrowed and reduced as to approximate very closely the condition found in *sanborni*, which otherwise appears to be a wholly distinct species. Four specimens from a single locality (Rinihue, Valdivia) include one of large size and grayish color which may be referred to *apta* without any violence; another which is small and glossy black falls with *sanborni*, and two others with a unique dull brownish color and peculiar skulls seem explainable only on the theory that they are hybrids.

Apparently western Malleco and Cautin include a meeting ground for at least three faunas, east Andean, west coast, and southern forest respectively. Intensive work in the region will doubtless be necessary before the whole situation is fully clarified. For the present no better course appears than to treat the majority of these "intermediates" under *apta*, although in many cases their departure from it is considerable. An attempt to suggest certain lines of variation and segregation is indicated in the subjoined list of specimens.

*Specimens examined.*—Total 128.

Typical or nearly typical: Concepcion, 6; La Picada, Mount Osorno, 11; Rinihue, Valdivia, 1; Petrohue, Lake Todos Santos, 7; Sierra Nahuelbuta, 36 (F.M. 32; A.M.N.H. 4).

Somewhat smaller and paler, but maintaining slender elongate skulls, in some cases even approaching the type seen in *sanborni:* Curacautin, 5; Lonquimai, 12; west of Lonquimai, 3 (A.M.N.H.); Rio Colorado, 16; Rio Lolen, Lonquimai Valley, 1; Tolhuaca, 16.

Similar but with skulls definitely approaching the type seen in *moerens* and *suffusa*, the braincase relatively wider, and the nasals shorter but narrower: Lake Galletue, 9; Pino Hachado, Neuquen, Argentina, 3.

Possible hybrids between *apta* and *sanborni*: Rinihue, 2.

**Akodon** (**Abrothrix**) **longipilis castaneus** subsp. nov.

*Type* from Mocha Island, coast of southern Chile, Province of Arauco. No. 97735 American Museum of Natural History. Adult male. Collected December 7, 1932, by D. S. Bullock.

*Diagnosis.*—Similar to *A. l. longipilis*, but mid-dorsal area, from forehead to base of tail, broadly and richly rufescent (Vandyke Brown or slightly lighter); sides and under parts a very slightly darker shade of gray. Skull with tendency to elongation of nasals and rostrum; molariform teeth smaller than in *longipilis*.

*Measurements.*—Type, measured by collector: total length 215; tail 88; hind foot (dry, with claws) 29. Average of nine adults: total length 213 (203–215); tail 90 (82–97). Skull of type: greatest length 32.4; zygomatic width 15.2; nasals 13.4; interorbital constriction 5.8; width of infraorbital plate 2.5; diastema 8.8; postpalatilar length 11.5; palatine slits 7.4; width of braincase 13.7; upper toothrow 4.6.

*Remarks.*—This is a well-marked form readily distinguished by the broad band of rufescent which covers the entire central upper parts and may even extend to the upper sides. In *A. l. apta* there is a slight tendency to differentiation of a rufescent dorsal area but it is much paler and less extensive.

As in the case of *Notiomys v. bullocki*, the principal material representing this form has been placed in my hands through the courtesy of Dr. H. E. Anthony of the American Museum of Natural History. This material consists of an excellent series of seventeen specimens and is supplemented by two additional examples lent by the British Museum through Dr. T. C. S. Morrison-Scott.

In the collection from Mocha Island, made for the American Museum by Dillman S. Bullock, are four species of rodents belonging to the four genera *Akodon*, *Abrothrix*, *Notiomys*, and *Oryzomys*. With the exception of the *Oryzomys*, which is scantily represented, all seem at least slightly differentiated from the mainland stocks from which they are obviously derived.

### Akodon (Abrothrix) longipilis moerens Thomas.

*Abrothrix suffusus moerens* Thomas, Ann. Mag. Nat. Hist., (9), **3**, p. 203, 1919—Beatriz, Lake Nahuelhuapi, Argentina.

*Abrothrix hirta moerens* Thomas, supra cit., (10), **4**, p. 40, 1929.

This form may not occur in Chile, but it is found very near the boundary and is included here in order to indicate its position with reference to the other members of the *longipilis* series, all of which are discussed. It appears to occupy a narrow and restricted area east of the Andes in a region where the humid forests of Chile are extended through low passes into Argentina. In size and cranial

characters, however, it falls with *hirta* and *suffusa* rather than with any of the Chilean forms.

Two paratypes in Field Museum are darker in color than *suffusa* and in a broad sense might be regarded as intermediate between *apta* and *suffusa*. The differences in size and cranial characters, however, are considerable. Perhaps it is a local form occupying about the same area and having about the same characters as *Notiomys m. fumosus*.

Beatriz, the type locality of *moerens*, does not appear on available maps of Lake Nahuelhuapi and Thomas gives no information as to its exact situation. Probably it is somewhere on the forested western shores of the lake. The eastern part of the lake extends into the open pampas and a specimen in Field Museum from Bariloche in this region is clearly nearer to *suffusa* than to *moerens*. Other material recorded from Beatriz includes *Irenomys*, *Notiomys valdivianus*, and *Dromiciops*, all of which are otherwise known only from forested parts of Chile. Further collecting in this region should be of interest.

**Akodon (Abrothrix) longipilis hirta** Thomas.

*Acodon hirtus* Thomas, Ann. Mag. Nat. Hist., (6), **16**, p. 370, 1895—Fort San Rafael, Mendoza, Argentina.

*Abrothrix hirtus* Thomas, supra cit., (8), **18**, p. 340, 1916; (9), **20**, p. 201, 1927.

*Abrothrix hirta hirta* Thomas, supra cit., (10), **4**, p. 40, 1929.

A small light gray mouse with the central upper parts slightly tinged with brownish; under parts and feet white; tail bicolored. Most similar to *A. l. suffusa* but paler and probably averaging longer-tailed. Total length (two specimens) 188–198; tail 81–86; hind foot 24–25.

*Range.*—Eastern base of the Andes in the provinces of Mendoza and Neuquen, Argentina, from lat. 34° 30′ to 37° S., apparently passing through the Andes into Chile in the Province of Talca.

Although one of the earliest forms to be described, this is still imperfectly known and poorly represented in museums. Examples from the type region in Mendoza have not been examined, but specimens from Neuquen (Collon Cura and Quilquihue) were regarded by Thomas (l.c., 1927) as agreeing with the type. A single specimen in Field Museum from Bariloche, Lake Nahuelhuapi, which is not far from the Neuquen localities, is only very slightly paler than *suffusa* and probably this, as well as the Neuquen specimens, is an intergrade. Still paler and more probably representing the extreme characters of the form are two specimens taken by Sanborn in 1939 at Arroyo del Valle, Province of Talca, Chile, on the

western side of the Andes. In the same vicinity he also obtained *Notiomys macronyx*, another form originally described from Mendoza. It seems likely, therefore, that somewhere between lat. 34° and 35° S. there is opportunity for the passage westward of at least part of the Mendoza fauna.

*Specimens examined.*—Arroyo del Valle, Talca, 2.

### Akodon (Abrothrix) longipilis suffusa Thomas.

*Akodon suffusus* Thomas, Ann. Mag. Nat. Hist., (7), **12**, p. 241, 1903—Koslowsky, Valle del Lago Blanco, Chubut, Argentina.

*Abrothrix suffusus* Thomas, supra cit., (8), **18**, p. 340, 1916.

*Abrothrix suffusus modestior* Thomas, supra cit., (9), **3**, p. 202, 1919—Maiten, Chubut, Argentina.

*Abrothrix hirta suffusa* Thomas, supra cit., (10), **4**, p. 40, 1929.

A medium-sized mouse with the median upper parts reddish brown and the sides grayish; under parts and feet creamy or nearly white; tail bicolored. Similar to *A. l. apta* but smaller, with the under parts and feet lighter colored; skull with narrow but shorter nasals and relatively wider braincase. Similar to *A. l. nubila* and *A. l. hirta*, but with upper parts darker colored. Total length 184 (172–190); tail 71 (67–77); hind foot 24.4 (23.5–24.5).

*Range.*—Eastern base of the Andes mainly in Argentina from the Province of Neuquen southward to meet the range of *A. l. nubila* in northern Santa Cruz; enters Chile at least at several points where conditions favor.

This mouse has an extensive but narrow range in the small valleys which connect the Andes with the pampas of Argentina. Apparently it does not pass into the open pampas and it enters the mountains only along valleys which cut the eastern slopes or which are directly connected with them at moderate elevations. It was found within Chilean borders in the region of the Rio Nirehuao, where it was the most abundant rodent. In this vicinity it was taken at one station on the Rio Coihoique which is actually on western drainage, but the physical conditions there are more eastern than western and there was no evidence that it passed into the humid coastal forests.

Its range corresponds rather closely with that of *Notiomys m. vestitus* and like that form it grades into a pale form in the north and also in the south. It is very similar in color to various specimens from Cautin and Malleco in eastern Chile which are somewhat larger and usually have narrower skulls, for which reasons they have been regarded as gradients between *suffusa* and *apta*. Occasional specimens from this part of Chile may be found, however, which are quite indistinguishable from *suffusa*.

*Specimens examined.*—Total 47: CHILE: Campo Bandera, Coihoique, 18 (A.M.N.H.); Rio Coihoique Station, 2; Rio Nirehuao, 24. ARGENTINA: Bariloche, Nahuelhuapi, 1; Valle del Lago Blanco, Chubut, 2.

**Akodon (Abrothrix) longipilis nubila** Thomas.

*Akodon suffusus* Allen, Mamm. Patagonia, **3**, p. 76, 1905.

*Abrothrix hirta nubila* Thomas, Ann. Mag. Nat. Hist., (10), **4**, p. 40, 1929—Alta Vista, Lake Argentino, Santa Cruz, Argentina.

Similar to *A. l. suffusa*, but averaging slightly larger and considerably paler, especially on the back where the brownish is lighter and more diffuse. Total length 183 (177–195); tail 75 (70–79); hind foot 25.8 (25–26).

*Range.*—Southern Patagonia from the coast at the mouth of the Rio Coy westward probably along streams to the base of the Andes and thence northward to meet the range of *A. l. suffusa* in northern Santa Cruz or southern Chubut.

Series of this form taken by Field Museum's expedition of 1939–40 show it to average much paler than *suffusa*. The hind foot is a little larger and the skulls are slightly more robust. Variation includes some specimens scarcely distinguishable from *suffusa*, but as a geographic race it seems well founded. It was not taken in the immediate vicinity of Punta Arenas but was encountered at Rio Verde, at the east end of Skyring Water, only a short distance farther north. In the district of Ultima Esperanza it was abundant and the Princeton Expedition found it in numbers on the upper Rio Chico. Allen records it from the coast at the mouth of the Rio Coy but it is not an animal of the open grassland and doubtless reaches the coast by following watercourses.

*Specimens examined.*—Total 38: Alta Vista, Lake Argentino, Argentina, 1; Lake Sarmiento, 3; Laguna Lazo, near Lake Sarmiento, 22; Puerto Natales, 2; Rio Chico, Santa Cruz, Argentina, 2; Rio Verde, Skyring Water, 8.

**Akodon (Abrothrix) longipilis francei** Thomas.

*Akodon francei* Thomas, Ann. Mag. Nat. Hist., (8), **2**, p. 497, 1908—Santa Maria, near Porvenir, Tierra del Fuego, Chile.

*Abrothrix francei* Thomas, supra cit., (8), **18**, p. 340, 1916.

Field Museum's expedition of 1939–40 did not succeed in obtaining this mouse on Tierra del Fuego. The actual type locality, which is but a few miles southeast of the port of Porvenir, was not visited and at various other localities on the island the species was not found.

Therefore, the name *francei* still rests on the unique type specimen in the British Museum. This type, which was hastily examined in 1937, was taken in midwinter (August) and is very full-pelaged with the under parts and feet snowy white and greatly contrasted with the upper parts. Moreover, it was originally preserved in brine although it has now been remade into a specimen of the usual style. All available specimens of *nubila* from the mainland are in summer pelage, so reliable comparisons are not possible.

In view of the close similarity to mainland forms of other rodents from Tierra del Fuego it seems improbable that this one is sharply distinguished. For the present, at least, it deserves no more than subspecific status and it would not be surprising to find it quite identical with *nubila*.

The skull length of 30.3 given for the type suggests large size as a possible character since a large skull of *nubila* measures only 29, but the other cranial measurements are essentially alike. Also, notes on the type skull record that it had been broken and repaired, which may account for the excessive length.

**Akodon (Abrothrix) sanborni** sp. nov.

*Type* from mouth of Rio Inio, south end of Chiloe Island, Chile. No. 22726 Field Museum of Natural History. Adult male, collected January 15, 1923, by Wilfred H. Osgood. Orig. No. 5522.

*Diagnosis.*—A small mouse of uniform blackish brown color including the tail and feet; tail about four-fifths the length of the head and body. Externally somewhat similar to *Akodon o. brachiotis* but more blackish in color, the ears smaller and more scantily haired. Feet and claws as in *Akodon*, the fifth digit on both fore and hind feet proportionately longer than in *Oxymycterus*. Skull with the rostral part narrow and elongate, the nasals in some cases "trumpet-shaped" as in *Oxymycterus;* infraorbital plate much narrowed, more sloping than in typical *Akodon*, but less so than in *Oxymycterus;* dentition essentially as in *Akodon* and *Oxymycterus*, the "subsidiary ridges" (i.e. secondary parastyle and mesostyle) somewhat better developed than usual in *Akodon;* anterior lamina of first upper cheek-tooth variable, in some cases distinctly cleft as in typical *Akodon*, in others faintly or not at all cleft as in *A. longipilis* and subspecies.

*Measurements.*—Average of ten adults from the type locality: total length 180 (169–200); tail 75.8 (69–85); hind foot 24.1 (23.5–25.5). Skull of type: greatest length 28.3; basilar length 20.8; zygomatic breadth 13.1; nasals 11.8 × 3.2; interorbital constriction 5.2;

width of infraorbital plate 1.8; diastema 6.6; postpalatilar length 9.8; palatine slits 6.6; width of braincase 12; upper cheekteeth 4.3.

During field work in Chile, this species was commonly referred to as the "black mouse." It is, in fact, so dark that this title is not undeserved, but the color is usually tinged with brownish (dark Clove Brown) and the under parts are somewhat grayish. Uniformity of color is a marked characteristic, and there is no indication of a dorsal differentiation. Apparently none of Philippi's names apply to this species and, since it is relatively scarce, probably he never received it. During Field Museum's expedition of 1923–24, although it was taken in some numbers on Chiloe Island, only four specimens were obtained on the mainland. In 1939, at Peulla on Lake Todos Santos, a small series was accumulated gradually, only one or two examples being taken on each "trap night." Here it was greatly outnumbered by *Akodon o. brachiotis* but apparently was more restricted to very dense forest. These mainland specimens average slightly larger with somewhat heavier skulls than those from Chiloe Island, and at some future time it may be possible to make some separation. At present, their relations to the *longipilis* series are not wholly clear[1] and, since no collecting has been done on the mainland opposite Chiloe Island, there is doubtless much more to be learned.

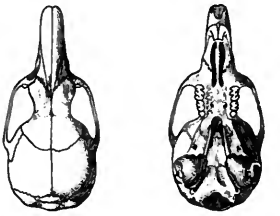


FIG. 25. *Akodon (Abrothrix) sanborni*. F.M. No. 22826. × 1.

On the basis of cranial and dental characters alone there could be no objection to regarding this as a small species of the genus *Oxymycterus*. Except for the infraorbital plate which, although narrow, is less sloping, practically every feature of the skull of *Oxymycterus* is repeated. The differences in the structure of the feet, however, are marked. With the feet of *Akodon*, therefore, and the skull and teeth of *Oxymycterus*, this species provides the characters that have had recognition under the name *Microxus*. Its close similarity to *Abrothrix*, however, leads to the conclusion that *Microxus* should be merged with *Abrothrix* and when this is done but few distinctions

[1] An interesting character which *sanborni* shares with *longipilis* and all its subspecies is evident only to the field collector. This is the close adherence of the skin of the tail to the tail vertebrae in all but immature specimens. In other rodents of the region the tail bone slips out easily, but in these it is necessary to use the knife all the way, the usual practice being to slit the under side longitudinally. In any considerable collection of dried skins evidences of this practice are to be seen in a large share of the specimens.

remain between *Abrothrix* and typical *Akodon*. As stated elsewhere, recently studied material includes specimens among the gradients from *apta* to *suffusa* with skulls having a similarity to those of *sanborni* amounting to practical identity.

The presence or absence of a cleft or division in the anterior lamina of the first upper cheektooth has been supposed to provide a distinction between *Akodon* and *Abrothrix* and if only the type species (*boliviensis* and *longipilis*) are compared it does so. Among other species, however, there is considerable variation and in many the condition in very young teeth is unknown. Therefore statements as to this character often are unreliable. In the series of *sanborni* from Chiloe Island there are a number of very young examples with the teeth quite unworn. In two of these examined there is scarcely any indication of an anterior division of the first upper cheektooth, while in two others the division is quite marked. In *lanosus*, which differs from *sanborni* mainly in size and external characters, the division is clear in all very young teeth and often persists in fairly late stages of wear. On the other hand, in *Akodon xanthorhinus*, which has never been supposed to be anything but an *Akodon*, the division is very faint and soon obliterated or quite absent. In some cases there is division in the tooth of the right or left side while the corresponding one of the opposite side is entire.

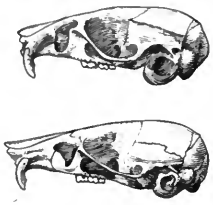


FIG. 26. *Akodon o. olivaceus* (upper) and *Akodon* (*Abrothrix*) *sanborni* (lower). ×1.

It seems, therefore, that peculiarity of the anterior lamina of the first upper cheektooth may furnish specific or sometimes perhaps subgeneric, but not generic characters. As knowledge of connecting forms grows, it is increasingly evident that among South American cricetine rodents, while differentiation has been marked, indications of a community of ancestry are still present to an unusual degree. To express rather than to obscure this significant situation it seems desirable to link various groups rather than to separate them.

Since the above-described species is not even subgenerically separable from *Abrothrix* and since it agrees with the usual concept of *Microxus*, it appears to follow that *Microxus* is a synonym of *Abrothrix* and that *Abrothrix* at most is only a subgenus of *Akodon* characterized by a combination of peculiarities, recurrent elsewhere, rather than by any unique features. However, the type species

(*mimus*) of *Microxus* has not been examined in this connection and since certain Peruvian species of *Akodon* show some approach to it, possibly its final status is yet to be determined.[1]

*Specimens examined.*—Total 37: Peulla, Lake Todos Santos, 10; Puerto Montt, 1; Quellon, Chiloe Island, 13; Rinihue, Valdivia, 1 (aberrant); Rio Inio, Chiloe Island, 12.

**Akodon (Abrothrix) lanosus** Thomas.

*Oxymycterus lanosus* Thomas, Ann. Mag. Nat. Hist., (6), **20**, p. 218, 1897—Monteith Bay, Straits of Magellan.

*Microxus lanosus* Thomas, supra cit., (8), **4**, p. 237, 1909.

A small, brown (Cinnamon Brown) mouse with small, thinly haired ears and the tail about three-fifths the length of the head and body. Under parts usually heavily washed with fulvous; feet white; tail bicolored. Skull slender and delicate with the nasals much elongate and the infraorbital plate narrow; dentition with the anterior lamina of the first upper cheektooth deeply cleft and the "subsidiary ridges" persisting through early stages of wear. Total length (10 adults) 163.4 (151–168); tail 59 (53–65); hind foot 21.9 (21.5–23).

This mouse was found sparingly in or near deep forest on Tierra del Fuego and in the vicinity of Punta Arenas where it shows preference for cool, damp habitat. In the field it was readily distinguished from the common *Akodon* of the region by its smaller ears, its usually more fulvous under parts, and its white feet.

Two specimens of the species, compared with the type by Thomas, have been recorded from upper Rio Chico by Allen (Mamm. Patagonia, p. 83, 1905). These and the type itself appear to be the only specimens heretofore obtained. The type in the British Museum is fairly well preserved, the skin laid on its side as in most of Darwin's specimens, and the tail vertebrae still in situ. The skull is in good condition, the teeth being practically unworn. The

[1] In 1913, I described *orophilus* and *orientalis* from northern Peru as subspecies of *Akodon mollis* (Field Mus. Nat. Hist., Zool. Ser., **10**, pp. 98–99), being misled by their very close external similarity and by their apparent continuity of distribution. Later, Thomas (Proc. U. S. Nat. Mus., **58**, pp. 239–240, 1920) named *torques* as a *Microxus* and implied that *orophilus* and *orientalis* also belonged to that genus rather than to *Akodon*. A re-examination of my original collections, together with series of *torques* and much additional material, leads to the conclusion that *orophilus* is specifically but not generically distinct from *mollis*, at least not in northern Peru. Externally *A. mollis altorum* and *A. orophilus* are identical and in northern Peru are separated only by the canyon of the Marañon River. They are not "respectively lowland and highland" forms, as Thomas thought, but forms of the western, central, and eastern cordilleras. In central and southern Peru the three cordilleras are not always so distinct as in the north and complicated distributional problems are yet to be worked out. It is doubtful if the form called *surdus* by Thomas is a southern representative of *mollis*, but *torques*, like *orientalis*, appears to be only a slight subspecies of *orophilus*. In fact it is difficult to find any external distinction between *torques* and *orientalis* and the only cranial character appears to be the somewhat wider braincase of *torques*.

braincase, as judged by notes made without comparisons, is somewhat broader than in recently collected specimens.

Apparently this species is quite distinct from *A. sanborni*, especially in color and size, but its skull, although considerably smaller, has very similar general characters. In the long stretch of coast between the Chonos Islands and the Straits of Magellan, where no mammal collecting has been done, it is possible that one or the other of these species may have considerable extension of range.

*Specimens examined.*—Total 42: Lake Fagnano, Tierra del Fuego, 17; vicinity of Punta Arenas, 24; "Monteith Bay," 1 (type in B.M.).[1]

**Eligmodontia puerulus** Philippi.

*Hesperomys puerulus* Philippi, Anal. Mus. Nac. Chile, Zool., Ent. 13a, pp. 20–21, pl. 7, fig. 1 (col.), 1896—San Pedro de Atacama, Province of Antofagasta, Chile.

*Mus puerulus* Philippi, supra cit., Ent. 14a, pp. 79–80, 1900.

A pale, soft-pelaged mouse with the under parts wholly or partly white to roots of hairs; soles of hind feet hairy. Total length 183 (175–193); tail 91 (88–95); hind foot 25 (24–26).

*Range.*—Known only from the type region.

This pretty species is doubtless closely related to *E. hirtipes*. It is only slightly paler than *E. elegans* (specimens from Province of Neuquen, Argentina), but that species has a longer tail and smaller audital bullae. One specimen has the hairs white to the roots over the entire under parts. The others are entirely white only on the throat and upper breast. One specimen has the under parts blotched with pale ochraceous.

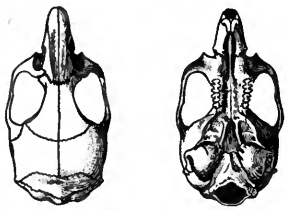


FIG. 27. *Eligmodontia puerulus*. F.M. No. 22321. × 1.

Philippi's type of *Hesperomys puerulus* is preserved in Santiago in fairly good condition. Extracts from my notes regarding it are as follows: "It is not so brightly ochraceous as in Philippi's figure, and is more of a pale buff with a cinnamon-tipped effect. On the under side, which I examined by lifting the specimen from its stand, the hairs are white to the roots on the throat, chest, inguinal region, and probably along middle line of abdomen. Laterally on the abdomen, the hairs have light grayish plumbeous bases. The soles

[1] On maps available, I have been unable to find the exact location of Monteith Bay.

of the hind feet seem to be hairy, but this is not well ascertained. Hind foot measures 21.5. The tip of the tail is not quite perfect, but apparently it was slightly penciled."

The small size of the hind foot in the type is the only feature to cast any doubt upon its identity with the small series now in hand in which the foot measures 24, 25, 25, 25, and 26 mm. Other characters of the type, especially the pure white under parts and general proportions, seem to outweigh this, and with a series from the vicinity of the type locality showing these characters, the establishment of the name is amply justified.

*Specimens examined.*—Twenty miles east of San Pedro, Rio San Pedro, Antofagasta, 5 (alt. 12,600 ft.).

**Eligmodontia elegans morgani** Allen.

*Eligmodontia morgani* Allen, Bull. Amer. Mus. Nat. Hist., **14**, p. 409, 1901—Basaltic Canyons, fifty miles southeast of Lake Buenos Aires, Argentina.

A small slender mouse with the tail about equal to or slightly shorter than the head and body; under parts with at least the chin and throat pure white to roots of hairs; soles of hind feet mostly or entirely hairy. Total length 153 (145–165); tail 73 (65–80); hind foot 22.5 (22–23); ear from notch 11–12.

A single specimen taken by Sanborn on a nearly bare, rocky hillside near Lake Sarmiento affords the only record of this mouse from Chilean territory. In adjoining parts of Argentina it was taken in considerable numbers by the Princeton expeditions, including localities on the east coast as far south as Rio Gallegos.

Although Thomas has remarked (Ann. Mag. Nat. Hist., (10), **4**, p. 40, 1929) that *morgani* "appears to be the same" as *elegans*, such material as is available in Field Museum seems to indicate that it is at least subspecifically distinguishable. A specimen from Choele Choel, a locality southwest of Bahia Blanca and in nearly the same latitude, assumed to represent *elegans*, has decidedly larger ears and a longer tail than specimens from southern Patagonia. Since these are the very characters mentioned by Allen in describing *morgani*, it seems necessary to give it subspecific status at least until further work on the group can be done. Actual topotypes of *elegans* from Bahia are not available and specimens from western Rio Negro seem to indicate that *morgani* may have a northward distribution in that region.

*Specimens examined.*—Total 6: ARGENTINA: Piedra Clavada, Santa Cruz, 1; Rio Coy, Santa Cruz, 1; Rio Gallegos, Santa Cruz, 1; Province of Santa Cruz, 2. CHILE: Lake Sarmiento, Ultima Esperanza, 1.

**Phyllotis darwini darwini** Waterhouse. DARWIN'S LEAF-EARED MOUSE.

*Mus darwinii* Waterhouse, Proc. Zool. Soc. Lond., p. 28 (top of page), 1837—Coquimbo, Chile.

*Mus darwinii* Waterhouse, Zool. Voy. Beagle, p. 64, pl. 23 (col.), pl. 34, fig. 17*a–b* (teeth), 1839.

*Mus melanonotus* Philippi and Landbeck, Arch. Naturg., **24**, (1), p. 78, 1858—Province of Santiago, Chile; Philippi, Anal. Mus. Nac. Chile, Zool., Ent. 14a, p. 43, pl. 18, fig. 1 (col.), 1900.

*Mus dichrous* Philippi, supra cit., pp. 14–15, pl. 3, fig. 2 (col.), 1900—near Peine, Province of O'Higgins, Chile.

*Mus megalotis* Philippi, supra cit., p. 15, pl. 3, fig. 3 (col.), 1900—Province of Santiago, Chile.

*Mus mollis* Philippi, supra cit., pp. 23–24, pl. 7, fig. 1 (col.), 1900—Province of Santiago, Chile.

*Mus illapelinus* Philippi, supra cit., pp. 28–29, pl. 9, fig. 1 (col.), 1900—near Illapel, Province of Coquimbo, Chile.

*Mus segethi* Philippi, supra cit., pp. 30–31, pl. 11, fig. 2 (col.), 1900—Plain of Peine, Province of O'Higgins, Chile.

*Mus campestris* Philippi, supra cit., pp. 38–39, pl. 16, fig. 1 (col.), 1900—Choapa, Province of Coquimbo, Chile.

*Mus melânotis* Philippi, supra cit., p. 39, pl. 16, fig. 3 (col.), 1900—no locality.

*Mus platytarsus* Philippi, supra cit., p. 47, pl. 19, fig. 4 (col.), 1900—La Ligua, Province of Aconcagua, Chile.

*Mus griseoflavus* Philippi, supra cit., pp. 55–56, pl. 24, fig. 1 (col.), 1900—near La Serena, Province of Coquimbo, Chile; preoccupied name.

*Phyllotis darwini* Trouessart, Cat. Mamm., p. 583, 1897; Thomas, Ann. Mag. Nat. Hist., (7), **9**, p. 131, 1902; Wolffsohn, Bol. Mus. Nac. Chile, **2**, No. 1, pp. 88, 90, 93, 94, 98, 99, 1910; Thomas, Ann. Mag. Nat. Hist., (8), **10**, pp. 406–409, 1912.

A large soft-pelaged mouse with large leafy ears and the tail usually longer than the head and body. Total length 257 (237–297); tail 127 (115–137); hind foot 29.5 (27–32); ear from notch (dry) 23–25.

*Range.*—Coastal region of central Chile from the vicinity of Coquimbo southward at least to Valparaiso, thence inland to Santiago and southward on the west side of the Andes to the Province of Talca.

In typical form *Phyllotis darwini* is rather richly colored and has larger ears than most of the subspecies allied to it. The under parts may be nearly white but often are creamy or even pale buffy rather than white. About one specimen in twenty has a fulvous pectoral spot. Although larger, it has a general appearance strongly suggestive of the Californian *Peromyscus truei.*

Specimens at hand are mostly from the coastal region from Coquimbo to Valparaiso but distribution inland to Santiago and

southward along the western base of the Andes is indicated by specimens received by Philippi from several localities in this region and described by him under various names. This is confirmed by five specimens taken by Sanborn in 1939 on the Rio Maule, some 19 km. above Curillanque in the Province of Talca. These do not differ from typical *darwini* in any important way. The species is recorded from Baños de Cauquenes by E. C. Reed (1877).

The type locality, Coquimbo, evidently is on the northern edge of the range. Specimens from Romero, about ten miles from Coquimbo, are relatively dark colored and in general agreement

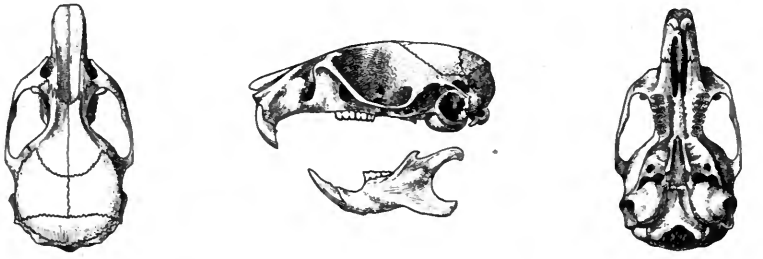


FIG. 28. *Phyllotis darwini darwini.* F.M. No. 23891. × 1.

with others from farther south; but within one hundred miles of Coquimbo northward and eastward, another form is found.

Ten names given by Philippi seem referable to *d. darwini* beyond any reasonable doubt. These are *melanonotus, dichrous, megalotis, mollis, illapelinus, segethi, campestris, melanotis, platytarsus,* and *griseoflavus.* In his work on Chilean rodents where most of these names were proposed, Philippi lists *Phyllotis darwini* and naively remarks that the museum has not been able to secure it, so he translates Waterhouse's description and reproduces his colored figure. The type of *M. platytarsus* was found in the museum at Santiago in 1923, and my notes on it are as follows: "Skull inside. Seems to be a rather reddish example of *Phyllotis darwini.* It is in that cinnamon phase often seen when the black tips of the hairs are not wholly worn off but turned cinnamon in color, thus matching the next color and increasing the general buffiness. The hind foot measures about 27–28; the ear from notch about 23." None of the others were found at this time, but most of them were examined by Wolffsohn and discussed in his paper of 1910. There seems no reason to doubt any of his conclusions and most of them might well be derived from the descriptions and figures. Types which Wolffsohn does not men-

tion and which may have had no recent examination are those of *megalotis*, *melanonotus*, and *melanotis*. In 1900, Philippi himself was unable to find the type of *melanonotus* and his figure is taken from another specimen of which no history is given.

A specimen in the British Museum (No. 11.11.17.8) received from Santiago bears a typewritten label attached in the Chilean museum and reading as follows: "Raton. *Mus melanonotus* Ph. & Landb. Chile 1892." This is perhaps the one figured in 1900, but the date 1892 indicates it is not the original type. It is accompanied by a good skull and is unquestionably referable to *Phyllotis d. darwini*.

*Specimens examined.*—Total 37: Buen Retiro, Las Higuelas, Calera, Aconcagua, 5; Las Rojas, Quillota, Valparaiso, 2; La Ligua, 1 (type of *Mus platytarsus* in Mus. Nac. Chile); Longotoma, Aconcagua, 1; Los Agostinos, Palomar, Aconcagua, 1; Olmue, Valparaiso, 4; Palmilla, La Cruz, Valparaiso, 2; Papudo, Aconcagua, 9; Rio Maule, Talca, 5; Romero, Coquimbo, 5; San Cristobal, Santiago, 2.

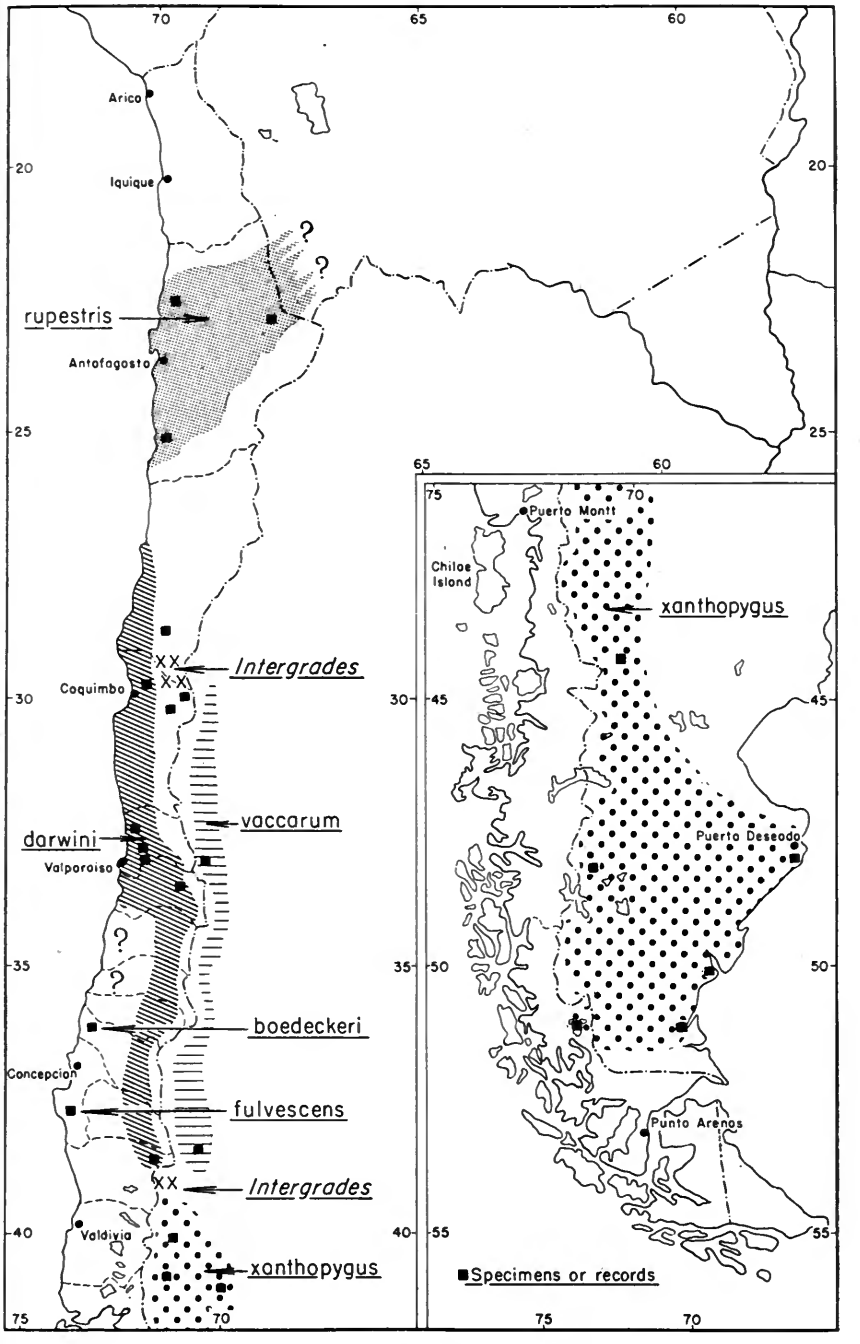
**Phyllotis darwini boedeckeri** Philippi.

*Mus boedeckeri* Philippi, Anal. Mus. Nac. Chile, Zool., Ent. 14a, p. 53, pl. 19, fig. 2 (col.), 1900—Coroney Ranch, near Quirihue, Province of Maule, Chile.

Similar to *P. d. darwini*, but smaller and shorter-tailed; under parts slightly more buffy. Total length 220–227; tail 104–106; hind foot 27; ear from notch (dry) 21.5.

*Range.*—Known only from the type locality in the coast range south of Valparaiso.

Three specimens collected by Sanborn in the Province of Maule differ so markedly from typical *darwini* in their smaller size and especially in their shorter tails that it seems altogether probable they represent a recognizable race occupying the coast district between Valparaiso and Concepcion. For this race Philippi's name *boedeckeri* is available. The colored figure of *boedeckeri* is obviously that of a *Phyllotis* and the description also is sufficient. The fact that the skull of a house rat is figured with it needs no especial consideration. Philippi's original measurements agree closely with those of the recent specimens. Mr. Sanborn visited Mr. Boedecker, whom he found still living in the Province of Maule, and his recollection was that he retrieved the type specimen after it had been caught by a hawk, and that it was forwarded to Philippi in bad condition. It was not found in the museum at Santiago and it is not mentioned in Wolffsohn's paper (1910a).




MAP 10. Distribution of *Phyllotis darwini* and Chilean subspecies.

Two of the three specimens in hand are adult and the third immature. In all three a fairly pronounced buffy ochraceous pectoral spot is present. Such a spot is usually absent in *darwini*, but in rare instances may occur. No *Phyllotis* are available from any of the region between Maule and Valparaiso.

*Specimens examined.*—Total 3: Pilen Alto, 8 miles west of Cauquenes, Maule, 1; Quirihue, Maule, 2.

**Phyllotis darwini fulvescens** subsp. nov.

*Type* from Sierra Nahuelbuta, west of Angol, Malleco, Chile. Altitude about 4,000 feet. No. 50550 Field Museum of Natural History. Collected November 8, 1939, by Wilfred H. Osgood. Orig. No. 7072.

*Diagnosis.*—Size about as in *P. d. boedeckeri;* smaller and shorter-tailed than in *P. d. darwini;* darker and more richly colored than either; upper parts ochraceous buff thickly mixed with dusky, the sides brighter; *under parts* from the breast backward *heavily washed with fulvous* (between Ochraceous Buff and Ochraceous Orange); chin and throat paler, dull creamy thinly concealing the Blackish Mouse Gray undercolor; a lateral line of pure color rather well developed from the sides of the face to the hips, with a somewhat expanded area in the axillary region bright Ochraceous Buff approaching Orange Ochraceous; an irregular blackish eye-ring, somewhat expanded on the lower side; ears blackish; tail sharply bicolored; feet white. Skull about as in *P. d. boedeckeri;* smaller and lighter than in *P. d. darwini.*

*Measurements.*—Total length 227, 246; tail 104, 118; hind foot 27, 28; ear from notch (dry) 19.3, 19.5. Skull of type: greatest length 30; zygomatic breadth 16; interorbital constriction 4; nasals 13 × 4.2; palatal slits 7.2; diastema 8.2; upper cheekteeth 5.4.

This form, although quite well characterized by its saturate coloration, is perhaps confined to the araucaria forest in the cloudlands of the cordillera of Nahuelbuta. In this region it appears to be rare and only two specimens so far have been taken, one by Dr. H. E. Anthony for the American Museum of Natural History, and one by Field Museum's expedition of 1939–40. In a week's intensive collecting, with three lines of traps out, only the single specimen (the type) was obtained and this not in a mouse trap, but in a steel trap set at the burrow of *Aconaemys.* The exact locality was near the high rock called Piedra de Aiguilas near the summit of the Sierra

directly west of Angol. Dr. Anthony's specimen, which fully agrees with ours, evidently was taken in the same vicinity.

**Phyllotis darwini vaccarum** Thomas.

*Phyllotis darwini vaccarum* Thomas, Ann. Mag. Nat. Hist., (8), **10**, p. 408, 1912—Las Vacas (Punta Vaca), Transandine Railway, Argentine slopes of cordillera opposite Mendoza, Argentina. Alt. 2,500 meters.

*Range.*—East base of the Andes from the Province of Mendoza, Argentina, southward to the Province of Neuquen; passing into northern Chile in the provinces of Coquimbo and Atacama.

This form seems to differ from typical *darwini* mainly in decidedly paler color and somewhat smaller ears. The large series from Paiguano, which is about sixty miles east of Coquimbo, although pale in color, has rather large ears, nearly or quite equaling *darwini*, and in this respect perhaps should be regarded as intermediate.

Three specimens of *vaccarum* from the type locality are indistinguishable from Chilean specimens except for their slightly smaller ears, and there is little doubt that the form ranges from one side of the Andes to the other. Its southward extension along the east side of the Andes to lat. 37° in Neuquen is indicated by specimens taken by Budin for the British Museum (see Thomas, Ann. Mag. Nat. Hist., (9), **18**, p. 635, 1926). One of these, received in exchange by Field Museum, shows no tangible difference from typical *vaccarum*. Another from the same locality (Chos Malal) although rather long-tailed, has the under parts somewhat as in *xanthopygus* and appears to indicate a gradation from *vaccarum* to *xanthopygus*.

*Specimens examined.*—Total 52: CHILE: Banos del Toro, Coquimbo, 2 (approaching *darwini*); Domeyko, Atacama, 2; Paiguano, Coquimbo, 43 (approaching *darwini*). ARGENTINA: Chos Malal, Neuquen, 2 (approaching *xanthopygus*); Punta Vaca, Mendoza, 3.

**Phyllotis darwini rupestris** Gervais.

*Mus rupestris* Gervais, Voy. Bonite, Zool., **1**, pp. 51–53, 1841; Gay, Hist. Chile, Zool., **1**, pp. 115–116, 1847—part; Atlas, pl. 6, figs. 1, 2, 1848—high mountains near Cobija, Antofagasta, Chile.

*Mus capito* Philippi, Reise durch die Wüste Atacama, pp. 159–160, Zool., pl. 2, fig. 2 (col.), 1860; Anal. Mus. Nac. Chile, Zool., Ent. 14a, p. 10, pl. 1, fig. 2 (col.), 1900—Hueso Parado, near Taltal, Province of Antofagasta, Chile.

*Hesperomys glirinus* Philippi, supra cit., Ent. 13a, p. 19 (top of page), pl. 7, fig. 3 (col.), 1896—San Pedro de Atacama, Chile.

*Akodon rupestris* Trouessart, Cat. Mamm., p. 535, 1897; Tate, Amer. Mus. Nat. Hist., Nov., No. 582, p. 26, 1932 (position queried).

*Hesperomys lanatus* Philippi, supra cit., Ent. 13a, p. 19 (bottom of page), pl. 7, fig. 2 (col.), 1896—San Pedro de Atacama, Chile.

*Mus glirinus* Philippi, supra cit., Ent. 14a, p. 59, 1900.

*Mus lanatus* Philippi, supra cit., Ent. 14a, pp. 59–60, 1900.

Similar to *P. d. darwini*, but color paler, ears and tail shorter. Total length 213 (194–229); tail 106.6 (93–118); hind foot 20.3 (19–21).

*Range.*—Arid parts of northern Chile in the Province of Antofagasta and adjoining regions; probably extending into Bolivia and Argentina.

In northern Chile the *darwini* series of *Phyllotis* is represented by a subspecies for which the name *rupestris* is available. The tail in this form is considerably shorter than in *P. d. vaccarum*, and the ears average slightly shorter. Corresponding to the external ears, there is a slight reduction in the size of the audital bullae. The color is pale, practically as in *vaccarum*. The series from the Province of Antofagasta agrees essentially with material from Bolivia and Argentina, indicating a range across the Andes. Specimens in the British Museum, especially those from Lipez, Bolivia, and Casabindo, Jujuy, Argentina, referred by Thomas to *ricardulus*, seem to belong with the Antofagasta form. The type and topotypes of *ricardulus*, however, are considerably darker and suggest a possible gradation toward *wolffsohni*. A small series in Field Museum from Tacna (alt. 11,600 ft.) also appears to belong here.

The application of the name *rupestris* to this form seems well justified although heretofore it has been assigned to *Akodon*. The external characters were unknown to Gervais, who based his somewhat detailed description on "un squelette mutilé, mais dont la tête et les dents sont bien conservées." No illustration accompanied the original description, but a few years later Gay, who worked with Gervais in the Paris Museum, published excellent figures of the specimen described by Gervais. Gay compared it with a specimen from Chile which he believed to be the same species and which he also figured not only as to its dentition but as to its external appearance. The colored plate of this animal obviously represents a *Phyllotis*, probably *P. d. darwini* or *P. d. vaccarum*. The dentition shown on another plate (pl. 6, fig. 2), supposed to be of the same animal, does not suggest *Phyllotis*, however, but is more like *Akodon*. In any case, whatever Gay's Chilean specimen may have been is unimportant, since it did not receive a new name, but was merely referred

to the *rupestris* of Gervais. The figures of the actual type of *rupestris* are themselves fairly conclusive. The dentition agrees with that of *Phyllotis* especially in the position of the loops of the upper molars directly opposite each other, the even figure 8 pattern of the second molar, and the elongate rather than rounded pattern of the last molar. The skull, shown in side view, has a short rostrum and a zygomatic plate vertical or slightly concave in front. The mandible is short and deep as in *Phyllotis* rather than long and slender as in *Akodon*. The external capsule of the base of the lower incisor, so well developed in *Phyllotis*, is distinctly indicated.

The locality Cobija (formerly included in Bolivia) is on the arid coast of Chile between the well-known ports of Antofagasta and Tocopilla. Sanborn visited the place in 1923 but obtained no mammals, since conditions were very unfavorable. He reports an abrupt rocky coast devoid of vegetation and rising to a lifeless nitrate plateau extending inland for a long distance. Beyond this, however, and in nearly the same latitude he found *Phyllotis* common on the Rio San Pedro, a tributary of the Rio Loa which comes through to the coast a short distance north of Cobija. It is extremely probable, therefore, that the mouse obtained by Sanborn is the same as the one described by Gervais from "un trou de rocher des hautes montagnes de Cobija." The only other small rodents obtained in the region were *Eligmodontia puerulus* and *Akodon a. dolichonyx*, neither of which is large enough to be considered in this connection.

Philippi's name *Mus capito* is obviously based upon an immature example of the *Phyllotis darwini* series. The description, measurements, and colored figure all point to this conclusion. The type appears not to exist, and for the present it seems best to associate the name with the mountain form of Antofagasta. No specimens are available from the vicinity of the type locality which is on the coast and somewhat south toward the region where *P. d. vaccarum* is found. Sanborn, while collecting at Caldera, still farther south, failed to obtain *Phyllotis* but examined a specimen there in the possession of a local naturalist; so there is no doubt of the coastal distribution of the species in this region. In case specimens from the type locality should prove to belong to the southern form, *capito*[1] might replace *vaccarum*.

[1] The name *Mus*(?) *capito* was used as a nomen nudum in 1815 by Illiger (Abhandl. K. Akad. Wiss., Berlin, 1801–1811, p. 108) and by Schinz in 1821 (Das Thierreich, 1, p. 288, footnote).

Philippi's names *glirinus* and *lanatus* also apply here. The specimens of both are stated to have been captured in the village of Atacama (San Pedro de Atacama) which is directly south of the Rio San Pedro and in a region of wholly similar conditions. Both are clearly members of the *darwini* series. Philippi himself notes their close resemblance and in comparing them makes no distinctions except slight differences in the measurements of the tail and ears. He also mentions their similarity to his *Mus mollis*, which is a synonym of *P. d. darwini*. The type of *glirinus* was not found in Santiago, and probably it no longer exists. Its description and measurements conform in detail, although the color shown by Philippi's figure could scarcely have been derived from a normal adult specimen of the species. The inaccuracy of the color in many of Philippi's figures is demonstrated, and in this case he remarks that the specimen when fresh had a different color. The proportions of the figure in this case and especially the large ears could apply only to one species.

The type of *H. lanatus*, which is described following *glirinus*, on the same page, is preserved and was examined in 1923. Extracts from notes made at that time are as follows: "The label is 'Raton. *Mus lanatus* Ph. Atacama, 1885.' A pale, soft-haired and rather short-tailed *Phyllotis*. At present the hind foot measures 24.5 and the ear from notch 19.5. A broken skull labeled *M. lanatus* may belong to the skin. At least it seems to be a *Phyllotis*. It measures: Occ.-nas. length 31; nasals 12.6 × 4; palatine foramina 7.25 × 2; upper toothrow 5.3. The mounted specimen is much paler and more buffy than in Philippi's figure, and the dark patches are where hair came out, showing the under color." The artist evidently followed the imperfections of the mounted specimen, as in other cases, and thus all uncertainty is removed as to the specimen which was the basis of the figure.

*Specimens examined.*—Total 25: Putre, Tacna, 7; San Pedro de Atacama, Antofagasta, 1 (type of *Hesperomys lanatus* in Mus. Nac. Chile); twenty miles east of San Pedro, Rio San Pedro, Antofagasta, 17.

### **Phyllotis darwini xanthopygus** Waterhouse.

*Mus* (*Phyllotis*) *xanthopygus* Waterhouse, Proc. Zool. Soc. Lond., p. 28 (middle of page), 1837—Santa Cruz, Patagonia.

*Mus xanthopygus* Waterhouse, Zool. Voy. Beagle, Mamm., p. 63, pl. 22, pl. 34, fig. 16, 1839.

*Phyllotis xanthopygus* Trouessart, Cat. Mamm., p. 534, 1897; Allen, Mamm. Patagonia, p. 58, pl. 13, fig. 1, pl. 14, figs. 2–3, 1905; Thomas, Ann. Mag. Nat. Hist., (9), **18**, pp. 635–636, 1926.

Most similar to *P. d. vaccarum*, but averaging slightly larger and shorter-tailed; coloration darker, the upper parts browner and the under parts wholly and heavily washed with Ochraceous Buff; skull larger and heavier; dentition averaging slightly heavier.

*Range.*—Southern and western Argentina from eastern Santa Cruz to the base of the Andes and thence northward at least to the southern part of the Province of Neuquen about lat. 39° S. Crosses the boundary into Chile at a few points.

Two adults and four young taken near Lake Sarmiento by Field Museum's expedition of 1939–40 furnish the only definite Chilean records of this form. Very probably they also indicate the southern limit of the range of the subgenus *Phyllotis*.

The suspicion that *xanthopygus* is only subspecifically separable from the *darwini* series was expressed by Thomas in 1926 (l.c.), and is borne out by material now in Field Museum. Included in this are several topotypes of *vaccarum* and specimens from several localities in Neuquen received in exchange from the British Museum. Of two specimens from Chos Malal, Neuquen, regarded by Thomas as *xanthopygus*, one is quite indistinguishable from *vaccarum* and the other differs from it only in having the under parts slightly more fulvous. In the color of the upper parts all specimens from Neuquen agree closely with *vaccarum* rather than with *xanthopygus*. Even specimens from Chubut are somewhat paler than the only available examples from the extreme south. It appears, therefore, that while *xanthopygus* may have no direct connection with typical *darwini*, it grades insensibly into subspecies *vaccarum*, which doubtless ranges down the east side of the Andes from Mendoza to Neuquen.

As between typical *darwini* and typical *xanthopygus* some distinctions can be drawn but even these are somewhat variable and elusive. Most obvious is the color of the under parts, which is creamy or nearly white in *darwini* and wholly ochraceous buff in *xanthopygus*. In *darwini* the ears and tail are longer, the dentition averages weaker, and the infraorbital plate slopes backward less and its front edge is more frequently concave, sometimes forming a hooked process or at least a sharp angle at the top. Otherwise there are no evident cranial characters that hold through any considerable series.

Apparently *xanthopygus* is mainly a rodent of the open pampa or of low brush along watercourses within it. In the south it extends

to the coast of Santa Cruz and in the west records seem to indicate that it does not penetrate far into the mountains. It was not found at Rio Nirehuao, although it is recorded from Chubut only a short distance east. The Princeton expeditions obtained it in considerable numbers and their records include the following localities: Basaltic Canyons, mouth of Rio Coy, upper Rio Chico, Swan Lake.

*Specimens examined.*—Total 12: ARGENTINA: Huanuluan, Rio Negro, 1; Collon Cura, Neuquen, 1 (approaching *vaccarum*); Pilcaneu, Rio Negro, 3; Tecka, Chubut, 1. CHILE: Laguna Lazo, near Lake Sarmiento, 6.

**Phyllotis (Auliscomys) boliviensis** Waterhouse.

*Hesperomys boliviensis* Waterhouse, Proc. Zool. Soc. Lond., pp. 9–10, 1846—"a few leagues south of Potosi," Bolivia.

*Phyllotis boliviensis* Trouessart, Cat. Mamm., p. 534, 1897; Thomas, Ann. Mag. Nat. Hist., (7), **1**, p. 280, 1898; (7), **6**, p. 467, 1900.

*P[hyllotis (Auliscomys)] boliviensis* Osgood, Field Mus. Nat. Hist., Zool. Ser., **10**, p. 191, 1915.

*Euneomys (Auliscomys) boliviensis* Thomas, Ann. Mag. Nat. Hist., (8), **17**, p. 143, 1916.

*Phyllotis (Auliscomys) boliviensis boliviensis* Ellerman, Fam. Gen. Rodents, **2**, p. 455, 1941.

A stout-bodied mouse, with very large ears, long lax pelage, and tail shorter than head and body. Color buffy with creamy white under parts and a tuft of contrasted bright ochraceous hairs at the anterior base of the ears. Total length 215; tail 90; hind foot 28; ear from notch 22–24.

A small series of seven specimens of this species was taken by Sanborn at an altitude of 15,000 feet at Choquelimpie, Tacna. They have the long lax pelage, large ears, and large audital bullae as described for typical *boliviensis*. Geographically they stand between *boliviensis* and its slight subspecies *flavidior* and do not wholly agree with either. Doubtless the species will be found elsewhere in northern Chile at high altitudes. It is an intrusive form belonging to the Bolivian rather than the Chilean fauna and so far is recorded only from the puna zone. It is now represented in Field Museum by large series from the highlands adjacent to Lake Titicaca in southwestern Peru.

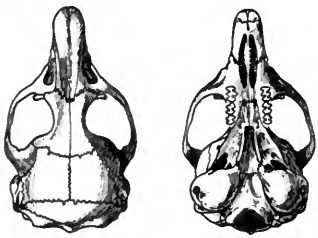


FIG. 29. *Phyllotis (Auliscomys) boliviensis*. F.M. No. 22696. × 1.

**Phyllotis (Auliscomys) micropus micropus** Waterhouse.

*Mus micropus* Waterhouse, Proc. Zool. Soc. Lond., p. 17, 1837; Zool. Voy. Beagle, Mamm., p. 61, pl. 20, pl. 34, fig. 13, 1839—"Interior plains of Patagonia, in latitude 50°, near banks of the Santa Cruz" River, Patagonia.

*Phyllotis micropus* Allen, Mamm. Patagonia, p. 60, pl. 12, fig. 13, pl. 14, fig. 1, 1905; Osgood, Field Mus. Nat. Hist., Zool. Ser., **10**, p. 190, 1915.

*Euneomys (Auliscomys) micropus* Thomas, Ann. Mag. Nat. Hist., (8), **17**, p. 143, 1916.

*Euneomys micropus alsus* Thomas, supra cit., (9), **3**, p. 202, 1919—Maiten, Chubut, Argentina.

*Phyllotis (Auliscomys) micropus* Ellerman, Fam. Gen. Rodents, **2**, p. 455, 1941.

A fairly large, heavy-bodied, and dark-colored mouse with rather small ears and the tail shorter than the head and body. Skull with narrow interorbital space, slightly concave, with its borders forming incipient ridges; maxillopremaxillary suture nearly vertical; posterior palate with a blunt median spine and with its lateral pits shallow and practically confluent with the parapterygoid fossae; front of incisors smooth, quite without grooves. Total length 249 (239–258); tail 102 (93–108); hind foot 31 (28–32).

*Range.*—Eastern base of the Andes, mainly in Argentina, from the Straits of Magellan northward to lat. 38° S., and thence in small numbers passing into Chile via the Nahuelhuapi region and the provinces of Malleco and Cautin westward to the Sierra Nahuelbuta. Represented by a slightly characterized race on Chiloe Island.

This mouse has an extensive range within which no well-established variations are definable. Although not previously recorded so far south, it was found in 1939–40 to be abundant in the wooded hills but a few miles from Punta Arenas. With the exception of the much smaller *Akodon xanthorhinus*, it is the most numerous and most successful rodent of the region, but so far as known it has not reached Tierra del Fuego. Throughout its range in Argentina and southern Chile, it seems everywhere to be abundant, but in the north, where it crosses the Andes into central Chile, it is rare and difficult to obtain. On Lake Todos Santos, where several hundred small rodents were collected at Peulla in 1939, only two specimens of this species were taken. In the Sierra Nahuelbuta during the same season it was also scarce. Apparently it is a recent immigrant to this part of Chile and, although there is some suggestion of differentiation, it seems too slight for definition on the basis of present material. The specimens from Lake Todos Santos have somewhat larger molars than is typical, and those from Nahuelbuta, which have normal molars, are externally marked by slightly pale under

parts, somewhat as described for *E. m. alsus*, but in this case as in that of *alsus*, the difference is fully covered by variation elsewhere.

Locality records for this species in the literature include the following: Rio Chico, Alta Vista, and Lago Argentina, Santa Cruz; Epuyen, Leleque, Maiten, and Tecka, Chubut; and Quilquihue, San Martin de los Andes, and Sierra de Pilpil, Neuquen.

The generic position of this species is a matter of considerable difficulty since it does not fall readily into any well-defined group but offers a combination of characters pointing in various directions. According to the grouping made by Thomas, in 1916, it was regarded

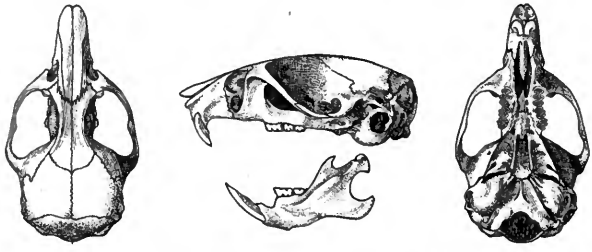


FIG. 30. *Phyllotis (Auliscomys) micropus.* F.M. No. 23263. × 1.

as a member of the subgenus *Auliscomys* within the genus *Euneomys*. The same grouping was made by Ellerman, in 1941, but *Auliscomys* was placed under *Phyllotis* rather than *Euneomys*. Material now in hand seems to justify this as a much more natural arrangement, although *micropus* is still somewhat anomalous in company with *boliviensis* and *sublimis*, to which its external resemblance is slight.

In characterizing *Auliscomys* in 1915, I considered it to occupy a connectant position between *Phyllotis* and *Euneomys* but, on account of lack of material representing it, did not give much attention to the species *micropus* which, because of its smooth incisors, was then regarded as a *Phyllotis*. Nevertheless, I was inclined to place *Auliscomys* as a subgenus under *Phyllotis*, where I still believe it belongs, although I do not now think it has any especial affinity to *Euneomys*. Thomas has referred *micropus* to *Euneomys*, has expressed the opinion that *Auliscomys* is nearer to *Euneomys* than to *Phyllotis*, has raised *Auliscomys* to generic rank and has added two further names *Galenomys* and *Chelemyscus*, both based on single specimens. In the course of this he has referred one species (*xanthopygus*) first to *Phyllotis*, then to *Euneomys*, and then back again to *Phyllotis*. The history is well set forth, with references, by Tate (Amer. Mus. Nat. Hist., Nov., No. 541, pp. 1–21, 1932).

From the foregoing, it may well be concluded that the distinction of genera of South American rodents is no easy matter and the suspicion is aroused that the methods employed may be faulty. What seems to have taken place is an attempt to apply to an imperfectly known fauna standards of distinction which are only workable with a thoroughly known fauna. Before all the species of a group are known, it may easily happen that specific and generic characters are confused, and under these circumstances conservatism, if it could be maintained, would unquestionably lead to the best results. However, it never has been maintained and probably cannot be, so we pass from one provisional classification to another, including some which delay rather than advance knowledge of the actual relationships.

In the group under consideration a present policy involving something of compromise may have some advantages. Disregarding the grooving of the incisors, there are common characters by which *Auliscomys* (i.e. *pictus*, *sublimis*, and *boliviensis*) and the species *micropus* may be separated from *Phyllotis*. These, therefore, should be brigaded in some fashion, doubtless best as a subgenus under the name *Auliscomys* as has been done by Ellerman. The characters are most extreme in *micropus*, but are at least partially evident in the other forms which apparently stand somewhat between *micropus* and typical *Phyllotis*. Most important are the development of the anterior outer lobe (parastyle) of the middle upper cheektooth and the somewhat more oblique pattern of all the grinding teeth in which the outer lobes are flexed forward rather than directed at right angles to the axis of the skull. The parastyle is a variable element in the entire group allied to *Phyllotis*. Thus it is well developed in *Andinomys* and appears also in *Graomys* but is not evident in *Chinchillula*. It is almost non-existent in *Euneomys*, being only faintly suggested in unworn teeth; it is quite slight in typical *Phyllotis;* it is fairly developed in the smaller forms of *Auliscomys;* and it is quite pronounced in the species *micropus*. Not only in dentition, but also in various cranial characters, including its palate and its maxillo-premaxillary suture, *micropus* agrees closely with *Phyllotis* rather than with *Euneomys*, clearly indicating that its close association with *Euneomys* cannot be defended.

In the very large series of *micropus* now available, there is one specimen (from Punta Arenas) in which the left upper incisor is distinctly grooved, the right being smooth as usual. Whether this is significant of relationship to other groove-toothed forms or not is

conjectural, but if any inference is to be drawn from it, it should be favorable. In *pictus*, slight grooves seem always to be present; in *sublimis*, faint grooves are often found, but in many specimens none are evident; in *boliviensis* and *flavidior*, even faint grooves have not been detected.

*Specimens examined.*—Total 71: ARGENTINA: Bariloche, Nahuelhuapi, 3; San Martin de los Andes, Neuquen, 1; Sierra de Pilpil, Neuquen, 1; Valle del Lago Blanco, Chubut, 2. CHILE: Casa Richards, Rio Nirehuao, 23; Laguna Lazo, near Lake Sarmiento, Ultima Esperanza, 8; La Picada, Volcan Osorno, Llanquihue, 1; Peulla, Lake Todos Santos, 2; Lonquimai, Cautin, 1; Puerto Natales, Ultima Esperanza, 1; Punta Arenas, Magallanes, 20; Rio Coihoique, 1; Rio Lolen, Cautin, 1; Sierra Nahuelbuta, Malleco, 6 (A.M.N.H. 3; F.M. 3).

**Phyllotis (Auliscomys) micropus fumipes** subsp. nov.

*Type* from Quellon, Chiloe Island, Chile. No. 23292 Field Museum of Natural History. Subadult male, collected December 23, 1922, by Wilfred H. Osgood. Orig. No. 5459.

*Diagnosis.*—Similar to *P. m. micropus* but upper side of hands and feet darker, somewhat brownish or sooty instead of whitish.

*Color.*—Practically as in *micropus* except that the hands and feet are darker.

*Skull.*—As in *micropus*.

*Measurements.*—Type: greatest length 214; tail 90; hind foot 29.5. Skull of type: greatest length 29.7; zygomatic width 16.9; width of braincase 13.8; cheekteeth 5.7.

*Remarks.*—Four specimens of this mouse taken on Chiloe Island constitute the only existing representatives of it. All of them are somewhat immature, and it is possible that a series of adults would show greater distinction from the east Andean form. They were not recognized in the field on account of their superficial resemblance to other rodents, so no especial effort was made to secure larger numbers. The small number of specimens, however, indicates comparative rarity.

*Specimens examined.*—Total 4: Quellon, Chiloe Island, 1; mouth of Rio Inio, Chiloe Island, 3.

**Euneomys chinchilloides chinchilloides** Waterhouse.

*Reithrodon chinchilloides* Waterhouse, Zool. Voy. Beagle, Mamm., p. 72, pl. 27, pl. 34, fig. 20, 1839—south shore (i.e. Tierra del Fuego) of the Straits

of Magellan, near eastern entrance; Milne-Edwards, Miss. Scient. Cap Horn, 6, Mamm., p. 29, pl. 3, 1891—Orange Bay, Tierra del Fuego.

*Reithrodon (Euneomys) chinchilloides* Coues, Proc. Acad. Nat. Sci. Phila., p. 185, footnote, 1874.

*Euneomys chinchilloides* Trouessart, Cat. Mamm., Suppl., p. 429, 1904.

A heavy-bodied, short-tailed mouse with dense, soft pelage, rich coloration, and rather small ears. Skull broad and heavy; infraorbital plate with front border nearly straight, slightly inclined backward; posterior palate with marked lateral pits separated from parapterygoid fossae by a high ridge; lower half of maxillo-premaxillary suture extended forward to a point more than halfway between the cheekteeth and the incisors; front of upper incisors deeply grooved; cheekteeth hypsodont and with markedly oblique pattern. Total length 237; tail 81; hind foot 32; ear from notch (dry) 19.3.

*Range.*—Island of Tierra del Fuego and adjacent mainland in the western part of the Province of Magallanes, Chile.

A single adult male of this rare species was taken by Sanborn December 30, 1939, in the forest at the southeastern end of Lake Fagnano, Tierra del Fuego; and two immature examples, apparently of the same species, were taken by J. M. Schmidt near Punta Arenas in February and March, 1940. These are the only existing modern specimens, the type and other recorded examples mostly having been preserved in alcohol or otherwise being in bad condition. The adult specimen indicates that the species is somewhat larger than has been supposed and it may be concluded that the type was not a fully mature animal.

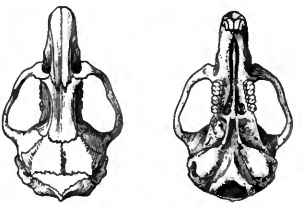


FIG. 31. *Euneomys c. chinchilloides.* F.M. No. 50736. × ¾.

Our adult specimen has the head, back and sides uniformly Cinnamon Rufous lightly mixed with dusky; the under parts are clear Cinnamon Rufous nearly concealing the under color, which is Dark Mouse Gray; the hands and feet are white; and the tail is sharply bicolor, brownish above and whitish below. Very characteristic is a narrow area of pure white surrounding the rhinarium and extending a short distance along the upper lips. The immature examples are considerably more blackish than the adult, the general effect of their upper parts being deep Fuscous. They furnish no evidence pointing to distinction of island and mainland forms and until more specimens are available it seems necessary to consider them the same as the adult.

The skull of the fully adult specimen furnishes the following measurements: greatest length 34.8; basilar length 28.4; zygomatic

breadth 21.1; interorbital constriction 4.1; nasals 16 × 5.1; palatal slits 9.1; diastema 9; upper cheekteeth 5.9.

The type locality of this species as given by Darwin, "South Shore of the Strait of Magellan, near the eastern entrance," is not wholly definite, but in 1940 our party worked at one locality which is doubtless only a few miles from it. This was at the Arroyo Beta on the northeast coast of Tierra del Fuego some fifteen miles north of Rio Cullen. Here we found a heavy growth of "black brush" in which *Akodon xanthorhinus* was excessively abundant, but no larger mice such as *Euneomys* or *Reithrodon* were obtained, although old signs indicated that they may have been present the previous year.

*Specimens examined.*—Total 3: Lake Fagnano, Tierra del Fuego, 1; Punta Arenas, 2.

### Euneomys chinchilloides ultimus Thomas.

*Euneomys ultimus* Thomas, Ann. Mag. Nat. Hist., (8), **17**, p. 185, 1916—St. Martin's Cove, Hermite Island, Cape Horn Islands, south of Tierra del Fuego.

Since a specific name has been given to the *Euneomys* of the Cape Horn Islands, perhaps it should be allowed to stand until sufficient and suitable material makes proper comparisons possible, but its distinction is very doubtful. At present it cannot be characterized in any way, since it was described only on the basis of supposed larger size and, as shown by our specimens from Tierra del Fuego, it is fully equaled by typical *chinchilloides*. It is recorded from Hoste Island as well as Hermite Island. The few known poorly preserved specimens are in the Paris Museum with the exception of one immature example sent in exchange to the British Museum.

### Euneomys petersoni Allen.

*Euneomys petersoni* Allen, Bull. Amer. Mus. Nat. Hist., **19**, p. 192, 1903—upper Rio Chico, Santa Cruz, Argentina; Mamm. Patagonia, p. 68, pl. 13, fig. 4, pl. 14, figs. 6–7, 1905.

*Euneomys dabbenei* Thomas, Ann. Mag. Nat. Hist., (9), **4**, p. 127, 1919—Lago Viedma, Santa Cruz, Argentina.

Similar to *E. chinchilloides*, but smaller and paler; white marking bordering upper lip broadly extended through base of whiskers to form a short facial stripe; skull similar in general, but smaller and lighter throughout. Total length 193–201; tail 58–68; hind foot 27–28; ear from notch (dry) 17–18.

*Range.*—Eastern base of the Andes from the district of Ultima Esperanza about lat. 51° S. northward at least to lat. 48° S. and possibly to 45°.

A small series taken near Lake Sarmiento is so much smaller and paler than *chinchilloides* and the distance from this locality to the Straits is so short that probabilities favor the assumption that *petersoni* and *chinchilloides*, although closely related, are distinct species. There is a slight break in climatic and floral conditions near the point where these specimens were taken, and it seems unlikely that the species will be found farther south. At the same locality *Eligmodontia* and *Phyllotis xanthopygus* were obtained, both being forms apparently reaching their southern limit in this vicinity.

A single specimen lent by the American Museum of Natural History through Dr. H. E. Anthony, who collected it at Campo Bandera, Coihoique, Chile, about lat. 45° S., also seems referable to *petersoni* although it shows paler under parts than the majority of our series. *E. dabbenei* from Lake Viedma, lying in the region between the upper Rio Chico and Lake Sarmiento, is obviously a synonym. Skull measurements of a fully adult female, compared with those of the type of *petersoni* (in parentheses) are as follows: greatest length 30.7 (30.5); zygomatic breadth 18.8 (17.5); interorbital constriction 3.8 (3.5); width of braincase 14.3 (14); length of nasals 13.5 (14); palatal slits 7.6 (8); diastema 8.2 (8.5); upper cheekteeth 5.4 (5.2).

*Specimens examined.*—Total 18: Campo Bandera, Coihoique, Llanquihue, 1 (A.M.N.H.); Laguna Lazo, near Lake Sarmiento, Ultima Esperanza, 17.

**Irenomys tarsalis tarsalis** Philippi.

*Mus tarsalis* Philippi, Anal. Mus. Nac. Chile, Zool., Ent. 14a, pp. 10–11, pl. 1, fig. 3, 1900–near La Union, Province of Valdivia.

*Irenomys longicaudatus* Thomas, Ann. Mag. Nat. Hist., (9), 3, pp. 200–201, 1919—recorded from Beatriz, Lake Nahuelhuapi, Argentina.

A mouse of fairly large size and thick pelage; tail rather hairy and distinctly penciled at the tip, much longer than head and body; ears of moderate size, blackish in considerable contrast to rufescent body color; skull with long braincase, large interparietal, slender rostrum and constricted interorbital space; *upper incisors deeply grooved;* molars with a simple lozenge-shaped pattern and deep inner and outer re-entrant angles. Total length 300 (290–326); tail 172 (162–188); hind foot 31.3 (30–32).

*Range.*—Temperate forested region of south-central Chile from the Province of Valdivia northwestward nearly or quite to the coast in the Province of Malleco and southeastward through the lake region to Lake Nahuelhuapi in Argentina.

After the rediscovery of this rare mouse by Thomas in 1919, it is interesting to have at hand ample material confirming his main

conclusions based on a single immature example. It was found in 1939 in considerable numbers in the deep forests surrounding Lake Todos Santos, and a single specimen was also taken near the crest of the Sierra Nahuelbuta in the Province of Malleco. Although all specimens were caught in traps set on the ground, it is evident that the animal is largely arboreal in habits. During an excessive abundance of small rodents about Lake Todos Santos, supposed to be due to the flowering the previous year of the bamboo called *quila*, this species was reported to be one of the most numerous, and according to native accounts it was seen frequently climbing about in the trees.

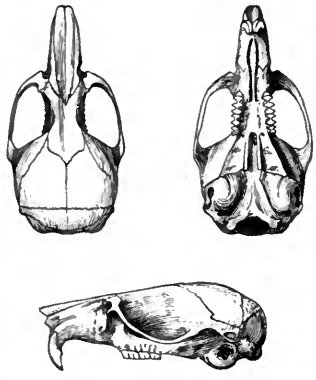


FIG. 32. *Irenomys t. tarsalis*. F.M. No. 50568. × 1.

Since the species has never been adequately characterized, it may be described as follows: General external appearance strongly suggesting *Rhipidomys;* tail much longer than head and body, well clothed with hair, slightly penciled at tip; feet large and broad; ears medium-sized, densely haired. Color of upper parts grayish Cinnamon Rufous with fine dusky lines; ears brownish black rather contrasted, occasionally with an indistinct whitish spot just below them; fore and hind feet mainly whitish, sometimes with dusky mixture medially; toes white; tail blackish brown all around, sometimes lighter on the under side for a short distance proximally; under parts heavily washed with pinkish Cinnamon Buff not fully covering plumbeous under color.

Skull with general form much as in medium-sized species of *Rhipidomys;* braincase very large and full; interparietal large; interorbital region much constricted; nasals rather flat, ending nearly even with premaxillae; anterior palatal foramina long, ending about even with second lamina of first upper molar; bullae of good size. Upper incisors deeply unisulcate; molars strongly hypsodont and laminate, the series slightly divergent anteriorly and posteriorly; grinding surfaces of laminae in unworn teeth diamond-shaped, of quite regular form. Measurements of the skull of an adult are: greatest length 32.4; basilar length 24.4; zygomatic width 16.3; least interorbital width 3.5; nasals 11.3 × 3; width of braincase 13.6; interparietal 10 × 4; diastema 8.3; palatine slits 8; upper toothrow 5.4.

Philippi's name, *Mus tarsalis*, which has page priority over *Reithrodon longicaudatus*, seems clearly to apply to this species. The description of *tarsalis* makes no mention of the skull or of the distinctive characters of the dentition, but the colored figure and other considerations seem conclusive. This figure is quite superior to the others published with it and, as explained in the text, was drawn from a fresh specimen, not from a poorly stuffed example in the museum as was the case with most of the others. Its agreement with our immature specimens is complete, and a better representation could scarcely be desired. The type of *tarsalis*, now apparently lost, came from "mi fundo San Juan," near La Union in the Province of Valdivia. Although considerable collecting was done by Mr. Sanborn in this and adjoining provinces, the species was not obtained, but in view of its probable arboreal habits, this is not strange. Moreover, no other mouse even remotely resembling Philippi's figure was taken in this region. *Phyllotis*, which occurs rarely in the humid forested part of southern Chile, is somewhat similar but it has a much shorter and less hairy tail. Lake Todos Santos, where most of our specimens were taken, is about the same latitude as Valdivia and no doubt the species ranges throughout the forested region of this part of Chile. A specimen recorded by Thomas was taken by Budin on Lake Nahuelhuapi in Argentina but in the same forest. Our single specimen from Nahuelbuta has much lighter under parts than others but further material is required to substantiate the existence of a local race in that region.

*Specimens examined.*—Total 16: La Picada, Mount Osorno, 1; Petrohue, Lake Todos Santos, 1; Puella, Lake Todos Santos, 13; Sierra Nahuelbuta, Malleco, 1.

**Irenomys tarsalis longicaudatus** Philippi.

*Reithrodon longicaudatus* Philippi, Anal. Mus. Nac. Chile, Zool., Ent. 14a, pp. 64–65, pl. 11, fig. 1, 1900—Melinka, Guaiteca Islands, lat. 44° S., Chile.

Very similar to *I. tarsalis*, but color of under parts somewhat paler, clear Cinnamon Buff rather than Cinnamon or Pinkish Cinnamon.

*Range.*—Guaiteca Islands and Chiloe Island.

The recognition of this as a separate form rests upon a small series, mostly immature, taken at the southern end of Chiloe Island during Field Museum's expedition of 1922–23. Nearly all were caught by Mr. Sanborn about an abandoned cabin at the edge of the forest, and regular lines of traps set through the forest yielded

scarcely any, probably a further indication that the animal is arboreal.

Comparison of this series with that from Lake Todos Santos representing true *tarsalis* is not wholly satisfactory because one series contains only adults and the other only immatures. In two of the southern specimens, which apparently have attained the coloration of maturity, the shade of the under parts is slightly less "pinkish" than in the northern ones, while in five others, quite immature, the under parts are very light colored, scarcely darker than the Cream Color of Ridgway. Whether this slight distinction will be borne out by further material is doubtful, but for the present two forms may be admitted, especially since they have some geographic basis.

The mounted type of Philippi's *Reithrodon longicaudatus* is still preserved in the Santiago Museum, but the skull has been removed and apparently lost (possibly associated erroneously with *Mus mochae*, see p. 173). The skin agrees fairly well with the original description and figure except that the color is somewhat more brownish, and the end of the tail is missing. The hind foot measures approximately 31 mm. The skin is mostly dark brownish with whitish buff under parts. The tail is blackish all around and quite hairy. The typewritten label gives "Melinca" for locality, although Philippi publishes only "Habitat in litore occidentali Patagoniae." Melinka is on one of the small islands of the Guaiteca group, just beyond the south end of Chiloe Island, where our specimens were taken, so it may be assumed with considerable reason that this is the actual type locality of *longicaudatus*. Mr. Sanborn trapped for a few days at Melinka but did not obtain the species there.

*Specimens examined.*—Total 8: Mouth of Rio Inio, Chiloe Island, 7; Melinka, Guaiteca Islands, 1 (type in Santiago).

**Reithrodon auritus cuniculoides** Waterhouse.

*Reithrodon cuniculoides* Waterhouse, Proc. Zool. Soc. Lond., p. 30, 1837; Zool. Voy. Beagle, Mamm., p. 69, pl. 26, 1839—Santa Cruz, Patagonia; Allen, Mamm. Patagonia, p. 63, 1905.

A short-tailed, loose-pelaged, and heavy-bodied mouse with rounded ears, the inner surfaces of which are densely hairy and light colored; inguinal region and inner side of thighs frequently white. Upper incisors distinctly grooved; anterior border of infraorbital plate deeply emarginate. Total length 242 (231–257); tail 95 (90–103); hind foot 34.6 (33–36).

*Range.*—Treeless coast of southern Patagonia from the eastern end of the Straits of Magellan northward at least through the

Province of Santa Cruz, Argentina. Enters Chilean territory near the Argentine boundary at the Straits of Magellan and westward in treeless regions to meet the range of *R. a. pachycephalus* near the base of the Andes.

Although several names have been applied to *Reithrodon* from southern South America, only two races seem distinguishable, a paler form from the east coast and the treeless region extending inland and a darker form from the edge of the forested region along the base of the Andes. The species was taken by Darwin at Port Desire, San Julian and Santa Cruz, and Waterhouse's type of *cuniculoides* was from Santa Cruz, so this name now applies only to the pale form. The only record of this form from Chile is furnished by a single immature example collected by J. M. Schmidt, in 1940, at North Arm Station, Rio Ciaike, just west of the Argentine boundary.

Specimens from Arroyo Aike, in the Basaltic Canyons, "one hundred and fifty to two hundred miles northwest of St. Julian and Santa Cruz," referred by Allen to *cuniculoides*, are scarcely darker than the few specimens available from the coast, evidently indicating that this form ranges across all of southern Patagonia to meet the range of *pachycephalus* in or near the wooded parts of the mountains.

*Specimens examined.*—Total 9: ARGENTINA: Arroyo Aike, Basaltic Canyons, Santa Cruz, 7 (A.M.N.H.); mouth of Rio Coy, Santa Cruz, 1 (U.S.N.M.). CHILE: Rio Ciaike, Magallanes, 1.

**Reithrodon auritus pachycephalus** Philippi.

*Mus pachycephalus* Philippi, Anal. Mus. Nac. Chile, Ent. 14a, p. 42, pl. 17, figs. 6, 6*a*, 6*b*, 1900—Straits of Magellan (Punta Arenas by present designation).

*Reithrodon cuniculoides obscurus* Allen, Bull. Amer. Mus. Nat. Hist., **19**, p. 190, 1903—Punta Arenas, Chile.

*Reithrodon hatcheri* Allen, supra cit., p. 191—head of Rio Chico, Santa Cruz, Argentina.

*Reithrodon cuniculoides* Wolffsohn, Bol. Mus. Nac. Chile, **2**, No. 1, p. 101, 1910.

*Reithrodon cuniculoides flammarum* Thomas, Ann. Mag. Nat. Hist., (8), **10**, p. 411, 1912—Spring Hill, northern Tierra del Fuego.

Similar in all general characters to *R. a. cuniculoides*, but color averaging darker, the upper parts more heavily mixed with blackish and the under parts a slightly darker shade of ochraceous buff.

*Range.*—Tierra del Fuego and western Patagonia from the Straits of Magellan northward near the base of the Andes at least through the territory of Chubut, grading into *auritus* in the east and *evae*

in the west; enters Chile near the international boundary at least in lat. 45° S.; also in the vicinity of Punta Arenas.

The *Reithrodon* of western Patagonia from northern Chubut to Magallanes and across the Straits to Tierra del Fuego is uniformly somewhat darker than *cuniculoides* from the east coast of Santa Cruz. Further subdivision, as judged by fairly ample material now in hand, does not seem justified and the conclusion is forced that the several names given to specimens from this region apply to one form only. Excluding *cuniculoides*, the earliest of these names is Philippi's *pachycephalus*. No type of this could be found in Santiago in 1924,

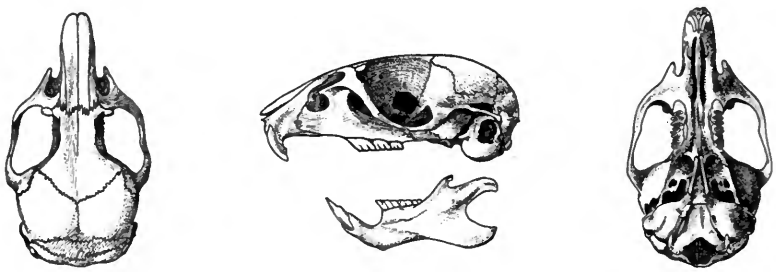


FIG. 33. *Reithrodon auritus pachycephalus*. F.M. No. 23258. × 1.

but one evidently was examined by Wolffsohn, and there seems no reason to disagree with his conclusion that it was a *Reithrodon*. Philippi's description and figure also indicate this, although his specimen was obviously quite immature. The locality given for it was simply "Freto Magellanica," and the exact locality may be assumed to be the vicinity of Punta Arenas, then as now a Chilean city with regular communication with Valparaiso and Santiago.

The names *obscurus* and *flammarum*, both based on single specimens, are evidently synonyms of *pachycephalus*. So also is *hatcheri*, although in its case the possibility that it may be somewhat intermediate between *cuniculoides* and *pachycephalus* is not wholly excluded. Several specimens from the original series of *hatcheri*, kindly lent by the United States National Museum, prove to have the upper parts quite as dark as in *pachycephalus*, but the under parts are a trifle lighter.

A small series from Tierra del Fuego shows no differences in size, color, or cranial characters from a similar series from Skyring Water, a short distance north of Punta Arenas. These in turn are quite like others from farther north, including a number from Rio

Nirehuao on the Chilean side of the line at about lat. 45° S., where the species was found to be abundant in 1924.

A review of the literature, supplemented by examination of a considerable series of specimens, is fairly convincing that *Reithrodon* is monotypic, consisting only of a single species divisible into several subspecies which differ from each other mainly in shade of color or in the extent of hairiness on the feet. As compared with *typicus*, *pachycephalus* and *cuniculoides* show certain cranial characters which doubtless are valid, but none which might not easily be bridged by intergradation.

That light and dark forms corresponding to those found on the mainland may at some time be distinguished on Tierra del Fuego is perhaps not impossible but it seems highly improbable. Our specimens from Tierra del Fuego are mostly from the edge of the forest, whereas the type locality of *flammarum*, Spring Hill, is on the north coast in a treeless region. In the vicinity of Spring Hill, however, there is much heavy brush of the kind called *mata negra*, furnishing exactly the same habitat in which we found *Reithrodon* on the mainland.

Names given to supposed northern forms are the following:

*Reithrodon a. auritus* Desmarest; south of Buenos Aires.
*a. pampanus* Thomas; northwest of Bahia Blanca.
*a. marinus* Thomas; Mar del Plata, Buenos Aires.
*a. typicus* Waterhouse; Maldonado, Uruguay.
*a. currentium* Thomas; Goya, Corrientes.
*a. caurinus* Thomas; Otro Cerro, Catamarca.
*a. evae* Thomas; Zapala, Neuquen.

Of these, those most likely to have permanent recognition are *auritus*, *typicus*, and *caurinus*. Most of the others are open to serious question and doubtless will prove to be either quite indistinguishable or intermediate in character. *R. pampanus* already has been eliminated as a synonym of *auritus* by Thomas (Ann. Mag. Nat. Hist., (9), **5**, p. 474, 1920). Next is *marinus*, which is based on two specimens that had been kept in captivity and which must remain in doubt until good material representing it is obtained. *R. currentium* was based on the assumption that *typicus* is dull-colored, this being the case in the faded type specimen. A modern series of *typicus* from Uruguay now in Field Museum, however, is bright colored as described for *currentium*, so that name is probably a synonym of *typicus*. The form called *evae* is represented in Field Museum by a specimen from Huanuluan, Rio Negro, which is definitely paler than *cuniculoides*. It is thus somewhat intermediate between *cuniculoides*

and the still paler form *caurinus*, although it is not unlikely that three forms may be distinguished.

During the season of 1939–40, when our field work was done in the south, *Reithrodon* was very scarce, although reports and indications were to the effect that at times it has been very abundant. Apparently it was near the low point of a cycle. In only two localities, one on Tierra del Fuego and one on the mainland, was it found in sufficient numbers to provide a fair representation. In many other places, slightly weathered droppings and runways of a large mouse, probably *Reithrodon*, were found in great numbers, apparently indicating that within two years, at most, it had been numerous. In most cases these signs were in open country away from the forest, usually in the low brush known as *mata negra*, whereas the localities where specimens were taken were at the edge of the forest or in openings within it. The excessive abundance of *Akodon xanthorhinus* which prevailed at the time was possibly connected with the scarcity of *Reithrodon*, but since it is a much smaller animal it is hardly to be supposed that *Reithrodon* retreated before it.

*Specimens examined.*—Total 36: ARGENTINA: Alta Vista, Lake Argentino, 1; Estancia Via Monte, Tierra del Fuego, 1; north end of Lake Fagnano, Tierra del Fuego, 4; upper Rio Chico, Santa Cruz, 4 (U.S.N.M.); Valle del Lago Blanco, Chubut, 1. CHILE: Campo Bandera, Coihoique, 2 (A.M.N.H.); Casa Richards, Rio Nirehuao, 16; Rio Verde, east end of Skyring Water, Magallanes, 7.

## ORDER ARTIODACTYLA

### KEY TO CHILEAN GENERA

Pelage long, soft and loose; upper lips widely cleft; feet with long pads behind hoofs; no accessory hoofs or "dew claws"; horns absent in both sexes.

Size larger; no especial elongation of hairs from brisket; lower incisors with closed roots; antorbital vacuity large ..... *Lama.*

Size smaller; hairs from brisket elongated to form an "apron" reaching nearly or quite to "knees"; lower incisors with persistently open roots; antorbital vacuity almost or quite closed ..... *Vicugna.*

Pelage smooth, crisp, and rather short; no long pads behind hoofs; accessory hoofs or "dew claws" present; males with horns.

Size large; height at shoulder more than 50 in.; males with forked horns. *Hippocamelus.*

Size smaller; height at shoulder less than 50 in.; males with straight unbranched horns ..... *Pudu.*

### **Hippocamelus bisulcus** Molina. HUEMUL.

*equus bisulcus* Molina, Sagg. Stor. Nat. Chili, pp. 320–322, 343, 1782—high Andes of Chile.

*Camelus equinus* Treviranus, Biol. Phil. lebend. Natur Naturf. Aerzte, **2**, pp. 179, 225, 1803—*E. bisulcus* renamed.

*Hippocamelus dubius* Leuckart, Dissert. inaug. de Equo bisulco Molinae, p. 23, 1816—*E. bisulcus* renamed.

*Auchenia huemul* H. Smith, Griffith's Cuvier, Anim. Kingd., **5**, p. 300, 1827—*E. bisulcus* renamed.

*Cervus (Cervequus) andicus* Lesson, Nouv. Tabl. Reg. Anim., Mamm., p. 173, 1842—*E. bisulcus* renamed.

*Cervus chilensis* Gay and Gervais, Ann. Sci. Nat., Paris, (3), **5**, pp. 91–93, 1846; Gay, Hist. Chile, Zool., **1**, pp. 159–160, 1847; Atlas, Mamm., pls. 10–11, 1848—Chile; Philippi, Anal. Mus. Nac. Chile, Zool., pp. 1–9, pl., figs. 1–6, 1892; pp. 8–10, pl. 1, fig. 1, 1894.

*Capreolus leucotis* Gray, Proc. Zool. Soc. Lond., pp. 64–65, pl. 12, 1849—Port Famine, Straits of Magellan.

*Mazama bisulcus* Lydekker, Deer of All Lands, p. 296, 1898.

*Hippocamelus bisulcus* Thomas, Proc. Zool. Soc. Lond., p. 212, 1898; Lydekker, Cat. Ungulate Mamm., **4**, p. 193, 1915.

A large yellowish brown finely speckled deer with coarse, brittle pelage; horns in the male usually with one simple fork and two points on each side; females hornless; feet with well-developed accessory hoofs or "dew claws," tail short and inconspicuous. Total length 160–170 cm.; height at shoulder 80 cm.

*Range.*—Southern and western Argentina nearly or quite to the Straits of Magellan and Chilean Andes north to the Province of Colchagua about lat. 34° S.; now rare or extirpated in parts of its former range.

The huemul appears to be a mountain animal that lives by preference near the upper limits of timber. In central Chile it is confined to the higher Andes and southward it is not usually found in the coast forests but occurs principally near the international boundary where conditions are most favorable to it, on the eastern or Argentine side of the mountains. Nevertheless, it has been reported from Port Famine, Magallanes, and, according to information received from Mr. Junius Bird, on the authority of Mr. Lucas Bridges, it has been found on Wellington Island and on the Peninsula of Taitao. In mountains near Lake Sarmiento (lat. 51° S.) in 1940 I picked up a shed horn doubtless only a few years old, but residents of the region reported that none of the animals had been seen there for some time.

Its northern limit on the Chilean side is or was in the vicinity of the sources of the Rio Cachapoal between lat. 33° and 34°. Both Philippi (l.c., 1892, 1894) and E. C. Reed (1877) mention specimens taken here in the Province of Colchagua and records from farther north are lacking. In Patagonia it is mainly western in distribution, but early reports state that it once occurred in hills near Port Desire on the Atlantic coast.

Various writers have given accounts of the hunting of the huemul, among the best being those of Prichard (1902) and Hatcher (1903). All agree in testifying to an unusual lack of wariness on the part of animals encountered on open hillsides in regions where they had not been subjected to much pursuit. My own experience with them, although limited to a few days' hunting in a single locality, was so extraordinary in this respect that a full account of it extracted from my personal journal may be of interest. The locality was Pico Richards, a mountain opposite Cerro Mano Negra at the head of "Rio Richards," a small southern tributary of Rio Nirehuao. About its base the mountain is well wooded with roble and other deciduous trees, and, although the summit at 4,000–5,000 feet is sandy and treeless, its sides have alternating forest clumps and open grassy or rocky slopes.

Under date of March 6, the entry in the journal is approximately as follows:

"The first evening I climbed up the side of the mountain just behind camp in the heavy woods for a short hour, and was unable to find the slightest sign of huemules and I came in with the feeling born of other experience that I was in for much hunting but no game. The next day with the peon Paulino, however, and only fifty yards beyond where I had been the night before, we came on an old track and soon after found a fresh one and with it the track of a *leon* which evidently had followed the huemul and perhaps had put it to flight. We followed this track until it led out on an open, practically treeless slope of the mountain, when Paulino suddenly beckoned and calmly said 'Alli esta uno,' as if it was what was to be expected. Sure enough, there was a huemul standing conspicuously on a slight promontory on the open side of the mountain far below us and a full quarter of a mile from any adequate cover. That it had taken this position after being chased by the puma was accepted by Paulino as a fact, but of course it was by no means certain. It appeared hopeless to get nearer to it without being seen, so I decided to try a long shot and await developments. I fired and it failed to move, although the bullet must at least have whistled by or clipped the rocks near it. I fired again and it continued standing still. I began to doubt its identity and to fancy it might be only the shady side of a rock with deceiving outlines, but shortly I distinguished a slight movement. Meanwhile Paulino had been urging me to go forward without attempt at concealment, since, he said, huemules were always 'muy manzos' and 'nunca disparen.' So I began sliding down the

loose rock from one of the few scrubby trees to another until I got within some three hundred yards at the very last point of concealment between me and the game. I was exposed to view repeatedly and any other animal would have sighted me and cleared out, but the huemul remained standing almost motionless in the one spot. . . . . Taking a rest, I fired from the new position and the animal dropped and rolled over an embankment out of sight.

"Preparing the specimen and getting it back to camp occupied several hours so it was not until three in the afternoon that we were again on the open mountain side. With the glasses I made out a single deer far down toward the western end of the mountain and, although it was late in the day, I again instinctively refused to take Paulino's advice to advance directly on it and chose to drop down to concealment and make a long circle through the trees. On getting nearer, a second deer was noted feeding leisurely with the first and just beyond, on the side of a small gully, were five guanacos scattered about. A most unusual place for guanacos, I thought, and a very exceptional experience in South America to see two kinds of large game at once.

"As we went on, the huemules moved about a bit, but kept to the same general vicinity. We could not avoid exposing ourselves now and then and at half a mile away the guanacos saw us and started up the mountain on the run. The huemules were nearer, but if they saw us, gave no signs of it. At about six hundred yards the game was in full sight and nearer approach seemed impossible, but just then we saw four other huemules farther on where they were on a grassy slope beyond an outcropping rocky butte to which I could crawl without being seen. On reaching this place I found the animals still some 250 yards away. They were quite at peace, one lying down and three others feeding. Picking the largest one, I fired and missed, at which they all turned and stood at attention. A second shot dropped one of them in its tracks, but the other three did not offer to run and merely stood about in a dazed sort of way. One of them sniffed at its dead companion and walked slowly around it. The others stood in their original positions some fifty feet away. Then I showed myself and walked directly toward them across the wholly open slope, but they paid no attention to me. I continued, expecting them to run at any minute, but they only walked about stiffly and the most that could be said was that they edged slightly up the hillside. Finally I reached the carcass of the dead one and tied a handkerchief on it before turning to the others. They had their

heads up and their eyes stared with looks of astonishment and curiosity, but they showed no fear or panic. The dead one was a very old female and doubtless their leader. The others were two younger but full-sized females and a young buck with small knobs of horns. Their nervousness was principally evinced by the stiffness with which they slowly stalked back and forth raising their legs in deliberate and measured fashion that produced a ridiculous effect quite suggestive of a goose-step. I walked toward the nearest one and he flicked his tail quickly, but would not retreat. Being less than thirty feet from him, I picked up a pebble and threw or rather tossed it at him and even this would not put him to flight. As we left, the three were slowly and reluctantly edging up the slope but still within 100 yards.

"Even Paulino, who had been repeating that huemules were very tame, said this was more than he had seen before. He was beside me all the time and had been especially interested in some 'baguaules' or wild cattle, about 100 of which had come out to feed in the dusk on a river flat below us, nearly a mile away. At the first shot they had put for the woods pell mell in a wild panic-stricken rush. Meanwhile the guanacos had long since disappeared via the open top of the mountain. The difference between these and the huemules was striking."

It was a unique experience with a hoofed animal, but fully corroborates what has been reported by others. The next day other huemules were found in numbers in the same vicinity evidently undisturbed by the shooting of the day before. At this time I secured a fine adult male which was solitary and a trifle more alert, but stalking him to a range of only 75 yards among scattered trees was accomplished without great difficulty. This animal and the two females were preserved as specimens. The male was in especially fine condition, quite fat and in good coat. His weight was estimated at not less than 200 pounds. His antlers were four-pointed as usual in the species. More than this number is said to be quite rare, although the natives report heads with as many as nine points.

Measurements of adult male and female are, respectively: total length 1,680, 1,570; tail 125, 130; hind foot 470, 430; height at shoulder 790, 780.

**Pudu pudu** Molina. PUDU.

*capra puda* Molina, Sagg. Stor. Nat. Chili, pp. 308–309, 343, 1782—southern provinces of Chile.

*Capra pudu* Molina, supra cit., ed. 2, p. 255, 1810.
*Cervus humilis* Bennett, Proc. Zool. Soc. Lond., p. 27, 1831.
*Cervus pudu* Gay, Hist. Chile, Zool., 1, p. 158, 1847; Atlas, Mamm., pls. 9–10, 1848.
*Coassus* (*Pudu*) *Pudu* Gray, Proc. Zool. Soc. Lond., (1850), p. 242, 1852.
*Pudu chilensis* Gray, Cat. Ungulata Brit. Mus., pl. 36, fig. 1, 1852.
*Pudua humilis* Garrod, Proc. Zool. Soc. Lond., p. 18, 1877.
*Pudu pudu* Pocock, Proc. Zool. Soc. Lond., p. 967, 1910.

A very small deer of rich rufescent coloration and simple unbranched horns not exceeding three inches in length.

*Range.*—Valdivian forest region of south-central Chile and the island of Chiloe; southward along the coast nearly to the Straits of Magellan.

The pudu has the distinction of being the smallest of American deer. Although having a slight general resemblance to the brockets of northern and eastern South America, it is very distinct from them. It is exclusively Chilean in distribution, although a supposed ally (*Pudella*), very rare and local, has been found in Ecuador. According to Gay, it ranged "desde la provincia de Cauquenes hasta la de Chiloe." At present it may not extend quite so far north, but is fairly common in the provinces of Valdivia, Cautin, Arauco, and northern Llanquihue. On Chiloe it is probably confined mainly to the southern and uninhabited part of the island. In early accounts and many later ones based on them, it is usually spoken of as an animal of the cordillera, but this appears not to be the case since it is actually recorded only from heavily forested regions either near sea level or at very moderate elevations. According to Reiche (1903), it formerly occurred on Mocha Island but has been extirpated there. In the higher parts of the Sierra Nahuelbuta it was not found, although common at lower levels. In the lake region, as, for example, at Lake Todos Santos, it is numerous in the deep forest near the water, but it is not reported from the heights above. The southward distribution of the pudu is uncertain, but it probably may be found, at least in scattered colonies, along the whole length of the Chilean coast nearly or quite to the Straits of Magellan. Apparently reliable reports indicate that it has been seen or taken on the western side of Riesco Island as far south as lat. 50°, but no specimens from this region have been preserved. Trustworthy information emanating from Mr. Lucas Bridges is to the effect that it has even penetrated to the east side of the mountains along the Rio Baker in about lat. 47° S.

During our work on Chiloe Island, it was evident that time spent in hunting the pudu would be largely if not wholly wasted, for

the forest is very dense and the animals are shy and skulking. Tracks were seen occasionally in the forest and, in a few instances, at the inner edge of sandy beaches at the south end of the island. Only once did we catch a glimpse of the animal itself, and this was from a boat when one appeared momentarily at the edge of a small opening on a hillside as we were rounding a promontory near the mouth of the Rio Inio. By enlisting the services of native hunters and dogs, however, a number of specimens were obtained. Their method of hunting was simple and effective. The dogs were put ashore in any promising situation, along a bay or inlet, while the men remained in a boat listening and watching. After a short chase, the little deer would take to the salt water and the boatmen in their *chalupa* would soon overtake it. The pudu's powers of resistance being comparatively slight, it was merely lifted out of the water and usually brought to us alive. Young animals were easily tamed, but full-grown males evinced very high spirits and indomitable objection to captivity. One which was brought to our camp was tied to a stake, where it struggled to the point of exhaustion and then sank panting to the ground. After lying prostrate for a time, it renewed its frantic efforts to escape and repeated the process until nightfall, when we thought it would become quiet. At intervals during the night, however, it was heard thrashing about and the next morning it was lying quite dead, with no external sign of injury. Young fawns, on the other hand, were very confiding and tractable, readily taking milk in a saucer, following us about the camp or cuddling in our arms to sleep.

Our specimens, taken in January, which is the season of midsummer, show wide differences in coloration probably representing two different pelages. One of these might be called a rufous pelage or phase and the other a dark brown one. The first has a broad band from the top of the head to the tail bright clear Hazel or Cinnamon Rufous, the sides being paler and finely speckled by reason of subapical dark bands on the hairs. The legs and feet are pale, nearly clear Cinnamon Rufous. In the other phase, which appears to be a fresh coat, the dorsal band is less defined and its color is deep Burnt Umber or Vandyke Brown inclining to blackish. The sides are only slightly lighter, owing to numerous hairs with narrow light tips. The feet and lower legs are hazel with a slight mixture of blackish in front.

The fawns of the pudu have a row of spots on either side of the back, running from the shoulders to the base of the tail. Below

these on the sides is a double row of spots. In addition, there are several spots on the shoulders and three parallel rows of four to five spots each on the flanks. The color of the fawns is dark Vandyke Brown along the mid-dorsal line and somewhat paler, more rufescent on the sides. The chin, throat, feet, and legs are Tawny or Ochraceous Tawny.

Two of the largest males obtained on Chiloe Island had weights of twenty-one pounds and twenty-four pounds respectively. Measurements of two males are: total length 830, 867; tail 35, 42; hind foot 200, 205; ear from crown 88, 86; height at shoulder 405, 410; shoulder to hip 460, 430. A male from the mainland at Petrohue on Lake Todos Santos is somewhat smaller; it measured: total length 795; tail 43; hind foot 205; height at shoulder 385.

*Specimens examined.*—Total 21: Cayetue, Lake Todos Santos, 7 (coll. K. Wolfhügel); Chiloe Island, 8; Petrohue, Lake Todos Santos, 1; Pitrufquen, Cautin, 1; San Pedro, Concepcion, 1 (skin only); Santa Juana, Arauco, 1 (skin only); Vega Blanca, Sierra Nahuelbuta, 1; Valdivia, Valdivia, 1.

**Lama guanicoe** Müller. GUANACO.

*Camelus guanicoe* Müller, Natursyst., Suppl., p. 50, 1776—Patagonia.

*camelus Huanacus* Molina, Sagg. Stor. Nat. Chili, p. 3, 1782—Chile.

*Lama huanachus* Thomas, Proc. Zool. Soc. Lond., p. 387, 1891.

*Auchenia Guanaco* Meyen, Nov. Act. Acad. Leop.-Carol., **16**, pt. 2, p. 552, pl. 40, 1833.

*Lama guanaco* Gay, Hist. Chile, Zool., **1**, p. 153, 1847.

*Auchenia Lönnbergi* Ameghino, Sinops. Geol.-Paleont. Patag., Suppl., p. 6, 1899—Rio Gallegos and Ultima Esperanza, Patagonia.

*Lama guanicoe* Osgood, Journ. Mamm., **2**, p. 39, 1921; Aranguren, Anal. Soc. Cient. Arg., **109**, p. 106, 1930; Cabrera, Rev. Mus. La Plata, **33**, p. 116, 1932.

A large ungulate allied to the camels, having a long slender neck, long legs, and feet with broad flat pads behind widely divergent "hoofs." Pelage long and thick; inner and outer sides of hind legs with a narrow naked space; lips highly mobile, deeply cleft in front; tail heavy and moplike; horns never present; ears long and pointed; lower incisors with short closed roots in adults.

*Range.*—Southern Patagonia, Tierra del Fuego and Navarin Island; northward in western Argentina and in the cordillera (mainly on the eastern side) of Chile to Bolivia, descending to the coast of Chile to some extent north of Valparaiso.

In Chile the guanaco is mainly an animal of the high cordillera. Gay speaks of its abundance, at least at certain seasons, in the Province of Concepcion, but it is no longer found in that part of

Chile, and even in the last century its occurrence there may have been unusual. North of Valparaiso it still comes to the coast or to the adjacent hills at various points. Writing in 1877, E. C. Reed states that it was then "bastante comun en la cordillera," Province of Colchagua. Along the eastern base of the Andes in valleys connecting with the open pampas it occurs with regularity but in no great numbers. In my own experience with it in the vicinity of Rio Nirehuao in 1923, small herds were to be found at intervals both to the eastward on the pampa and in the mountains rising on the west. They were quite wary and would dash away at sight of a hunter. One was killed by Mr. Conover a short distance east of our station at Casa Richards.

In southern Patagonia and on Tierra del Fuego guanacos are still found in considerable numbers but are more and more confined to the less accessible parts of the region. On the large island of Navarin, south of Tierra del Fuego, and just across the Beagle Channel they are well established, perhaps by introduction, but exact information with regard to this is not at hand. Among local hunters it is believed that those of Tierra del Fuego are darker in color than those of Navarin Island and also darker than those of the Patagonian mainland. No direct comparison of skins has been made, however, and a series of skulls from Tierra del Fuego shows no distinction from those of the territory of Santa Cruz.

In traversing most of the unforested part of Tierra del Fuego in 1940, Field Museum's expedition observed a total of scarcely more than fifty guanacos, most of them at one locality near the bay of San Sebastian. Elsewhere they were absent, and report is to the effect that they have retreated to higher parts of the mountains, to reach which they have passed through partially wooded regions. The practice of killing the new-born young to obtain skins for the beautiful robes called "capas" is continued with little or no restriction, and it is rare that an immature animal is seen. The full-grown animals are not especially valued and are seldom hunted. Among the sheep men, it is commonly believed that all the guanacos now living are very old and that the time is not distant when a sudden heavy mortality may be expected.

**Vicugna vicugna** Molina. VICUGNA.

*camellus* [sic] *vicugna* Molina, Sagg. Stor. Nat. Chili, pp. 313–315, 342, 1782—Andes of provinces of Coquimbo and Copiapo, Chile.

*Lama vicugna* Thomas, Proc. Zool. Soc. Lond., p. 387, 1891.

*Vicugna vicugna* Miller, Proc. U. S. Nat. Mus., **66**, Art. 8, pp. 1–2, pl. 1, 1924; Aranguren, Anal. Soc. Cient. Arg., **109**, p. 121, 1930; Cabrera, Rev. Mus. La Plata, **33**, p. 116, 1931.

A cameloid allied to the guanaco but smaller and having somewhat finer pelage; a conspicuous white or whitish apron depending from the brisket; hind legs without lateral naked spaces; lower incisors very long, slender, and with persistently open roots.

*Range.*—Andes of northeastern Chile northward and eastward into Bolivia and Argentina, meeting the range of the supposed subspecies *mensalis*[1] in Bolivia or southern Peru.

Sanborn received some general reports of the vicugna while in the northern provinces, and near Putre, Tacna, he himself saw three specimens at large. It is probable that the animal is now confined to rather remote parts of the higher Andes. Its range corresponds closely with that of the chinchilla and, like that animal, it has suffered much persecution.

Although Molina's description of the vicugna is detailed and accompanied by the statement that the animal is common in mountains of the provinces of Coquimbo and Copiapo, it is not unlikely that his information was second-hand. Gay, who usually quoted Molina, makes no mention of the vicugna and apparently had no knowledge of its occurrence in Chile. If he believed it to be the same as the guanaco, it is strange that he should omit all reference to it in his rather full account of that animal. Philippi (Reise durch die Wüste Atacama, p. 160) mentions having had a near view of vicugnas in the desert of Atacama, but he was unable to obtain specimens and regarded them as quite rare in comparison with the guanaco. In San Pedro de Atacama he found skins offered for sale and at Rio Frio near lat. 25° S. he obtained an imperfect skull. This last, if properly identified, appears to be the only actual record of a Chilean specimen. Philippi refers to the localities in Coquimbo and Copiapo given by Molina and adds: "Ich kann nicht sagen, ob er darin Recht hat or nicht."

On the whole, it appears that knowledge of this animal in Chile is very scanty and the southern limits of its range are much in doubt. A specimen from Catamarca, Argentina, recorded by Thomas, is perhaps the only preserved specimen typical of the species.

The generic separation of the vicugna proposed by Miller followed by Cabrera seems well justified on the basis of its peculiar lower incisors. In the guanaco these teeth are relatively short and

[1] Thomas, Smiths. Misc. Coll., **68**, p. 3, 1917.

the roots wholly closed in the adult animal. In the vicugna they are very long, slender, and persistently open. In a Bolivian specimen in Field Museum a middle lower incisor is 77 mm. (more than three inches) in length, of which only one-fourth is exposed. Numerous minor characters are to be seen in the skull, the most notable being in the preorbital vacuities, which are always large and open in the guanaco but very small or entirely closed in the adult vicugna.

## INTRODUCED SPECIES

Aside from domesticated animals, most of which are generally distributed,[1] there are a number of introduced mammals in Chile. Detailed information about their origin and spread is lacking in most cases.

### **Euphractus sexcinctus** Linnaeus.

*Dasypus sexcinctus* Linnaeus, Syst. Nat., ed. 10, **1**, p. 51, 1758—Para, Brazil.

The six-banded armadillo or peludo appears to be established in central Chile. Mr. Carlos Reed, Director of the Zoological Garden in Santiago, states that in recent years he has examined more than twenty specimens from various localities.

### **Zaedyus pichiy** Desmarest.

*Loricatus pichiy* Desmarest, Nouv. Dict. Hist. Nat., **24**, Tab. Meth. Mamm., p. 28, 1804—northeastern Argentina.

The common small armadillo of the Argentine pampas has occasionally been brought into Chile and is believed to be existing there in a wild state, at least in several localities. It is recorded from the Province of Nuble by Carlos Schneider (1935a, p. 514), who had examined several specimens and had reliable reports of others. Gay stated in 1847 that it was frequently brought from Argentina to Chile and kept as a house pet.

### **Rattus norvegicus** Erxleben.

*Mus norvegicus* Erxleben, Syst. Regni Anim., p. 381, 1771—Norway.

*Mus lutescens* Gay, Hist. Chile, Zool., **1**, pp. 118–119, 1847; Atlas, Mamm., pl. 6, fig. 3, pl. 7, fig. 2, 1848—central provinces of Chile.

[1] An exception is the llama, which is numerous in the nitrate district of northern Chile but is not seen farther south except as a curiosity. The Yaghan dog of Tierra del Fuego (see Lönnberg, 1919, p. 10) is now extinct. A mounted specimen is preserved in the Salesian museum in Punta Arenas. The domestic cavy, to which Molina's name *Lepus minimus* applies, is found mainly in the north.

*Mus Simpsoni* Philippi, Anal. Mus. Nac. Chile, Zool., Ent. 14a, pp. 29–30, pl. 10, fig. 1, 1900—San Domingo Island, western Patagonia.

*Mus cauquenensis* Philippi, supra cit., pp. 61–62, 1900—Quirihue, Maule, Chile.

Excessively abundant throughout Chile and frequently leaving cities and towns to invade the woods and fields. In many localities it is so numerous that native rodents are entirely crowded out. In the Province of Maule, for example, Sanborn found house rats so omnipresent that trapping for smaller forms was almost hopeless. The same was true of various localities in the central valley. Chile's long coast line, with numerous ports, and the relatively small area between the coast and the high Andes furnish conditions under which rats have almost unlimited opportunity for ingress but somewhat restricted areas in which to spread, with the result that they have become inordinately numerous.

Philippi's names *simpsoni* and *cauquenensis* appear to refer to this species, although the latter may have been a brown phase of the *rattus* group. The type of *simpsoni* is still preserved in the museum at Santiago. It has no skull associated with the mounted skin. The color is bright brown with none of the grayish of Philippi's figure. The hind foot measures 35.

Gay's name *lutescens* undoubtedly applies to a house rat. His colored figure is a good representation of the Norway rat and there is nothing in his figures of the skull and teeth which might not have been derived from the same species. His comparison with *Mus brasiliensis* (= *Holochilus*) has caused some authors to express uncertainty about the name, but this does not seem to be justified. No *Holochilus* occurs in Chile or even near Chile, whereas *Rattus* is very abundant. In regard to this name Wolffsohn (1910a, p. 96) quotes Thomas as follows: "*Mus lutescens* Gerv. is neither more nor less than one of the grey forms of *Mus rattus*. I have seen the type in Paris." Gay's plate, however, shows a bright rufous rat rather than a gray one, and its short tail points to *norvegicus* rather than *rattus*.

**Rattus rattus** Linnaeus.

[*Mus*] *rattus* Linnaeus, Syst. Nat., ed. 10, **1**, p. 61, 1758—Sweden.

*Mus aethiops* Philippi, Anal. Mus. Nac. Chile, Zool., Ent. 14a, pp. 9–10, pl. 1, fig. 1, 1900—Province of Santiago, Chile.

*Mus subrufus* Philippi, supra cit., p. 45, pl. 18, fig. 3, 1900—Chile.

*Mus saltuum* Philippi, supra cit., pp. 50–51, pl. 21, fig. 1, 1900—Andes south [sic] of Puerto Montt, Chile.

*Mus coquimbensis* Philippi, Anal. Mus. Nac. Chile, Zool., Ent. 14a, p. 52, pl. 22, fig. 1, 1900—La Serena, Coquimbo, Chile.

*Mus cyaneus* Philippi (not *Mus cyanus* Molina 1782), Verhandl. Deutsch. Wiss. Verein. zu Santiago, 3, p. 9, 1895; Anal. Mus. Nac. Chile, Zool., Ent. 14a, pp. 53–54, pl. 23, fig. 1, 1900—Province of Constitution, Chile.

*Mus osorninus* Philippi, supra cit., pp. 56–57, pl. 25, fig. 1, 1900—Osorno, Chile.

Both black and brown types of this species occur and since they doubtless interbreed they cannot well be distinguished. In many localities their numbers are appalling. Apparently competition with the larger Norway rat has little effect on them. They were not seen in the extreme south, but they abound in the cool forests of the lake region as well as in warmer parts farther north.

No less than six of Philippi's names apply to this species, as plainly evident from his descriptions and figures. None of the types were found in the museum at Santiago.

**Mus musculus** Linnaeus.

[*Mus*] *musculus* Linnaeus, Syst. Nat., ed. 10, p. 62, 1758—Sweden.

*Mus leptodactylus* Philippi, Anal. Mus. Nac. Chile, Zool., Ent. 14a, pp. 48–49, pl. 20, fig. 2, 1900—Valparaiso, Chile.

The house mouse is common throughout Chile, ranging south to the Straits of Magellan and for the most part being confined to human habitations and settlements. Where rats are not overabundant, it seems to offer no serious competition with native species.

**Oryctolagus cuniculus** Linnaeus.

[*Lepus*] *cuniculus* Linnaeus, Syst. Nat., ed. 10, p. 58, 1758—Germany.

The European rabbit was not seen in central Chile, although reports indicate that it may be present in some localities. It was seen in small numbers on Tierra del Fuego near the port of Porvenir and also on the mainland in the vicinity of Punta Arenas. According to reports from Chilean naval officers, who have cruised through Beagle Channel and among the Cape Horn Islands, rabbits are established in parts of this region, notably on Lennox Island.

**Lepus timidus** Linnaeus.

[*Lepus*] *timidus* Linnaeus, Syst. Nat., ed. 10, p. 57, 1758—Sweden.

The European hare, which has spread rapidly over the greater part of central and southern Argentina, is common in adjoining parts

of Chile east of the Andes. In 1940 it was seen frequently in the vicinity of Punta Arenas and in the district of Ultima Esperanza, especially near Lake Sarmiento, it was noted in great numbers. It furnishes much sport for local hunters and its skins are marketed in large numbers. According to a newspaper report seen in Punta Arenas, 50,000 skins of hares and rabbits were sold there in 1939.

## SPECIES ERRONEOUSLY ATTRIBUTED TO CHILE[1]

*Lasiurus caudatus* Tomes, Proc. Zool. Soc. Lond., pp. 42–43, 1857—Pernambuco, Brazil.

Under the above name, which applies to a species of *Dasypterus*, there is mention of a "specimen in bad state in spirit from Chile." No further record of this specimen has appeared and, without confirmation, the occurrence of *Dasypterus* in Chile, although perhaps not improbable, is scarcely to be regarded as established.

*Stenoderma chilensis* Gay and Gervais, Hist. Chile, Zool., **1**, pp. 30–31, 1847; Atlas, **2**, pl. 1, fig. 1, 1848—Chile (=*Sturnira lilium* Geoffroy).

Although fully described and figured in Gay's great work on the natural history of Chile, this bat has not since been reported from Chile and its occurrence is very doubtful. Gay's account merely states "Este murcielago es muy escaso en Chile" without giving evidence of any actual records.

*Canis fulvicaudus* var. *chiloensis* Gray, Proc. Zool. Soc. Lond., p. 511, 1868.

This was said to be from Chiloe Island, but Thomas has stated (Proc. Zool. Soc. Lond., p. 236, 1903) that it was "wrongly localized." Cabrera (Journ. Mamm., **12**, p. 58, 1931) regards it as a synonym of *Lycalopex vetulus*, a species which does not reach Chile.

*Ursus ornatus* F. Cuvier, Hist. Nat. Mamm., **5**, livr. 50, unpaged text and col. pl., 1825.

In naming this species, Cuvier remarks: "Il avait été ramené en Europe par un des vaisseux du Roi que en avait fait l'acquisition au Chili même; ainsi son origine ne peut être douteuse." A few years later, however, Tschudi (Fauna Peruana, pp. 91–92, 1844) threw

[1] Several armadillos reported by Molina were not really attributed to Chile as at present bounded, since they were said to inhabit the district of Cujo now included in the Province of Mendoza, Argentina.

doubt on this statement as follows: "Ein lebendes Exemplar von *U. ornatus* wurde in Jahr 1825 nach Europa gebracht und kurze Zeit im Jardin des plantes in Paris lebend erhalten. F. Cuvier Mamm. fasc. 50 gab eine Abbildung von diesem angeblich aus Chile stammenden Bären. Wir haben aber alle Ursache zu vermuthen, dass das Thier in Nordperu, und zwar in Truxillo, an Bord genommen wurde; denn dieser Hafen ist der einzige an der ganzen Westküste, nach welchem lebende Bären aus dem Innern zum Verkaufe gebracht werden." In 1902 (Ann. Mag. Nat. Hist., (7), **9**, p. 215), Thomas, apparently influenced by the unequivocal nature of Cuvier's statement,[1] took issue with Tschudi, saying: "F. Cuvier's specimen was said definitely to have come from Chile, and there seems no sufficient authority for Tschudi's suggestion that it was obtained at Trujillo."

From experience and information gained by Field Museum's expeditions in both Peru and Chile, it seems that Tschudi was right. The spectacled bear is still common in mountains near Trujillo, Peru, but there is no recent evidence even suggesting its occurrence in Chile. It may be that Cuvier's type was obtained by the French ship at a Chilean port but, if so, it had doubtless reached there by coasting vessel from Peru.

*L'istrici, sia il Porco-spino Chilesesi* Molina, Sagg. Stor. Nat. Chili, pp. 292–293, 1782.

*Histrix chilensis* Anonymous, Geog. Nat. Civil Hist. Chili ("Translated from the original Italian by an American Gentleman"), **1**, p. 205, 1808; p. 242, 1809[2]—"northern Andes of Chili" where no porcupine occurs (=*Coendou prehensilis* Linnaeus 1758).

Apparently Molina's report of a porcupine in Chile and the name based on it in English translations of his work were without any justification. No porcupine occurs there or even near there.

*Viscaccia americana* Schinz, Thierr., **4**, pp. 429–431, 1825 (=*Lagostomus maximus* Desmarest).

Schinz states that "Dieses Thier lebt in Brasilien und Chili." His description, however, applies wholly to the well-known Argentine viscacha which does not reach either Brazil or Chile.

[1] Perhaps also to strengthen his assumption that a different subspecies (*majori*) was found in Ecuador.

[2] A different edition under the same title "to which are added Notes and Appendixes by the English Editor," these being signed by the initials "E.E."

*Mus pusillus* Philippi, Arch. Naturg., **24,** (1), pp. 79–80, 1858; Anal. Mus. Nac. Chile, Zool., Ent. 14a, p. 19, pl. 5, fig. 2, 1900.

A specimen examined in the Santiago museum in 1922 is evidently the basis of Philippi's figure published in 1900, but that it is the specimen described in 1858 is doubtful. At the time it was examined, it was thought probable that something like it would be found in Chile and it was not given especial attention. However, nothing closely related to it has been obtained in Chile during subsequent collecting and the question arises as to whether or not it may have been brought in with freight from Argentina or otherwise accidentally.

Notes on this specimen are as follows: "Possible type in museum labeled 'Raton. *Mus pusillus,* Ph. Cord. Santiago, 1860.' The description was published in 1858, so if this really was the type, it could not have been collected in 1860, but the label is not original and was doubtless put on many years later. In fact, it is typewritten and, of course, there were no typewriting machines in Chile in those days. It is a small, soft-haired, grayish mouse with a white belly. The skull is inside and could be removed for positive identification. The ears have been shriveled by preservative, and probably were larger than in Philippi's figure. Only one remains and this measures about 11 mm. in present condition. The hairs of the chin and upper throat are practically all white; those of chest have dark bases. The hind foot in good condition is 21."

The description published by Philippi in 1900 does not differ from that of 1858, being only a verbatim translation from German to Spanish, but there is added a paragraph of speculation as to a possible relationship to the Argentine "*Mus*" *laucha.* In this it may be that Philippi was more nearly right than usual, although his assumptions appear to have been based entirely on literature.

On the basis of the description alone it would be difficult to dispose of this name, but if the specimen figured in 1900, and apparently collected at a very early date, be considered the type it is not unlikely that reference to the modern genus *Hesperomys* would be justified. That the species belongs to the Chilean fauna is more than doubtful.

## UNIDENTIFIABLE NAMES

*Canis vulpes chilensis* Kerr, Anim. Kingd., Mamm., p. 144, No. 258, 1792.

Regarded by J. A. Allen (Bull. Amer. Mus. Nat. Hist., **7,** p. 188, 1895) as "not determinable."

*Phoca porcina* Molina, Sagg. Stor. Nat. Chili, pp. 279–280, 341, 1782.

The basis of this name is a description obviously derived from a young animal which might have been either a sea lion or a fur seal. Allen says of it in 1902 (Bull. Amer. Mus. Nat. Hist., **16**, p. 114): "The *Phoca porcina* of Molina (1782) is recognizable merely as an eared seal, but whether referable to *Otaria* or *Arctocephalus* cannot be determined from Molina's very imperfect account of it." There seems to be no reason to disagree with this conclusion. The name can be disposed of by regarding it as a synonym of *P. lupina*, which has page priority and a full description.

*Mus chilensis* Giebel, Verzeichn. Zool. Mus. Univ. Halle-Wittenberg Aufgestellt, Säugeth., 2te. Ausgabe, p. 29, 1866.

As cited above, this is a nomen nudum without nomenclatural status, but its possible earlier publication in a work which is not available is suggested.

*Mus maulinus* Molina, Sagg. Stor. Nat. Chili, pp. 302–303, 342, 1782.

The supposed animal described under this name is the most fanciful of any to which Molina actually applied a Latin designation. Scarcely any subsequent author has even hazarded a guess as to what it might be. It was called "Il gran topo boschereccio," or great wood mouse, and was said to be more than twice the size of a marmot, which it resembled in color, and its teeth were the same in number and arrangement as those of the common mouse. The Latin diagnosis is as follows: "Mus cauda mediocri pilosa, auriculis acuminatis, pedibus pentadactylis."

*Mus laniger* Molina, Sagg. Stor. Nat. Chili, pp. 301–302, 1782.

This name, adopted by many authors for the chinchilla, proves to have a composite basis involving the characters of several different animals among which it is impossible to make a choice. Therefore, the name is regarded as unidentifiable and it is proposed that its use be suppressed (see Osgood, 1941).

*Castor huidobrius* Molina, Sagg. Stor. Nat. Chili, pp. 285–287, 342, 1782.

Although frequently applied to the river otter of central and southern Chile, this name rests on an unsound basis. Its case is well stated by Thomas (Proc. U. S. Nat. Mus., **58**, p. 225, 1920), who says: "I am not prepared to recognize as an otter a species

described as having long rodent incisors and unpalmated forefeet, and think that in view of the insoluble mixture of local names, habits, and characters contained in Molina's description the name *Castor huidobrius* should be set aside as indeterminable."

*Guillinomys chilensis* Lesson, Nouv. Tabl. Regne Anim., Mamm., p. 126, 1842.

A renaming of the unidentifiable *Castor huidobrius* of Molina; therefore unrecognizable and without status.

*Mus*(?) *dasypus* Philippi, Anal. Mus. Nac. Chile, Zool., Ent. 14a, p. 61, 1900—Province of Santiago, Chile.

Among the numerous names given to Chilean rodents by Philippi, this is the only one for which the species cannot even be conjectured. Apparently the brief description was taken from memory of a decayed and mutilated mouse brought to the author by a local hunter and then doubtless thrown away. Philippi says of it: "Tiene el carácter mui notable, que ambas extremidades son cubiertas hasta la base de los dedos del mismo pelaje largo i tupido que el resto del cuerpo," probably indicating either an abnormal condition of the specimen or some vagary of the author's recollection.

# CHILEAN MAMMALS LISTED IN THE ORDER OF THEIR DISCOVERY

1758 *Mirounga leonina* Linnaeus.

1776 *Lama guanicoe* Müller.

1782 *Arctocephalus australis* Zimmermann.
*Conepatus chinga* Molina.
*Dusicyon culpaeus* Molina.
*Felis concolor puma* Molina.
*Felis guigna* Molina.
*Felis pajeros colocolo* Molina.
*Grison cuja* Molina.
*Hippocamelus bisulcus* Molina.
*Lagidium viscacia* Molina.
*Lutra felina* Molina.
*Myocastor coypus* Molina.
*Octodon degus* Molina.
*Pudu pudu* Molina.
*Spalacopus cyanus* Molina.
*Vicugna vicugna* Molina.

1800 *Otaria flavescens* Shaw.

1801 *Lasiurus cinereus villosissimus* Geoffroy.
*Hydrurga leptonyx* Blainville.

1824 *Tadarida brasiliensis* Geoffroy.

1826 *Lasiurus borealis bonariensis* Lesson and Garnot.

1832 *Leptonychotes weddelli* Lesson.
*Oryzomys longicaudatus* Bennett.

1833 *Lagidium viscacia cuvieri* Bennett.
*Cavia australis* Geoffroy and D'Orbigny.

1835 *Ctenomys magellanicus* Bennett.
*Histiotus macrotus* Poeppig.
*Oryzomys longicaudatus magellanicus* Bennett.

1836 *Dusicyon culpaeus magellanicus* Gray.

1837 *Abrocoma bennetti* Waterhouse.
*Akodon longipilis* Waterhouse.
*Akodon olivaceus* Waterhouse.
*Akodon olivaceus brachiotis* Waterhouse.
*Akodon xanthorhinus* Waterhouse.
*Conepatus humboldti* Gray.
*Dusicyon fulvipes* Martin.
*Dusicyon griseus* Gray.
*Phyllotis micropus* Waterhouse.
*Marmosa elegans* Waterhouse.
*Phyllotis darwini* Waterhouse.
*Phyllotis darwini xanthopygus* Waterhouse.
*Reithrodon auritus cuniculoides* Waterhouse.

1838 *Desmodus rotundus d'orbignyi* Waterhouse.
*Myotis chiloensis* Waterhouse.

1839 *Euneomys chinchilloides* Waterhouse.
*Akodon xanthorhinus canescens* Waterhouse.

1841 *Aconaemys fuscus* Waterhouse.
*Phyllotis darwini rupestris* Gervais.
1842 *Lyncodon patagonica* Blainville.
1844 *Notiomys megalonyx* Waterhouse.
*Octodon bridgesi* Waterhouse.
1846 *Phyllotis boliviensis* Waterhouse.
1848 *Ctenomys opimus* Wagner.
1858 *Akodon andinus* Philippi.
*Notiomys valdivianus* Philippi.
*Oryzomys longicaudatus philippii* Landbeck.
1860 *Ctenomys fulvus* Philippi.
1861 *Histiotus montanus* Philippi and Landbeck.
1865 *Felis jacobita* Cornalia.
1866 *Histiotus montanus magellanicus* Philippi.
1872 *Ctenomys maulinus* Philippi.
1880 *Ctenomys magellanicus fueginus* Philippi.
1892 *Myotis chiloensis atacamensis* Lataste.
1893 *Dromiciops australis* Philippi.
1894 *Dromiciops australis gliroides* Thomas.
*Notiomys macronyx* Thomas.
*Marmosa elegans soricina* Philippi.
1895 *Akodon longipilis hirta* Thomas.
1896 *Akodon andinus dolichonyx* Philippi.
*Ctenomys robustus* Philippi.
*Dusicyon culpaeus lycoides* Philippi.
*Eligmodontia puerulus* Philippi.
1897 *Akodon lanosus* Thomas.
*Lagidium viscacia moreni* Thomas.
1898 *Conepatus rex* Thomas.
*Notiomys valdivianus michaelseni* Matschie.
1900 *Akodon olivaceus mochae* Philippi.
*Akodon olivaceus pencanus* Philippi.
*Phyllotis darwini boedeckeri* Philippi.
*Irenomys tarsalis* Philippi.
*Irenomys tarsalis longicaudatus* Philippi.
*Notiomys megalonyx microtis* Philippi.
*Reithrodon auritus pachycephalus* Philippi.
1901 *Dusicyon griseus domeykoanus* Philippi.
*Felis concolor patagonica* Merriam.
*Eligmodontia elegans morgani* Allen.
1903 *Akodon longipilis suffusa* Thomas.
*Ctenomys magellanicus osgoodi* Allen.
*Dusicyon griseus maullinicus* Philippi.
*Notiomys macronyx vestitus* Thomas.
*Euneomys petersoni* Allen.
1905 *Notiomys delfini* Cabrera.
1907 *Lagidium viscacia wolffsohni* Thomas.
1908 *Akodon longipilis francei* Thomas.
*Lutra provocax* Thomas.
1910 *Akodon longipilis moerens* Thomas.

1912 *Phyllotis darwini vaccarum* Thomas.
1916 *Abrocoma bennetti murrayi* Wolffsohn.
*Euneomys chinchilloides ultimus* Thomas.
1914 *Dusicyon culpaeus andinus* Thomas.
1917 *Aconaemys fuscus porteri* Thomas.
1919 *Akodon olivaceus beatus* Thomas.
1920 *Lagidium viscacia famatinae* Thomas.
1921 *Conepatus chinga mendosus* Thomas.
*Lagidium viscacia boxi* Thomas.
1924 *Rhyncholestes raphanurus* Osgood.
1925 *Notiomys macronyx alleni* Osgood.
*Notiomys valdivianus chiloensis* Osgood.
*Spalacopus cyanus tabanus* Thomas.
1926 *Lagidium viscacia sarae* Thomas.
1931 *Marmosa elegans coquimbensis* Tate.
1934 *Chinchilla chinchilla velligera* Prell.

## NEW FORMS ADDED IN THIS PUBLICATION

1943 *Myotis chiloensis arescens.*
*Felis concolor araucanus.*
*Felis guigna molinae.*
*Octodon lunatus.*
*Spalacopus cyanus maulinus.*
*Ctenomys magellanicus dicki.*
*Ctenomys maulinus brunneus.*
*Myocastor coypus melanops.*
*Notiomys valdivianus bullocki.*
*Notiomys valdivianus bicolor.*
*Akodon longipilis apta.*
*Akodon longipilis castaneus.*
*Akodon sanborni.*
*Phyllotis darwini fulvescens.*
*Phyllotis micropus fumipes.*

## TYPE LOCALITIES IN CHILE

Names are given as originally proposed followed by the present generic name when this is different. Names of recognizable species and subspecies are printed in **boldfaced** type.

ACONCAGUA

*Abrocoma* **bennetti** Waterhouse.
*Lynchailurus pajeros huina* Pocock (*Felis*).

ANGOSTURA (Province of Santiago)

*Mus melanonotus* Philippi (*Akodon*).
*Mus porcinus* Philippi (*Akodon*).

ANTOFAGASTA (Province of; oasis of Leoncitos)

*Hesperomys dolichonyx cinnamomea* Philippi (*Akodon*).

ANTUCO (Province of Bio Bio)

*Nycticeius* **macrotus** Poeppig (*Histiotus*).
*Nycticeus poepingii* Lesson (*Lasiurus*).
*Nycticeius varius* Poeppig (*Lasiurus*).
*Nycticeus chilensis* Lesson (*Histiotus*).
*Plecotus poeppigii* Fitzinger (*Histiotus*).

ATACAMA (coast)

*Otaria velutina* Philippi.

ATACAMA DESERT

*Ctenomys atacamensis* Philippi; Tilpozo.
*Ctenomys chilensis* Philippi.
*Ctenomys* **fulvus** Philippi; Pingo Pingo.
*Ctenomys pallidus* Philippi; Breas, southwest of Antofagasta de la Sierra.
*Ctenomys pernix* Philippi; Aguas Calientes, east of Salar de Atacama.
*Hesperomys dolichonyx cinnamomea* Philippi (*Akodon*).

BAGUALES (Sierra at boundary between Chile and Argentina)

*Viscaccia* **wolffsohni** Thomas (*Lagidium*).

CARTAJENA (Province of Valparaiso)

*Mus melampus* Philippi (*Akodon*).

CHILOE ISLAND

*Akodon* **sanborni** Osgood; Rio Inio.
*Canis* **fulvipes** Martin (*Dusicyon*).
*Dromiciops* **gliroides** Thomas; Huite, near Ancud.
*Lycalopex fulvicaudus* Gray (*Dusicyon*).
*Myocastor coypus* **melanops** Osgood; Quellon.
*Notiomys valdivianus* **chiloensis** Osgood; Quellon.
*Phyllotis micropus* **fumipes** Osgood; Quellon.
*Rhyncholestes* **raphanurus** Osgood; Rio Inio.
*Vespertilio* **chiloensis** Waterhouse (*Myotis*).

CHOAPA (Province of Coquimbo)

*Mus campestris* Philippi (*Phyllotis*).

CHONOS ARCHIPELAGO

*Mus* **brachiotis** Waterhouse (*Akodon*); small island in Midship Bay.
*Mus chonoticus* Philippi (*Akodon*).
*Otaria brachydactyla* Philippi (*Arctocephalus*).

COBIJA (Province of Antofagasta, mountains near)

*Mus* **rupestris** Gervais (*Phyllotis*).

COLCHAGUA (Province of)

*Mus macrocercus* Philippi (*Oryzomys*).
*Mus psilurus* Philippi (*Akodon*).

RIO COLORADO (Province of Malleco)

*Ctenomys maulinus* **brunneus** Osgood.

CONCEPCION

*Mus araucanus* Philippi (*Oryzomys*).
*Mus* **pencanus** Philippi (*Akodon*).

CONSTITUTION (Province of)

*Mus cyaneus* Philippi (*Rattus*).

COPIAPO (Province of)

*Canis* **domeykoanus** Philippi (*Dusicyon*).

COQUIMBO

*Camelus* **vicugna** Molina (*Vicugna*); mountains of Coquimbo and Copiapo.
*Chinchilla* **velligera** Prell.
*Desmodus* **d'orbignyi** Waterhouse.
*Mus* **cyanus** Molina (*Spalacopus*).
*Mus* **darwini** Waterhouse (*Phyllotis*).
*Mus* **longipilis** Waterhouse (*Akodon*).
*Poephagomys ater* Cuvier (*Spalacopus*).

CURICO (vicinity of)

*Octodon* **bridgesi** Waterhouse.

HERMITE ISLAND (Cape Horn Islands)

*Euneomys* **ultimus** Thomas.

ILLAPEL

*Mus agilis* Philippi (*Oryzomys*).
*Mus diminutivus* Philippi (*Oryzomys*).
*Mus landbecki* Philippi (*Akodon*).
*Mus illapelinus* Philippi (*Phyllotis*).

JUAN FERNANDEZ ISLAND

*Otaria philippii* Peters (*?Arctocephalus*).
*Phoca ansoni* Desmarest (*Mirounga*).
*Phoca ansonina* Blainville (*Mirounga*).
*Phoca elephantina* Molina (*Mirounga*).
*Phoca* **leonina** Linnaeus (*Mirounga*).

LAKE LLANQUIHUE (west side at "Nueva Braunau")

*Canis* **maullinicus** Philippi (*Dusicyon*).

LA LIGUA (Province of Aconcagua)

*Mus pernix* Philippi (*Oryzomys*).
*Mus platytarsus* Philippi (*Phyllotis*).

La Serena (Province of Coquimbo)
*Mus griseoflavus* Philippi (*Phyllotis*).

Limache (Province of Valparaiso)
*Myotis chiloensis* **arescens** Osgood.

Linares (Cordillera)
*Ctenomys chilensis* Philippi.

Madre de Dios Island (Trinidad Channel)
*Hesperomys coppingeri* Thomas (*Oryzomys*).

Magellan (Straits of)
*Canis* **griseus** Gray (*Dusicyon*).
*Canis* **magellanicus** Gray (*Dusicyon*); Port Famine.
*Canis patagonicus* Philippi (*Dusicyon*).
*Capreolus leucotis* Gray (*Hippocamelus*); Port Famine.
*Conepatus* **humboldtii** Gray.
*Ctenomys* **magellanicus** Bennett; Port Gregory.
*Mephitis patagonica* Lichtenstein (*Conepatus*).
*Mus* **magellanicus** Bennett (*Oryzomys*); Port Famine.
*Oxymycterus* **lanosus** Thomas (*Akodon*); Monteith Bay.
*Phoca* **flavescens** Shaw (*Otaria*).
*Reithrodon* **chinchilloides** Waterhouse (*Euneomys*); south shore near east entrance.

Mas Afuera Island
*Otaria argentata* Philippi (*?Arctocephalus*).

Maule (Province of)
*Mus atratus* Philippi (*Akodon*).
*Mus* **boedeckeri** Philippi (*Phyllotis*); Coroney Ranch.
*Mus glaphyrus* Philippi (*Oryzomys*); Coroney Ranch.
*Mus maulinus* Molina (unidentifiable).
*Mus melaenus* Philippi (*Oryzomys*).
*Mus* **microtis** Philippi (*Notiomys*).

Maule (Lake; Province of Talca)
*Ctenomys* **maulinus** Philippi.

Melinka (Guaiteca Islands)
*Reithrodon* **longicaudatus** Philippi (*Irenomys*).

Mocha Island
*Akodon longipilis* **castaneus** Osgood.
*Mus* **mochae** Philippi (*Akodon*).
*Notiomys valdivianus* **bullocki** Osgood.

Nahuelbuta (Sierra)
*Akodon longipilis* **apta** Osgood.
*Felis concolor* **araucanus** Osgood.
*Phyllotis darwini* **fulvescens** Osgood.

Nirehuao (Rio)
*Notiomys valdivianus* **bicolor** Osgood.

O'Higgins (Province of)
*Mus ruficaudus* Philippi (*Akodon*).

Olmue (Province of Valparaiso)
*Octodon* **lunatus** Osgood.

OSORNO

*Aconaemys* **porteri** Thomas.
*Mus osorninus* Philippi (*Rattus*).
*Mus xanthopus* Philippi (*Akodon*).

PAIGUANO (Province of Coquimbo)

*Marmosa elegans* **coquimbensis** Tate.

PEINE (Province of O'Higgins)

*Mus dichrous* Philippi (*Phyllotis*).
*Mus lepturus* Philippi (*Akodon*).
*Mus saltator* Philippi (*Oryzomys*).
*Mus segethi* Philippi (*Phyllotis*).
*Oxymycterus niger* Philippi (*? Notiomys*).

PETEROA (Cordillera in Province of Curico)

*Mus peteroanus* Philippi (*Oryzomys*).

PICA (Province of Tarapaca)

*Ctenomys* **robustus** Philippi.

PINO HACHADO PASS (Chilean-Argentine boundary)

*Lagidium* **sarae** Thomas and St. Leger.

PUENTE ALTO (Province of Santiago)

*Octodon degus clivorum* Thomas.

PUERTO MONTT

*Canis torquatus* Philippi (*Dusicyon*).
*Mus brevicaudatus* Philippi (*Akodon*).
*Mus fonckii* Philippi (*Akodon*).
*Mus saltuum* Philippi (*Rattus*).

PUNTA ARENAS (Province of Magallanes)

*Hesperomys* **michaelseni** Matschie (*Notiomys*).
*Mus* **pachycephalus** Philippi (*Reithrodon*).
*Oxymycterus* **delfini** Cabrera (*Notiomys*).
*Reithrodon cuniculoides obscurus* Allen.

QUILLOTA (Province of Valparaiso)

*Felis pajeros huina* Pocock; near Lake Catapilco.
*Grison furax melinus* Thomas.

QUINTERO (Lake; Province of Valparaiso)

*Hesperomys* **megalonyx** Waterhouse (*Notiomys*).

QUIRIHUE (Province of Maule)

*Mus cauquenensis* Philippi (*Rattus*).
*Spalacopus cyanus* **maulinus** Osgood.

RIESCO ISLAND (Est. Ponsonby)

*Ctenomys magellanicus* **dicki** Osgood.

RIO COLORADO (Province of Malleco)

*Ctenomys maulinus* **brunneus** Osgood.

SAN PEDRO DE ATACAMA (Province of Antofagasta)

*Hesperomys* **dolichonyx** Philippi (*Akodon*).
*Hesperomys glirinus* Philippi (*Phyllotis*).
*Hesperomys lanatus* Philippi (*Phyllotis*).
*Hesperomys* **puerulus** Philippi (*Eligmodontia*).
*Vespertilio atacamensis* Lataste (*Myotis*).

SANTIAGO (Province of)

*Mus brachytarsus* Philippi (*Akodon*).
*Mus dasypus* Philippi (unidentifiable).
*Mus fusco-ater* Philippi (*Akodon*).
*Mus germaini* Philippi (*Akodon*).
*Mus megalotis* Philippi (*Phyllotis*).
*Mus melanonotus* Philippi and Landbeck (*Phyllotis*).
*Mus mollis* Philippi (*Phyllotis*).
*Mus vinealis* Philippi (*Akodon*).
*Myoxus getulus* Poeppig (*Octodon*).
*Sciurus* **degus** Molina (*Octodon*).

SANTIAGO (Cordillera)

*Canis* **culpaeus** Molina (*Dusicyon*).
*Felis* **puma** Molina.
*Lepus* **viscacia** Molina (*Lagidium*).
*Mus aethiops* Philippi (*Rattus*).
*Mus* **andinus** Philippi (*Akodon*).
*Mus exiguus* Philippi (*Oryzomys*).
*Mus senilis* Philippi (*Akodon*); Valle del Yeso.
*Mus trichotis* Philippi (*Akodon*).

SERENA (Province of Coquimbo)

*Mus coquimbensis* Philippi (*Rattus*).
*Mus griseoflavus* Philippi (*Phyllotis*).

TALCAREGUE (Province of Colchagua)

*Mus nigribarbis* Philippi (*Oryzomys*).

TIERRA DEL FUEGO

*Akodon* **francei** Thomas; Santa Maria, near Porvenir.
*Canis* **lycoides** Philippi (*Dusicyon*).
*Ctenomys* **fueginus** Philippi; "östlichen Insel."
*Mus infans* Philippi (*Akodon*).
*Mus* **xanthorhinus** Waterhouse (*Akodon*); Hardy Peninsula.
*Reithrodon* **chinchilloides** Waterhouse (*Euneomys*); near eastern entrance, Straits of Magellan.
*Reithrodon cuniculoides flammarum* Thomas; Spring Hill.

TALTAL (Province of Antofagasta)

*Mus capito* Philippi (*Phyllotis*); "Hueso Parado."

TARAPACA (Province of)

*Lagidium lutescens* Philippi; between Copacoya and Inacaliri.
*Lagotis* **cuvieri** Bennett (*Lagidium*).

TOLHUACA (Province of Malleco)

*Notiomys valdivianus araucanus* Osgood.

UNION (Province of Valdivia)

*Didelphys* **australis** Philippi (*Dromiciops*).
*Mus* **tarsalis** Philippi (*Irenomys*).

VALDIVIA (Province of)

*Canis trichodactylus* Philippi (*Dusicyon*).
*Didelphys* **soricina** Philippi (*Marmosa*).
*Felis* **guigna** Molina.
*Mus amblyrrhynchus* Philippi (*Oryzomys*).

VALDIVIA (Province of)—*continued*

*Mus commutatus* Philippi (*Oryzomys*).
*Mus dumetorum* Philippi (*Oryzomys*).
*Mus longibarbus* Philippi (*Akodon*).
*Mus nemoralis* Philippi (*Akodon*).
*Mus* **philippii** Landbeck (*Oryzomys*).
*Oxymycterus* **valdivianus** Philippi (*Notiomys*).
*Vespertilio gayi* Lataste (*Myotis*).

VALLENAR

*Abrocoma murrayi* Wolffsohn.

VALPARAISO (vicinity of)

*Abrocoma cuvieri* Waterhouse.
*Canis amblyodon* Philippi (*Dusicyon*).
*Didelphis* **elegans** Waterhouse (*Marmosa*).
*Didelphis hortensis* Reid (*Marmosa*).
*Felis* **colocola** Molina.
*Felis guigna* **molinae** Osgood.
*Mus* **cyanus** Molina (*Spalacopus*).
*Mus leptodactylus* Philippi.
*Mus* **longicaudatus** Bennett (*Oryzomys*).
*Mus* **olivaceus** Waterhouse (*Akodon*).
*Octodon cumingii* Bennett.
*Otaria fulva* Philippi.

VILLA PORTALES (Province of Cautin)

*Notiomys connectens* Osgood.

NO EXACT LOCALITY

*Auchenia guanaco* Meyen (*Lama*).
*Camelus huanacus* Molina (*Lama*).
*Canis albigula* Philippi (*Dusicyon*); central provinces.
*Canis vulpes chilensis* Kerr (*?Dusicyon*).
*Canis rufipes* Philippi (*Dusicyon*).
*Capra* **pudu** Molina (*Pudu*).
*Cavia minimus* Molina.
*Cervus chilensis* Gay and Gervais (*Hippocamelus*).
*Cervus humilis* Bennett (*Pudu*).
*Conepatus laticaudata* Geoffroy.
*Cricetus chinchilla* Fischer (unidentifiable).
*Equus* **bisulcus** Molina (*Hippocamelus*).
*Eriomys pellionum* Van der Hoeven (unidentifiable).
*Grison vittata chilensis* Nehring.
*Guillinomys chilensis* Lesson (unidentifiable).
*Habrocoma helvina* Wiegmann (*Abrocoma*).
*Lagidium crassidens* Philippi.
*Lutra californica* Gray.
*Lutra chilensis* Bennett.
*Mephitis dimidiata* Fischer (*Conepatus*).
*Mephitis furcata* Wagner (*Conepatus*).
*Mephitis molinae* Lichtenstein (*Conepatus*).
*Mus* **coypus** Molina (*Myocastor*).
*Mus fusco-ater* Philippi (*Akodon*).
*Mus infans* Philippi (*Akodon*).
*Mus laniger* Molina (unidentifiable).
*Mus macronychos* Philippi (*Akodon*); central provinces.

NO EXACT LOCALITY—*continued*

*Mus melanizon* Philippi (*Akodon*).
*Mus melanotus* Philippi (*Phyllotis*).
*Mus nasica* Philippi (*Akodon*).
*Mus* **philippii** Landbeck (*Oryzomys*).
*Mus subrufus* Philippi (*Rattus*).
*Mustela* **cuja** Molina (*Grison*).
*Mustela* **felina** Molina.
*Mustela quiqui* Molina (*Grison*).
*Myopotamus coypus albomaculatus* Fitzinger (*Myocastor*).
*Octodon cumingii* Bennett.
*Otaria chilensis* Müller.
*Otaria chonotica* Philippi.
*Otaria leucostoma* Philippi (*?Arctocephalus*).
*Otaria rufa* Philippi.
*Oxymycterus scalops* Gay (*Notiomys*); central provinces.
*Phoca chilensis* Kerr (*?Mirounga*).
*Phoca lupina* Molina (*?Arctocephalus*).
*Phoca molinaii* Lesson (unidentifiable).
*Phoca porcina* Philippi (unidentifiable).
*Phoca tetradactyla* Schinz (*?Arctocephalus*).
*Psammoryctes noctivagus* Poeppig (*Spalacopus*).
*Sciurus* **degus** Meyen (*Octodon*).
*Spalacopus poeppigii* Wagler.
*Spalacopus* **tabanus** Thomas.
*Vespertilio capucinus* Philippi (*Histiotus*).
*Vesperus segethii* Peters (*Histiotus*).
*Viverra chilensis* Link (*Conepatus*).
*Viverra* **chinga** Molina (*Conepatus*).

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# INDEX

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