Mammals (exclusive of bats) of Belém, Pará, Brazil

RONALD H. PINE(*)

ABSTRACT

A complete list of the non-volant wild mammals believed to be now living in Belém, Para, Brazil and vicinity or which may have lived there within historic times is presented. The list includes 72 species: 9 opossums, 6 primates, 10 edentates, 1 rabbit, 3 introduced commensal rodents, 18 native rodents, 2 cetaceans, 17 carnivores, 1 manatee, 1 tapir, and 4 artiodactyls. Relevant synonomies, recognition characters and notes on taxonomy and natural history are provided. A non-technical key is included which is intended to be of especial use by non-mammalogists such as paramedical researchers.

INTRODUCTION

This paper deals with the Recent mammals of Belém, Brazil and its immediate vicinity. It is intended for use by anyone interested in the mammals of the area. This includes paramedical workers, parasitologists, naturalists who are non-mammalogists and mammalogists (both those who are unfamiliar with the South American fauna and specialists on South American mammals). For this reason, the paper may appear to be a strange amalgam of the elementary and the technical. If so, it may be merely because too many authors have devoted their attention to too circumscribed an audience. It seems to me that a publication of this kind should be of as much use to everyone as possible.

THE CITY OF BELÉM AND ITS MAMMALS

As a major city and important port providing access to and egress from the Amazon Basin, Belém has been visited by many naturalists and a number of mammals have been first described as being from the vicinity. In addition, Belém is the home of the Museu Paraense Emilio Goeldi *(Museu Goeldi)* which has sponsored a good deal of research on mammals. Several eminent mammalogists have been affiliated with this museum. A number of major laboratories which study wild mammals from a public health point of view are also located in Belém.

Considering the importance of the area from a mammalogical and paramedical standpoint, it is somewhat surprising that so little is known of the local fauna and that no really complete list of the mammals of this particular region has ever been attempted.

This paper tries to enumerate all the different kinds of wild mammals other than bats which have occurred in historic times where the city and its suburbs now stand. Some of these animals are unrecorded from the area but on the basis of zoogeographic considerations are presumed to have lived there prior to decimation by hunting and or by destruction of habitat by urbanization and agriculture. Other species, as yet unrecorded from the area, may still be found there. These are included in the key so that it will cover all predictable possibilities. The inclusion of a species in this account is not to be taken as *prima facie* evidence of its ever having occured in the Belém area. The converse is also true. The chiropteran fauna of Belém is presently under study by Charles O. Handley, Jr. of the Smithsonian Institution. His work, in conjunction with mine, will probably show Belém to have a larger mammalian fauna than any other locality on earth and more than many entire countries.

Some special problems were encountered in trying to enumerate the mammalian fauna of the area covered in this report. To begin with, to try to determine the original faunal composition of an area now mostly occupied by a major city has obvious difficulties. The fact that live animals and skins have long

(*) Mammal Identification Service, Smithsonian Institution, Washington, D. C.

been transported by water to the markets of Belém from a wide area of the Amazon basin is another problem. A number of mammals (especially monkeys) originally described as from the immediate vicinity of Belém were actually brought from far away and finally sold there. Some of these animals seem to have ended up in the zoo in Belém and certain uncritical workers may have taken this as evidence that they were from nearby.

Another special problem is provided by the terminology people have used in designating this locality. In the earlier scientific literature Belém [founded in 1615 according to Bates (1863a)] is most often called "Pará". Unfortunately, there is more than one town named "Pará" in Brazil (although the "others" are certainly of minor importance). "Pará" is also the name of a river (which apparently first bore the name) and of the state of which Belém is the capital. The state of Pará was once the largest state in Brazil. According to Bates (1863a) this state was approximately 800,000 square miles in area. Since 1853 *(op. cit.)* the size of the state has been greatly reduced. One can easily see that if the only indication of a specimen's provenance is "Pará" the exact locality can be a bit uncertain.

The mammals of Belém are part of the great fauna of the Amazon Basin. A goodly number of its inhabitants are arboreal and a relatively high number have prehensile tails, including certain opossums, monkeys, anteaters, a carnivore, and porcupines. Outside of the New World and the Australasian region, such prehensility is quite rare. Curiously, no gliding mammals are found in South America.

Marsupials are more abundant and varied in the Americas than the textbooks would have us believe. Although it is "common knowledge" that the only marsupial found outside of the Australian region is "the opossum", there are two families of marsupials in South America (the opossums are in one of these), 15 genera, and scores of species. In places the "biomass" of marsupials appears to be about equal to that of the rodents. When one takes this into account, along with the fact that one of the New World marsupials has recently extended its range to Canada and a number of other regions, the supposed competitive inferiority of marsupials in general comes into question. Incidentally, and contrary to popular belief, about half of the species *native* mammals in Australia are placentals. Marsupials do not make up the great majority of species.

By far, the bats are the most abundant mammals as individuals in tropical America. Their "biomass" may exceed that of all the other mammals combined.

Problems in South American Mammalian Taxonomy

The taxonomy of South American mammals is very poorly worked out. Most groups have never been critically revised. All we have for most genera is a confusing hodgepodge of original description of supposedly new kinds. The great majority of South American mammals have been named many times but nonetheless several undescribed and/or presently unrecognized species come to light every year. About as often as not. these are not turned up by mounting an expedition but by going through museum drawers containing "identified" specimens collected years ago (sometimes hundreds of examples of an unrecognized from may turn up in this way). This state of affairs comes as a surprise to laymen (and to most zoologists studying other groups of animals-most of which are even *more* unknown). Although most accept it as a matter of course that chemists can keep coming up with new compounds, physicists with new subatomic particles and astronomers with new heavenly bodies, for some reason, people tend to think that we have mammal classification all worked out. Even some of the most eminent taxonomists occasionally make this assumption. For example, Blackwelder (1967) has said that a statement attributed to G. G. Simpson "...appears to be the result of a mammal-centered viewpoint. All the species of mammals are known and a system of classification is in existence... This situation is by no means universal". Even if all the Recent mammals were known it would seem strange that Simpson (a paleontologist) would regard *all* the mammals as known.

It is a frequent source of frustration to non-taxonomists (and to taxonomists as well) who are concerned with studies on animals that the names and classifications they spend considerable time in learning are changed so frequently as a result of new taxonomic research. Although this frustration is certainly understandable, any active field of scientific research such as taxonomy cannot be expected to have its formulations remain static. Taxonomists, too, have trouble keeping up with the latest work in genetics, serology, virology or what have you.

Because the taxonomy of mammals is in a state of flux and will so remain so long as there is a science of taxonomy (and by the time it would take us to work everything out the animals will have evolved into something else) it is necessary for paramedical workers, parasitologists, ecologists, physiologists, etc. to deposit *each* of the specimens in their samples in a museum collection. Quite frequently, what looks like one species in the field and which is so regarded in the current literature turns out to be two or more species. The result is a sample of unknown composition which results in a problem which can never be rectified if the specimens have been discarded.

The following key, for recognizing mammals of the Belém region, should be used with the above discussion in mind.

The key and a discussion of keys in general

As far as I know, the following key is the only one ever written (at least for mammals) which attempts to do the following:

1.) Uses no technical language — to that untrained but literate children, paramedical workers *and* mammalogists may utilize it successfully.

2.) Utilizes only external characteristics so that a fresh specimen in the hand, a specimen preserverd in fluid *or* a specimen prepared as a "skin and skull" may be identified.

3.) Chooses characters that allow identification of individuals of virtually all ages-not just adults.

4.) Allows identification under the most primitive of field conditions hand lenses, microscopes, etc. are not needed. Dimensions are used rarely and then only when absolutely necessary so that the great bulk of specimens may be determined without use of even a ruler.

The key is a simple dichotomous one using Arabic numerals and "a"s and "b"s The idented keys favored by some specialists are confusing. Numbers in each couplet referring back to its antecedent are omitted here. I feel that this convention, which supposedly is a great help in reading a key in reverse, confuses more than it helps. If something seems to have gone wrong in an attempt to identify an organism with the present key the person may read up the column to find out where he went wrong.

This is an "unnatural" key. Some feel that a key should be "natural", *i.e.* that it is the proper function of a key to reflect relationships or that it should use only taxonomically or phylogenetically significant characters. The sole function of a key should be as an aid in identification. Any attempt to try to make it do more will almost certainly make it less usable.

Keys should be written by studying specimens of the animals in question and trying to find the best (usually previously unused) diagnostic characters. Many keys are constructed by digging through the literature and taking a little from this place and a little from that. Such keys are seldom useful. The new key should then be tried out on people who are unfamiliar with the animals and/or zoologically naive to see how it works in practice. This is the best way to pick up errors and ambiguities.

It is hoped that the following key may serve as a model for construction of keys by other workers so that new ones will be more universally usable-and not of use to virtually no one but mammalogists (as is the case with keys now extant).

Although some might say that a key such as the one presented here cannot be constructed for large geographical areas I am convinced this is not the case. Problems

which cannot be solved otherwise can usually be eliminated by introducing zoogeographical considerations but this should be avoided except as a last resort.

Although this paper tries to facilitate identifications of juveniles in addition to adults, special difficulties will be encountered in some cases if the animals are quite young. In these cases, it is helpful to know that one is, indeed, dealing with a young animals. In general, young animals have disproportionately large heads and feet.

KEY TO THE MAMMALS OF BELÉM OTHER TAN BATS

1a.) With wings ..... bats (not covered in this key)
1b.) Without wings 2
2a.) External hind limbs lacking 3
2b.) External hind limbs present 5
3a.) With beak 4
3b.) Without beak ..... *Trichechus inunguis*
4a.) "Fin" on back a mere ridge giving a hump-backed apperance. Rear teeth with a basal shelf instead of being of a simple conical shape ..... *Inia geoffrensis*
4b.) Fin on back high (somewhat like that of a shark) with an overhanging tip. All teeth, including rear ones, of a simple conical shape ..... *Sotalia fluviatilis*
5a.) Back covered by a bony shell with horny plates 6
5b.) Back covered with hair, bristles or spines but without a shell 10
6a.) Tail covered with bony armor with horny surfaces. Plates on basal portion of tail forming definite rings of armor 7
6b.) Tail without plates of bony armor although horny scales are present .. *Cabassous unicinctus*
7a.) With long, coarse (always white?) hairs growing from body shell. Head shield separated from body shell by a partial collar of bony plates rather than by an expanse of loose skin ..... *Euphractus sexcinctus*
7b.) Body shell without long coarse hairs although on close inspection minute hairs can be seen. An expanse of flexible skin between head shield and body shell 8
8a.) With a patch of enlarged, projecting knife-blade-like plates of armor on hind legs .... *Dasypus kappleri*
8b.) Scales on hind leg somewhat variable in size and shape but no such patch of enlarged scales present 9
9a.) Number of *completely* movable bands in body shell seven or less *Dasypus septemcinctus*
9b.) Number of *completely* movable bands in body shell eight or more.. *Dasypus novemcinctus*
10a.) Five toes on hind foot. First toe (corresponding in position to human "big toe") somewhat set off from the others and without a claw or nail. In each side of upper jaw there are five small peglike teeth in front of a much larger dagger-like tooth (the canine tooth) 11
10b.) Less than five toes on hind foot or if there are five, all of them have claws and/or nails. Never more than three teeth in front of canine (any or all of these teeth including the canine may be absent) 19
11a.) Hind foot heavily webbed. Back with striking pattern of dark midline stripe and saddle-like blotches ..... *Chironectes minimus*
11b.) Hind foot not webbed. No such pattern of saddles present 12
12a.) With three longitudinal black stripes running down back ..... *Monodelphis americana*
12b.) Back unmarked 13

13a.) With pronounced pale spots above eyes strongly contrasting with surrounding darker coloration 14
13b.) No such spots present 15
14a.) Tail furred above and below for considerable distance past anus ..... *Philander opossum*
14b.) Tail essentially naked below from anus to tip ..... *Metachirus nudicaudatus*
15a.) With prominent *black* line running from middle of "forehead" to nose pad. Tail mottled ..... *Caluromys philander*
15b.) No such line present or if present ill-defined and incomplete and tail not mottled 16
16a.) Hair on back *coarse* and consisting of long, stiff guard hairs and shorter underhairs. Skin on tail black at base becoming *abruptly* pinkish white or yellowish farther from body ..... *Didelphis marsupialis*
16b.) Hair on back soft with all hairs essentially of one type. If tail is not plain-colored then markings tend toward irregular mottlings 17
17a.) Basal haired portion of tail longer than naked sole of hind foot (including toes). Fur woolly. Tail with mottling, the light areas tending to predominate toward tip *Marmosa cinerea*
17b.) Basal haired portion of tail about same length as naked sole of foot (including toes) or less. Fur more velvety than woolly. Tail without markings or with scattered light spots which show little or no tendency to predominate toward tip 18
18a.) Haired basal portion of tail about as long as or virtually as long as naked sole of foot including toes. Midventral region and cheeks buffy or pinkish ..... *Marmosa murina*
18b.) Haired basal portion of tail negligible, much shorter than naked sole of foot. Midventral region and cheeks immaculate *white* (except for inguinal area of female which tends toward maroon). White of belly surrounded by hair with pure gray bases no buffy or brownish mixed in) ..... *Marmosa parvidens*
19a.) Front feet with two to three toes These terminated by enormously enlarged claws (as opposed to nails or hooves) 20
19b.) Front feet with more than three toes 22
20a.) All four feet with three toes ..... *Bradypus infuscatus*
20b.) Front feet with two toes 21
21a.) Tail approximately same length as head and body length ..... *Cyclopes didactylus*
21b.) Tailless or virtually so ..... *Choloepus didactylus*
22a.) Hind feet with three toes 23
22b). Hind feet with more than three toes 27
23a.) Only one tooth (on each side) above and below in the front of the mouth 24
23b.) More than one tooth (on each side) above and below in the front of the mouth 25
24a.) Tail present but very short, its length three or more times its width. Free portions of hind toes considerably longer than nails ..... *Dasyprocta prymnolopha*
24b.) Position of tail indicated by a mere button-like patch of naked skin. Free portions of hind toes about same length as or shorter than nails ..... *Hydrochoeris hydrochaeris*
25a.) Longest hairs between ears much shorter than ears ..... *Tapirus terrestris*
25b.) Longest hairs between ears as long as or longer than ears 26
26a.) With narrow pale "collar" aroud the "neck". Hair of lower jaw not contrastingly paler than on adjacent areas ..... *Tayassu tajacu*
26b.) No pale "collar" around "neck". Lower jaw covered with white hairs ..... *Tayassu pecari*
27a.) Feet with hooves 28
27b.) Feet without hooves 29
28a.) Hairs tipped with buffy. Creamy stripe over eye ..... *Mazama gouazoubira*
28b.) Hairs not tipped with buffy. No creamy stripe over eye ..... *Mazama americana*

29a.) Without teeth 30
29b.) With teeth 31
30a.) Tail covered all the way to tip with exceedingly long coarse hair *Myrmecophaga tridactyla*
30b.) Tail covered with short hairs at base but scaly and becoming virtually naked toward tip ..... *Tamandua tetradactyla*
31a.) First toe (corresponds in position to "big toe" of humans) with human-like flat nail rather than claw 32
31b.) All toes on hind foot with claws 37
32a.) All toes except for first (which has a flat nail) with claws. Color solid black except for buffy bands on otherwise black hairs of *lower* back ..... *Saguinus tamarin*
32b.) All toes with nails (these nails may superficially resemble claws-being much more highly arched than human nails). Color pattern not as given in 32a 33
33a.) Underside of tail near tip with naked patch of friction ridges ..... *Alouatta belzebul*
33b.) Underside of tail completely furred 34
34a). Bearded and with "bowl-haircut" or "bangs" with "part" on crown. Tail bushy as in foxes ..... *Chiropotes satanas*
34b.) Not bearded. Without "bowl-haircut", "bangs" or "part". Tail furred but not bushy .. 35
35a.) *Skin* on face white except for a roughly circular area around nostrils and mouth where it is black ..... *Saimiri sciureus*
35b.) Skin on face more or less of one color 36
36a.) Fur woolly. Eyes enormous, reminiscent of those of an owl. No black cap on top of head although black lines may be present ..... *Aotus trivirgatus*
36b.) Fur not at all woolly, rather long, straight and somewhat coarse. Black cap of fur on top of head. Eyes not strikingly large for a monkey ..... *Cebus apella*
37a.) More than one front tooth on each side of lower jaw 38
37b.) Only one front tooth on each side of lower jaw 53
38a.) Five toes on hind foot 39
38b.) Four toes on hind foot 46
39a.) Feet completely webbeb 40
39b.) Feet not completely webbed 41
40a.) Tail with prominent flange or keel on each side ..... *Pteronura brasiliensis*
40b.) Tail without prominent flange or keel on sides ..... *Lutra enudris*
41a.) Eyes (but not muzzle) contained inside black "mask" (shaped similarly to the domino variety) ..... *Procyon cancrivorus*
41b.) Face may be black but is not masked as described above 42
42a.) With large, almost naked glandular areas at corners of mouth and on throat ... *Potos flavus*
42b.) Such large glandular areas not present 43
43a.) Face and underside of neck black-separated from grizzled mantle covering dorsal surface by cream-colored line ..... *Galictis vittata*
43b.) Markings otherwise 44
44a.) Dark rings around tail ..... *Nasua nasua*
44b.) Tail not ringed 45
45a.) Chestnut brown above, with a prominent mid-ventral stripe of the same color. Rest of the belly orangish tan ..... *Mustela africana*
45b.) Ventral surface a solid color (gray or black) except for throat and/or upper chest which may bear a creamy colored patch ..... *Eira barbara*

46a.) Doglike. Claws non-retractile. Tail bushy or if not bushy then only about as long as head 47
46b.) Catlike. Claws retractile. Tail may be somewhat fluffy but not bushy. Tail much longer than head 49
47a.) Tail long and bushy; coat with soft underfur in addition to stiff hairs 48
47b.) Tail short (about same length as head) and not bushy; coat coarse with no soft underfur ..... *Speothos venaticus*
48a.) With short crisp fur colored so as to give a "salt and pepper" effect above and below ..... *Atelocynus microtis*
48b.) With longer (German shepherd-like) fur. Belly fur of a solid pale color, not with "salt and pepper" effect ..... *Dusicyon thous*
49a.) "Whiskers" growing from *solid* black patch. A *solid* withe patch between black patch and nose ..... *Felis concolor*
49b.) Not so marked 50
50a.) With stripes and/or spots on dorsal surface. Some of these markings should be faintly visible under *close* inspection even if the animal appears to be solid black. If more or less blackish, then fur without "salt and pepper" effect 51
50b.) No markings on dorsal surface. If mostly gray or black at least part of dorsal surface should present a "salt and pepper" appearance ..... *Felis yagouaroundi*
51a.) With stripes on back of neck 52
51b.) Only spots on back of neck ..... *Leo onca*
52a.) Hair on back of neck pointing backwards ..... *Felis tigrina*
52b.) Hair on back of neck pointing forward ..... *Felis pardalis* and *Felis wiedii* see discussion of former
53a.) With rows of white spots (some usually coalescing into stripes) on flanks ..... *Agouti paca*
53b.) No spots or stripes 54
54a.) Tail fluffy, much shorter than ears; soles of feet completely furred *Sylvilagus brasiliensis*
54b.) Tail much longer than ears or absent. Tail may be bushy but not fluffy. Soles of feet mostly naked 55
55a.) Tail bushy. Without spines on body ..... *Sciurus gilvigularis*
55b.) Tail not bushy or if it appears bushy, animal with spines 56
56a.) When viewed from the side there is a definite notch in the edge of the worn surface of the first upper tooth ..... *Mus musculus*
56b.) No such notch present 57
57a.) Spiny (or with quills) 58
57b.) Fur may be coarse but is not spiny 62
58a.) Four digits with claws on hind foot. Aditional toe absent or rudimentary *Coendou prehensilis**
58b.) All five digits well-developed and with claws 59
59a.) Tail rather well-haired with tip white. White "blaze" on top head .... *Echimys chrysurus*
59b.) Tail essentially naked. White markings described above absent 60
60a.) Area around "nose" chestnut-colored. Long hairs growing from tips of ears *Echimys armatus*
60b.) Area around "nose" not chestnut. Tips of ears without long hairs 61
61a.) Belly with hair of two kinds, straight guard hairs (of greater diameter) and softer, woolly underfur. Tail about as long as or longer than head and body ..... *Rattus rattus*
61b.) Belly hairs of variable diameter but straight and essentially all of the same type with no soft woolly underfur. Tail absent or shorter than head and body *Proechimys guyannensis*
62a.) Belly fur of but one type-no obvious division into straight guard hairs (of greater diameter) and soft woolly underfur 63

(*) Another species of *Coendou* is also present in the area - see accounts of species

62b.) Belly fur consisting of straight guard hairs(of greater diameter) and soft woolly underfur 68
63a.) Fur on throat immaculate white to the roots 64
63b.) Fur on throat not immaculate white. Tips of hairs may be white but they have dark bases 66
64a.) Gray patch on top of foot contrasting strongly with white toes ... *Rhipidomys mastacalis*
64b.) No such contrasting gray and white pattern on foot 65
65a.) Adults with total lengths in excess of 235 mm ..... *Oryzomys concolor*
65b.) Adults with total lengths less than 230 mm ..... *Oryzomys bicolor*
66a.) Ear with tuft of longer hair on inside surface near bottom edge. Tail about half as long as head plus body ..... *Zygodontomys lasiurus*
66b.) Inside of ear appears naked (actually covered with minute hairs of about the same length throughout-no tuft). Tail about as long as head and body 67
67a.) Fur on back short (less than 10 mm ..... *Oryzomys capito*
67b.) Fur on back long (more than 10 mm) ..... *Oryzomys macconnelli*
68a.) Entire naked sole of hind foot (including heel) covered with scales. Some scales on heel as large as those on tail ..... *Nectomys squamipes*
68b.) Rear portion of sole of foot more less smooth 69
69a.) Smaller, house mouse *(Mus musculus)*-sized ..... *Oryzomys delicatus*
69b.) Larger, house rat-sized 70
70a.) Chestnut-colored on flanks. Conspicuous hairs of various lengths in ears .... *Holochilus brasiliensis*
70b.) Of various grays and blacks and browns on flanks. Minute hairs in ears all of about the same length 71
71a.) Tail shorter than head plus body, tending to be bicolored (paler below). Temporal ridges on skull subparallel ..... *Rattus norvegicus*
71b.) Tail longer than head plus gody, tail dark above and below. Temporal ridges on skull strongly bowed outward ..... *Rattus rattus*

Annotated list of the mammals of Belém

The names listed in the synonomies are, almost without exception, the names used by autohrs who actually noted the presence of the animal in question in the vicinity of Belém. When this is not the case, there are other compelling reasons for their inclusion.

Caluromys philander philander (Linnaeus)

= *Calouromys phylander* [sic]: Travassos and Kloss (1958)

The arboreal woolly opossum appears to be common in Utinga (the forested area surrounding the city's waterworks). Judging by their description, the *"Didelphys cinerea"* of Goeldi and Hagmann (1904) appears to represent this species. Other records are listed by Miranda-Ribeiro (1936) from "Pará", Avila Pires (1958) and Carvalho and Toccheton (1969).

Statements have appeared in the literature tc the effect that the pouch is "rudimentary" or "vestigial" in the genus *Caluromys*. Examination of study skins seems to contradict this statement or to at least make it appear to be an exaggeration. Perhaps the lips of the marsupium do not completely close in the species of this genus. Study of fresh specimens or "alcoholics" which are carrying young should clear up this point. Judging from available study skins, *C. philander* may have the marsupium somewhat less developed than do other species of *Caluromys*.

Caluromys philander is the only mammal in the Belém area which has a mostly naked tail mottled with dark brown and cream and which has a dark stripe from the forehead to the nose.

The scrotum appears to be blue in the living animal. The woolly opossum is about as large as a medium-sized North American tree squirrel. It is considerably larger than the tree squirrel found in Belém, however.

Monodelphis americana americana (Müller)

= *Peramys tristriata*: Goeldi and Hagmann (1904)
= *Peramys americanus*: Thomas (1912)
= *Peramys americana*: Miranda-Ribeiro (1936)

This animal has been recorded from the vicinity of "Pará" by Goeldi and Hagmann (1904) and by Miranda-Ribeiro (1936). Specimens have been taken in Utinga and at the Instituto Agronomico do Norte near Belém. Carvalho and Toccheton (1969) reported it from Utinga. This opossum appears to be quite rare, extremely difficult to trap, or both.

This is the only mammal in the Belém area with three longitudinal stripes on its back. The tail is shorter than the head and body, and an adult is about the size of a house mouse. This animal resembles a shrew more than what most people think of as an opossum.

Marmosa cinerea cinerea (Temminck)

This opossum is common in Utinga. A female taken on 11 June was lactating but no embryos or attached young were present. Free-living immatures were taken during the first half of June. Carvalho (1969) has previously reported this animal from Utinga. Judging by their description the *"Didelphys cinerea"* of Goeldi and Hagmann (1904) was probably *Caluromys philander*. This is the largest member of the genus in the Belém area. Adults are about the size of Norway rats. This is the only *Marmosa* in the area which has a haired portion of the tail considerably longer than the naked sole of the foot. The fur is relatively long and woolly. The only noticeable markings on the face are black rings around the eyes. Adult females have an ochraceous inguinal area and the males have bicolored (slaty and pinkish-white) testes.

Young *Didelphis marsupialis* have very coarse hair and lack the prominent dark eye rings of *Marmosa cinerea*.

Marmosa murina murina (Linnaeus)

This murine opossum was trapped in Utinga where it is common. It has been previously reported from Belém by Avila Pires (1958) and Carvalho and Toccheton (1969). Dr. Charles O. Handley, Jr. trapped two females in Utinga on 24 August 1965. Both were carrying young = 35 mm CR.

In size this animal is comparable to a young black rat *(Rattus rattus)*. The belly tends to be rather pinkish, the inguinal area of an adult female tends toward maroon. The only markings on the face are the large black eye rings. The haired portion of the tail is approximately the same length as the naked sole of the hind foot or a bit less. The testes are solid black.

Marmosa parvidens Tate

Tate (1931a) named *Marmosa juninensis* from Perú and *Marmosa parvidens* from Guyana on the same page-each from but a single specimen. I have seen the holotypes of both and they are probably conspecific. In Tate's description of *M. juninensis* he compared it with *M. lepida* (Thomas) and *M. caucae ucayaliensis* Tate. He compared *M. parvidens* only with *lepida*. Later Tate (1933) put both *M. juninensis* and *M. parvidens* in his *"lepida* section" of the *"microtarsus* group". In 1939 he reported two additional specimens of *parvidens* from Venezuela and stated he was removing it from the "*murina* [!] group" and placing it in the "*fuscata* section" of the "*noctivaga* group". My studies have confirmed that Tate was correct in placing. *M. parvidens* in his "*fuscata* section" and they have shown that *parvidens*-like animals (these probably *are* all *parvidens*) occupy an extensive range in South America (Pine, *et al.*, 1970; Pine, 1972).

Direct comparisons of what is here called *M. parvidens* with the holotype of *M. emiliae* Thomas (1909) will probably reveal that *parvidens* is a junior synonym of *emiliae*.

This is the smallest species of *Marmosa* in the Belém area. *M. parvidens* is only slightly larger than *Mus musculus*.

Dorsally this opossum is dark grayish brown. In the Belém population there is always a mid-ventral strip of fur that is pure white to the roots. The only dark markings on the face are the black ey rings. The cheeks are white. The tail is essentially naked without any furred portion at the base.

This opossum appears to be rather uncommon in Utinga. A female taken 14 June 1968 contained 7 embryos = *ca.* 3 mm CR.

Specimens are also available from Serra do Navio in Amapá.

Philander opossum opossum (Linnaeus)

= *Didelphys opossum* : Goeldi and Hagmann (1904)
= [*Metachirops*] *o. opussum* [*sic*]: Carvalho (1957)

The gray "four-eyed" possum has been reported for Belém by Goeldi and Hagmann (1904), Carvalho (1957), Carvalho and Toccheton (1969) and Avila Pires (1958). It is common in Utinga. One female taken in Utinga 12 June was carrying 4 young (= 27 mm CR) in her pouch.

This opossum is the only mammal in the Belém region which has a slate-colored mask on the face with a large cream-colored spot over each eye and a tail haired all around for about the first two inches before it becomes naked. The basal portion of the naked part of the tails is black. The terminal portion is whitish or pinkish.

This animal is intermediate in size between *Caluromys philander* and *Didelphis marsupialis.*

Metachirus nudicaudatus nudicaudatus (E. Geoffroy St.-Hilaire)

Miranda-Ribeiro (1936) mentioned a specimen from "Pará".

Metachirus nudicaudatus (the brown opossum) occurs in Utinga where it appears to be uncommon. Individuals of this species which I livetrapped in the Mato Grosso had the peculiar habit of chattering their teeth while their cages were being handled.

This opossum has marked pale spots over the eyes and a tail that is naked below to its base.

Chironectes minimus minimus (Zimmermann)

= *Chironectes variegatus* : Pelzeln (1883)
= *Chironytes palmata* : Goeldi and Hagmann (1904)
= *Chironectes minimus* : Travassos and Kloss (1958)

Pelzeln (1883) reported the water 'possum from "Pará". Goeldi and Hagmann (1904) reported it from Ilha do Mosqueiro and Avila Pires (1958) from Ilha das Onças. The latter specimen is apparently the same one reported by Travassos and Kloss (1958). Miranda-Ribeiro (1936) also cited a specimen from Ilha das Onças as noted by Hershkovitz (1959a). Carvalho and Toccheton (1969) reported the species from Utinga and Ilha das Onças. Three immature individuals which died (or were killed) in captivity 21 July 1968 were originally taken at Barcarena *ca.* 23 km SWW Belém on the Rio Pará. A sight record was made at Mocambo [an area inside the *Instituto de Pesquisas e Experimentação Agropecuárias do Norte* (IPEAN) which is adjacent to the city of Belém] by Dr. Charles O. Handley, Jr. (personal communication). This individual, an immature, was chased for some distance along a path. Lainson and Shaw (1968) have also reported this animal from the lower Amazon. The above records are of interest since Hershkovitz (1969) questioned the occurrence of *Chironectes* in Amazon valley.

The water 'possum seems to be quite rare in the vicinity of Belém but perhaps its secretive aquatic and nocturnal habits make it appear much less common than is actually the case. In Middle America, bat collectors who set mistnets over streams encounter water 'possums much more frequently than collectors did in pre-mistnet days and it is now apparent trat the animals are more abundant than one might have supposed previously. In 1962 my field party took two *Chironectes* while bat netting at Yaxoquintela, 37 km NE Altamirano, Chiapas, México and we discovered that the local people (who were good naturalists in this remote area) were unaware of the existence of such a creature.

This is the only mammal in the Belém area with large dark gray or black middorsal saddles. There is also a black middorsal stripe. The ground color above is gray. The belly is pure white and the hind feet are heavily webbed.

This animal is intermediate in size between a cat and a large *Rattus norvegicus.*

Didelphis marsupialis marsupialis Linnaeus

= *Didelphys marsupialis*: Goeldi and Hagmann (1904)

This animal was reported from Belém by Miranda-Ribeiro (1936), Goeldi and Hagmann (1904) and from the "Vicinhança do Pará" by Ihering (1914). Carvalho and Toccheton (1969) mentioned its occurrence in Utinga. It is quite common in the area. This species has become an urban animal in the Belém area and may be more abundant in the town proper than in the forest. I have examined specimens from Utinga, Vileta Street and Piraya Street.

Females killed on 10 June, 11 June and 18 June showed the following evidence of reproductive state respectively, 12 embryos = 11 mm CR, 3 young in pouch, 6 young in pouch = 45 mm CR. Newly weaned immatures were taken during the same period.

This cat-sized marsupial lacks facial markings except for the presence of a poorly-defined dark line running from between the eyes to the crown of the head. The dorsal surface is covered with coarse hair and appears either gray or blackish. The tail is furred for a short distance at the base. The more basal part of the naked portion of the tail is black. The rest is white or pinkish.

Aotus trivirgatus trivirgatus (Humboldt)

= *Nyctipithecus Felinus* Spix (1823)
= *Nyctipithecus duruculi* Lesson (1840)
= [*Nyctipithecus*] *Azarae*: Meerwarth (1898)
= *Aotus infulatus*: Cruz Lima (1945)
= *Aotes infulatus*: Vieira (1955)
= *Aotes trivirgatus infulatus*: Hill (1960)

According to Spix (1823) *"Nous avons trouvé ce singe [Nyctipithecus Felinus] dans les environs de la capitale de Para et le conservâmes long-temps dans notre menagérie ou il mangeoit du riz"*. Since Spix mentioned no other localities, the vicinity of Belém may be taken as the type locality for *felinus*. Vieira (1955) recorded this animal from Belem. Wallace (1853) stated that *Nyctipithecus trivirgatus* is not found on the lower Amazon, and Cruz Lima (1945) mentioned its presence in the vicinity of the city.

Certain authors such as Hill (1960), Carvalho (1960) and Carvalho and Toccheton (1969) regarded *A. t. infulatus* (Olfers) as a subspecies distinguishable from the nominate form of the owl monkey and would include Belém within its range. Cabrera (1958) and Hershkovitz (1959a) felt otherwise. For reasons which are more than somewhat obscure, Hill *(op. cit.)* listed [*Nyctipithecus*] *duruculi* Lesson as a synonym of *A. t. trivirgatus* rather than of *"Aotus t. infulatus"* although he correctly noted the type locality of *duruculi* is "Pará". No part of the range of *A. t. trivirgatus* is shown as included in the state of Pará in Hill's map.

Elliott (1913b) gave Kuhl as the authority for the name *Callithrix infulatus* and gave Pará as the type locality Kuhl gave no type locality (but merely wrote "in Brasilia rarus") and gave Lichtenstein as the authority for the name. Hershkovitz (1959) stated the name is attributable to Olfers and that the type was from Brazil.

This nocturnal monkey is considerably smaller than a house cat and is readily recognizable owing to its enormous eyes.

Chiropotes satanas satanas (Hoffmannsegg)

= *Cebus Satanas* Hoffmannsegg (1807)
= [*Pithecial*] *satanus*: Meerwarth (1898)

Pelzeln (1883) reported the bearded saki from "Pará". Hoffmannsegg first reported it from the "Nachbarschfat der Stadt *Pará* in Brasilien". Hill (1960) gave localities in his text which surround Belém although his range map unaccountably shows the easternmost extension of range toward Belém to be Capim Elliot (1913a) also reported this monkey from Belém Cruz Lima (1945) wrote it "... coud be found, at least until very recently, in regions relatively near the city of Belém..." See also Miranda-Ribeiro (1940).

This remarkable monkey is about as large as a small house cat. The hair of the shoulders and back range "from blackish brown to dark reddish chestnut... this color sometimes extending to the upper part of the limbs" according to Cruz Lima (1945). The rest of the animal is black. In adults there are pronunced "bangs" with some evidence of a part in the

middle and a black beard (but no mustache). The tais is bushy somewhat as in foxes and this character alone will identify immature individuals which lack the beard and are "dull ochraceous chestnut, which is darker in those parts which in the adults are black" (Cruz Lima, *op. cit.*).

Alouatta belzebul belzebul (Linnaeus)

= [*Mycetes*] *belzebul*: Meerwarth (1898)
= *Alouata* [*sic*] *Belzebul*: Goeldi and Hagmann (1904)
= *Mycetes beelzebub*: Wallace (1853)
= *Mycetes beelzebub*: Wallace (1854)

Wallace (1853, 1854) reported this howler monkey "in the vicinity of Pará". Meerwarth (1898) also reported it from "Pará". Judging from the context, he seems to have been referring to the state rather than the city. Belém is included within the range of the form in his range map. Ihering's (1914) range map indicates that this animal once lived in Belém also. Hill's (1960) map and range as described verbally agree in including Belém and he gave nearby localities of occurrence. See also Goeldi and Hagmann (1904) and Cabrera (1958).

This is a large monkey which is totally blackish in appearance except for the hands, feet and terminal portion of the tail which are some shade of brownish or rufous. The tail is prehensile with a naked pad on its terminal ventral portion.

Cebus apella apella (Linnaeus)

Hill (1960) included Belém within his range map for this capuchin and gave nearby locality records. Meewarth (1898) stated that this monkey is not found south of the Amazon (see also Schlegel, 1876). Carvalho (1957) stated he had seen it "nos arredores de Belém". Differing ideas concerning the identity of *Cebus apella* and the populations of monkeys to be considered conspecific with it may have something to do with the origin of these contradictions.

This animal is probably not found very close to the city at the present time.

This is the only monkey in the Belém area with a prehensile tail without a naked friction pad. There is a blackish "cap" on top of the head. Tre animal is tawny with a darkening toward black of the extremities as one progresses distally. There is no pronunced beard and although the tail is well haired it is not bushy.

Saimiri sciureus sciureus (Linnaeus)

= *Chrysothrix sciurea*: Pelzeln (1883)
= [*Saimiri*] *sciureus*: Meerwarth (1898)
= *Saimiris* [*sic*] *sciureus*: Böker (1932)
= *Saimiri sciurea sciurea* Hill (1960)

I have seen a specimen taken in 1965. Data on the tag read "Murutucum" IPEAN, Belém.

Cruz Lima (1945) reported this squirrel monkey from the vicinity of Belém. Earlier, Pelzeln reported it from "Pará". Carvalho and Toccheton (1969) have reported it from Utinga as did Böker (1932). Hill (1960) gave localities on the Belém-Bragança railroad and Rio Guamá and said it lives in the vicinity of Belém. His range map, howewer, does not show the range as coming as far east as the Tocantins. Dr. Richard W. Thorington, Jr. informs me (personal communication) that specimens from "Belém, Pará" and Utinga are in the São Paulo Museum. Free ranging (re-introduced ?) groups may be seen on the grounds of the *"Museu Goeldi"* and in the *"Bosque"* in Belém.

This monkey is about the size of *Saguinus tamarin* or a reasonably large tree squirrel (which means it is much larger than *Sciurus aestuans* which is a rather small tree squirrel). The face has a characteristic black and white pattern. The skin of a circular area including the nose and mouth is black, the remainder of the face is white. The hair on top of the head forms a grayish "widow's peak". The ears are white and tufted. Dorsal coloration varies from grayish and olivaceous to ochraceous. The terminal portions of the limbs are rusty-colored and the tip of the tail is black. The tail is not prehensile.

Saguinus tamarin tamarin (Link)

= *Saguinus Ursula* Hoffmansegg (1807)
= *Midas ursulus* : Kuhl (1820)
= *Midas ursulus* : Bates (1863a)
= *Midas ursulus* : Pelzeln (1883)
= [*Hapale*] *ursula* : Meewarth (1898)
= *Midas ursulus* : Goeldi and Hagmann (1904)
= *Cercopithecus ursulus* : Elliot (1913a)
= *Marikina* (*Tamarin*) *tamarin tamarin* : Vieira (1955)
= *Leontocibus* [*sic*] *tamarin* : Travassos and Kloss (1958)
= *Leontocebus tamarin* : Avila Pires (1958)
= [*Leontocebus tamarin*] *tamarin* : Carvalho (1958)
= *Saguinus t.* [*amarin*] *tamarin* : Carvalho and Toccheton (1969)
= *Saguinus midas niger* : Hershkovitz (1969)

I here follow Carvalho and Toccheton (1969) in the usage of the trinomial *Saguinus tamarin tamarin.* Hershkovitz (1969) used the combination *"Saguinus midas niger"* for this animal but without explanation.

This tamarin has been reported many times from the vicinity of Belém and still occurs there. Cruz Lima (1945) said it had occurred in the suburbs of the city "... up to a short time ago..." One specimen was taken in Utinga in June of 1968. Another had been taken in "Belém" in January, 1965. Other recent mention of the animal in the vicinity are Carvalho and Toccheton (1969) and Thorigton (1969).

Wallace (1852) stated this animal was to be found only in the "district" of Pará. Cabrera (1958) wrot that Wallace's statement constituted a designation of type locality to "Pará". Avila Pires (1958) interpreted Wallace's comment as a designation of the city of Belém as the type locality. It seems clear that Wallace did not formally designate a type locality but was merely delimiting the geographic range as known to him. The first actual restriction of type locality was made by Avila Pires.

Elliot (1913a) gave the type locality of "*Cercopithecus ursulus* (Hoffmansegg)" as "Para, Lower Amazon".

This monkey is slightly small than *Saimiri sciureus.* The coloration is black except for on the lower back and rump which is mottled with ochraceous buff. All of the digits terminate in claws except for the first digit of the hind foot which bears a flat nail. The ears look as if the tops had been cut off with scissors.

Myrmecophaga tridactyla tridactyla Linnaeus

I know of no records of the giant anteater from near Belém. It is included here merely because it may have lived in that area at one time.

This animal attains the size of a quite large dog. The snout is enormously elongated although the mouth is quite small. Teeth are absent. There is a diagonal dark stripe bordered with white which runs from under the throat almost to the middorsal line. The hair is long and coarse, especially on the tail where it may reach a length of more than a foot (1 foot = 304.8 mm).

Tamandua tetradactyla tetradactyla (Linnaeus)

The tamandua anteater was reported for the vicinity of "Pará" by Goeldi and Hagmann (1904). Specimens from Utinga taken as late as 1955 and 1957 are in the *"Museu Goeldi"*. Apparently Carvalho and Toccheton (1969) do not recognize any subspecies of *T. tetradactyla* since they used a binomial in their discussion of specimens from the state of Pará.

This is a medium-sized anteater somewhat larger than a domestic cat. Teeth are absent and the snout is elongated as in the other anteaters. The torso is girdled with black and a black bar runs from the "girdle" up over each shoulder. The rest of the animal is buffy, including an incomplete buffy middorsal stripe. The tail is prehensile, mostly "naked" ("naked" areas have short bristles) and scaled.

Cyclopes didactylus didactylus (Linnaeus)

= *Cyclothurus didactylus* : Pelzeln (1883)
= *Cyclothurus didactylus* : Goeldi and Hagmann (1904)

Specimens taken in the suburbs of Belém during the period 1955-1958 are in tre Goeldi museum. Goeldi and Hagmann (1904) reported it from the vicinity of "Pará" and Pelzeln (1883) had earlier reported it from "Pará". Carvalho and Toccheton (1969) reported it from "Belém (Marambaia)".

The silky (or "two-toed") anteater is the only mammal in tropical America which has evidence of but two digits on each forelimb

and a long tail. In size this arboreal anteater is similar to a black rat *(Rattus rattus).* The fur is usually rather golden, is silky and frequently somewhat irridescent. The tail is prehensile and completely haired except for a ventral naked friction pad.

Bradypus infuscatus marmoratus (Gray)

= *Arctopithecus flaccidus* var. 2 Gray (1849)
= *Arctopithecus problematicus* Gray (1849)
= *Arctopithecus flaccidus* var. 2. Smithii Gray (1869)
= *Bradypus* [*Arctopithecus*] *marmoratus*: Goeldi and Hagmann (1904)
= *Bradypus tridactylus*: Carvalho (1960)
= *Bradypus tridactylus*: spp.: Carvalho and Toccheton (1969)

Cabrera (1958) suggested "Pará" as the type locality of this form. Gray's original description merely listed the "Brazils" as country of origin. Gray's descriptions of "*Arctopithecus flaccidus* var. 2" and *Arctopithecus problematicus* are based upon specimens from "Pará".

Although Hershkovitz (1969) gave no explanation for his views, he apparently concluded that there is but one species in what is now the subgenus *Bradypus.* Until this group is formally revised I prefer to regard the subgenus as polytypic.

One specimen from the *Instituto Agronomico do Norte* was taken in June of 1968. This three-toed sloth appears to be an article in the diet of the local people. At least my Brazilian collueagues cooked this one after its scientific potential had been utilized. It was quite palatable. Bates (1863b) also mentioned *Bradypus* being used as an article of diet. See also Wallace (1953) and Ferreira (1934). It would be interesting to know the extent to which this animal is purposely hunted.

It is a widespread belief that the three-toed sloths will feed only on the leaves of *Cecropia.* That this is not so has been shown by Luederwaldt (1918) and Carvalho (1960). See also Menegaux (1908). There seems to be little doubt, however, that a much more than casual relationship exists between *Cecropia* and *Bradypus* (see Gmelin, 1788, and Menegaux, 1909). When Charles Elton was in Belém he told me that the *Cecropia* trees he had examined were full of ants and wondered what kind of protection *Bradypus* had against these insects. Bates (1863b) specifically mentioned the great numbers of stinging ants in a *Cecropia* inhabited by a *Bradypus* and Ihering (1907) stated that three-toed sloths are not bothered by the ants in *Cecropia* trees. It seems to me that the peculiar coarse outer fur, dense underfur and thick skin of *Bradypus* should afford good protection from ants (see Ihering, 1907). It is interesting to note that the two-toed sloths (which do not appear to be associated with *Cecropia*) have naked palms and soles (which are apparently used as friction pads) along with a rather large, naked rhinarium. In *Bradypus,* the palms and soles are protected by hair and the hairless portion of the rhinarium is relatively much smaller. Beebe (1926) in a discussion of *Bradypus tridactylus* nothed the considerable swimming proclivities of this animal, observed that a swimming *Bradypus* floats rather high out of the water and attributed this buoyancy to the hair. He also felt the hair had considerable importance in camouflage. The combined protection offered by the peculiar fur, thick skin and peculiar basket-like ribcage (characterized by numerous flattened ribs and well-ossified sternal elements) which forms a strong but "springy" arrangement of bony rings must make it difficult to injure a three-toed sloth. Looked at in this way, the common distinction between the armored and unarmored Xenarthra loses some of its force. Beebe *(op. cit.)* noted that ants on *Cecropia* can sometimes annoy *Bradypus.* For a discussion of the status of certain cecropias as "ant-plants" see Wheeler (1910, 1942).

Bradypus infuscatus is the only mammal in the vicinity of Belém which has no external evidence of digits on the front feet other than three grotesquely long claws. The animal is virtually tailless and is about the same size as a domestic cat.

Choloepus didactylus (Linnaeus)

This two-toed sloth has been reported from the vicinity of Belém by Goeldi and Hagmann (1904). According to the locals it is less common (or at least more difficult to come by) than *Bradypus infuscatus*.

An adult female weighing 10300 gms. was taken in Utinga in June of 1968.

This is the only mammal in tropical America which has no external evidence of the presence of digits on the front feet other than two greatly enlarged claws and which is virtually tailless. Adults may be as large as a good-sized dog. The palms and soles appear manifestly naked — a condition different from that found in *Bradypus infuscatus*.

Euphractus sexcinctus sexcinctus (Linnaeus)

= *Dasypus setosus*: Goeldi and Hagmann (1904)

Thomas (1903) mentioned examples from "Pará". The context is such that the state would seem to be indicated rather than the city. He said later (1911) "... Para [*sic*] specimens... may be provisionally accepted as typical". Cabrera (1958) gave "Pará" as the type locality designated by Thomas.

I know of no certain record for Belém. Krumbiegel (1940) recorded the species from "Peixe bois". A small (young?) specimen of *Euphractus* received for identification from Dr. Francisco de Paula Pinheiro was taken at "km 9/ Est. Ferreira Gomes/T. Federal do Amapá-Amapá in 1972. This may represent the first record of the genus from north of the Amazon. Unfortunately, the skull of this specimen cannot be located.

This is the only armadillo to be expected from the Belém region which has long coarse hairs growing from the carapace. There are five toes on each front foot and the tail is completely covered with armor. This armadillo is about the same size as a large domestic cat.

Unlik some armadillos *Euphractus sexcinctus* may be capable of inflicting a rather nasty bite. A newly captured individual of this species which I observed in the Mato Grosso was capable of making deep impressions in pieces of wood with its teeth.

Cabassous unicinctus (Linnaeus)

= *Lysiurus unicinctus*: Goeldi and Hagmann (1904)

This armadillo occurred in the vicinity of Belém at least as late as 1901 (Goeldi and Hagmann, 1904).

These animals are largely fossorial. A living member of this genus which I observed in Mato Grosso state was incapable of building up appreciable speed on the surface of the ground and its attempts to make headway were somewhat reminiscent of those of a mole or pocket gopher under similar circumstances.

There are five toes on the front feet-some bearing enormously enlarged claws.

Dasypus kappleri kappleri Krauss

The occurrence of this armadillo in the vicinity of Belém has not been really documented as far as I know. Its inclusion here is owing to the ambiguous statement by Cabrera (1958) to the effect that its range consists of "Sur de Venezuela, Guyanas, y bajo Amazonas, hasta Pará, Brasil". Also Hamlett (1939) noted its presence in the lower Amazonian region.

This is a very large armadillo, as large as a middle-sized dog. It is the only armadillo with a completely armored tail which may occur in the Belém region that has a patch of greatly enlarged blade-like scales on each hind leg.

Dasypus novemcinctus novemcinctus Linnaeus

= *Tatusia novemcincta*: Goeldi and Hagmann (1904)

Goeldi and Hagmann reported this species from "matas do Pará". A specimen (n.° 939) from Belém labelled *"Tatusia novemcincta"* and represented by a skull and head scute is present in the *"Museu Goeldi"*. Lainson and Shaw (1968) reported this species from the lower Amazon but unfortunately gave no specific localities. Krumbiegel (1940) mentioned this animal as from "Peixe bois".

Carvalho and Toccheton (1969) do not seem to recognize any subspecies of *D. novemcinctus* since they merely used the binomial.

The nine-banded armadillo is about as large as a good-sized domestic cat. There are about nine *completely* movable bands in the carapace and there are but four toes on each front foot.

Dasypus septemcinctus Linnaeus

= *Tatusia hybrida* : Goeldi and Hagmann (1904)

The presence of this species in the vicinity of Belém has not been very well documented. Cabrera gave the geographic range as "...*Pará hasta Santa Catarina*". According to Hamlett (1939) the "*Tatusia hybrida*" of Goeldi and Hagmann (1904) represents this species. The latter authors noted its presence on the island of Marajó but not from around Belém. Hamlett reported the species from "Pará".

This is a small armadillo about the size of a large guinea pig (*Cavia porcellus* Linnaeus). There are but four toes on each front foot. The tail is completely scaled. The number of *completely* movable bands is always less than eight.

Sylvilagus brasiliensis (Linnaeus) ssp.

A specimen of this brownish rabbit taken in Utinga in 1956 is in the "*Museu Goeldi*". Cabrera (1961) did not include the lower Amazon within the range of this species.

This is the only wild rabbit to be expected from near Belém. An adult is considerably smaller than an adult domestic rabbit. The tail is rudimentary (usually less than 30 mm long). There are whitish cheek patches.

Sciurus (Guerlinguetus) gilvigularis paraensis Goeldi and Hagmann

= *Sciurus aestuans* var. *paræensis* Goeldi and Hagmann (1904)
= *Guerlinguetus alphonsei paraensis* : J. A. Allen (1915)
= *Guerlinguetus Aestuans paraensis* : Pinto (1931)
= *Guerlinguetus gilvigularis paraensis* : Moojen (1942)
= *Sciurus gilvigularis paraensis* : Carvalho (1959, 1960)
= *Guerlinguetus gilvigularis paraensis* : Carvalho and Toccheton (1969)

Moojen (1942) gave Belém as the type locality of this squirrel and listed specimens from Belém and Utinga. Cabrera (1961) gave the type locality as "los matorrales del río Pará." Carvalho (1959) restricted the type locality to "*as matas do Murutucu e Utinga, arrabalde de Belém, Estado do Pará.*" The original description referred marely to the "*matas do Pará*" (given as "Para" [*sic*] by Allen (1915).

In recent years specimens have been taken at the *Instituto Agronomico do Norte*, at Mocambo and in Utinga. Carvalho and Toccheton (1969) reported it from Belém (Utinga, Aurá e Murutucú)."

Owing to the fact that some consider *Guerlinguetus* to be a full genus it is here included in the technical name as subgenus although subgenera have not been generally indicated in the remainder of this work (except for *Grammogale*).

I here tentatively follow Avila Pires (1964) in treating *paraensis* as a subspecies of *gilvigularis* rather than of *aestuans* (which Avila Pires regards as a separate species).

This is a small tree squirrel (about the same size a *Rattus rattus*). It is the only rodent in the Belém area with a genuinely bushy tail. There area no spines. The fur on the body is short and crisp. The hairs on the dorsal surface of the body are dark at the base and tipped with orange. The belly is whitish or light gray, often with areas of orangish buff. There are hairs tipped with white on the dorsal surface of the tail.

Oryzomys capito goeldii Thomas

= *Oryzomys Goeldii* : Goeldi and Hagmann (1904)
= *Oryzomys goeldi* [*sic*] : Avila Pires (1958)
= *Oryzomys capito goeldii* : Cabrera (1961)
= *Oryzomys goeldi* [*sic*] : Nery-Guimarães and Azevedo (1964)
= *Oryzomys goeldi* [*sic*] : Nery-Guimarães and da Costa (1964)
= *Oryzomys goeldii* : Nery-Guimarães, Azevedo and Damasceno (1966)
= *Oryzomys capito goeldi* [*sic*] : Carvalho and Toccheton (1969)

This species is common in Utinga.

A female taken 12 June 1968 carried 4 embyor = 20 mm CR.

Adults show a great deal of color variation, ranging through various browns and reddish-browns. The young have a sooty gray juvenal pelage which is quite distinct from that of adults.

Oryzomys capito goeldii is the only mouse or rat-like rodent in the Belém area with the following combination of characteristics :

1.) Upper incisors not notched (as described for *Mus musculus*).

2.) Top of feet white instead of being brownish, orange-buff or with a dark gray patch.
3.) Tail not manifestly tufted.
4.) Fur on ventral surface of head wholly or almost wholly gray-based instead of hair being immaculate white from tips to roots.
5.) No spines.
6.) Fur on belly consisting of one kind of hair as opposed to consisting of rather stiff guard hairs or spines and a more or less kinky or woolly underfur.
7.) Inside of ears appearing naked except on very close inspection (as opposed to ears manifestly hairy inside).
8.) Fur on back short (less than 10 mm) as opposed to fur long (more than 10 mm).

This mouse is intermediate in size between a house mouse and a golden hamster.

Oryzomys macconnelli macconnelli Thomas

= *Oryzomys macconnelli*: Carvalho and Tocheton (1969)

In 1960 Hershkovitz synonomized *O. macconelli* (along with eighteen other named forms — including *O. goeldii* Thomas) with *Oryzomys capito* (Olfers). The entirety of this taxonomic activity took place in a footnote of seven lines. Since no evidence was given in justification for these conclusions and since *O. c. goeldii* and what appears to be *O. macconnelly* occur sympatrically in Utinga and in the vicinity of Serra do Navio, Amapá, I am here treating the two as separate species. The conspecificity of *capito* and *goeldii*, although undemonstrated, is here accepted provisionally.

O. macconnelli seems to be much less common than *O. capito goelddi* in Utinga. It is larger than *O. capito goeldii*, the young seem not to have the sooty juvenal pelage characteristic of *capito* and the adult pelage is much longer and usually a rich reddish becomig a bright buffy ochraceous on the flanks. A useful field characteristic is the delicacy of the skin. The skin of *O. macconnelli* rips much more easily than that of *O. capito*.

Further investigation may show that a number of populations of large, reddish *Oryzomys* from elsewhere in South America now "lumped" under the name *"Oryzomys capito"* are conspecific with *O. macconnelli*.

Carvalho and Toccheton (1969) have previously reported this species from Utinga.

This animal is about the same size as (or slightly smaller than) a golden hamster. Its characters agree with those given under *Oryzomys capito goeldii* except that in the case of "character 8" *macconnelli* has very long fur (with individual dorsal hairs up to 20 mm in length).

Oryzomys delicatus J. A. Allen and Chapman ssp.

= *Oryzomys microtis*: Carvalho and Tocheton (1969)

This small *Oryzomys* occurs in Utinga. *Oryzomys microtis* J. A. Allen is a synonym of *Oryzomys delicatus* which may or may not deserve subspecific recognition. I have examined the paratypes of *O. microtis* and find them to differ in no important way from individuals of the Belém population of *delicatus* except that the belly hairs seem to be less markedly gray-based. Although the original description of *O. microtis* emphasized that one of its most importan characters is a tail shorter than the head and body length this is not always so and does not seem to hold even in the case of the paratypes.

This mouse is abouth the same size as a house mouse. It may be distinguished from all other rats and mice from near Belém by the following characters:

1.) Upper incisors not notched (as described for *Mus musculus*).
2.) No spines (although the fur is coarse).
3.) Fur on ventral surface of head not immaculate white but buffy and largely gray-based.
4.) Ears manifestly hairy inside. Edge of pinna with a marked fringe of hairs at dorsal insertion.
5.) Tail not manifestly shorter than head and body length.
6.) "House-mouse sized" rother than "rat-sized."

Oryzomys bicolor bicolor (Tomes)

This arboreal mouse occurs in Utinga where it seems to be somewhat uncommon.

Except for its smaller size it is quite similar in appearance to *Oryzomys concolor concolor*.

Carvalho and Toccheton (1969) treated *Oecomys bicolor paricola* (Thomas) with type locality Igarapé-Assú as a valid subspecies. In this, they did not follow Hershkovitz (1960).

Oryzomys bicolor is the only rat-or mouse-like rodent in the Belém region with the following combination of characteristics :

1.) Upper incisors not notched (as described for *Mus musculus)*.
2.) Fur on underside of head immaculate white to the roots.
3.) No spines.
4.) Fur on belly consisting of one kind of hair as opposed to consisting of rather stiff guard hairs or spines and a softer underfur.
5.) Top of foot without dark gray patch basal to whitish toes.
6.) Mouse-sized (somewhat larger than *Mus musculus)* — total length of adult less than 230 mm.

Oryzomys concolor concolor (Wagner)

Carvalho and Toccheton (1969) recognized the form *O. c. tapajinus*. In this they differed from Hershkovitz (1960).

This species is similar to *O. bicolor* but is larger (about the same size as *Oryzomys capito)*. It is arboreal.

Two immature females taken in Utinga 19 and 21 June 1968 each had two bots in its inguinal region. This species has also been taken at the *Instituto Agronomico do Norte*.

Oryzomys concolor may be told from all other mouse- or rat-like rodents in the Belém area by possessing "characters 1-5" listed under *Oryzomys bicolor* but differing from *O. bicolor* in its greater size (adults have total lengths in excess of 235 mm).

Nectomys squamipes amazonicus Hershkovitz

= *Nectomys squamipes* : Deane (1960)

This large blackish-brown semi-aquatic rat occurs in Utinga where it does not appear to be particularly common and at the *Instituto Agronomico* [see Avila Pires (1958) and Carvalho and Toccheton (1969)]. It is easily confused with *Holochilus brasiliensis brasiliensis*. In size it approximates *Rattus norvegicus*.

This is the only rat- or mouse-like rodent in the vicinity of Belém with the following characters :

1.) Rat-sized rather than mouse-(*Mus musculus*) sized.
2.) Fur on underside of head gray-based rather than immaculate white to roots.
3.) Without spines.
4.) Belly fur consisting of long stiff guard hairs and soft wooly underfur (as opposed to only one kind of hair present).
5.) Entire ventral surface of fott covered with scales. These scales are quite apparent to the naked eye and in the region of the heel some are as large or larger than the tail scales — as opposed to rear portion of foot appearing more or less smoth to the naked eye.

Rhipidomys mastacalis cearanus Thomas

This is a medium-sized arboreal rat attaining a size somewhat greater than does *Oryzomys capito*). Coloration is usually grayish but may become somewhat brownish or reddish in the older adults. This species seems to be somewhat uncommon in Utinga.

Carvalho and Toccheton (1969) used the name *Rhipidomys emiliae* for specimens taken at km 94 on the Belém-Brasilia highway. One might wish that they had given some explanation of why they disagree with remarks made by Cabrera (1961) in connection with the use of this name.

The genus *Rhipidomys* is in bad need of revision.

This is the only mouse- or rat-like rodent under consideration which has a gray patch on the dorsal surface of the hind foot which contrasts strongly with whitish toes. The fur on the ventral surface consists, for the most part, of hairs which are immaculate white to their bases. The tail bears a terminal tuft.

Zygodontomys lasiurus fuscinus (Thomas)

= *Zygodontomys fuscinus*: Avila Pires (1958)
= *Zygedontomys* [*sic*] *fuscinus*: Travassos and Kloss (1958)

This terrestrial rodent is found in Utinga from which it has been recorded by Avila Pires (1958) and Carvalho and Toccheton (1969).

It is about the same size or slightly larger than *Oryzomys capito*. It is the only mouse- or rat-like rodent treated here which has a tail which is *manifestly* shorter than the head and body length. In appearance it is rather vole-like. Dorsal coloration is dark brown flecked with ochraceous, giving a somewhat "salt and pepper" effect. The fur on the ventral surface is gray-based.

Holochilus brasiliensis brasiliensis (Desmarest)

= *Holochilus nanus* Thomas (1913)
= *Holochilus sciureus*: Thomas (1920)
= *Holochilus brasiliensis nanus*: Avila Pires (1958)
= *Holochilus nanus*: Avila Pires (1958)
= *Holochylus* [*sic*] *brasiliensis nanus*: Travassos and Kloss (1958)
= *Holochilus brasiliensis nanus*: Carvalho and Tocheton (1969)

Thomas (1913 and 1920) reported this animal from "Para" [*sic*] = Belém.

This semi-aquatic rat occurs (apparently somewhat uncommonly) in Utinga. It is easiest to confuse with *Nectomys squamipes amazonicus*. Two females taken on 12 and 14 June each contained 3 embryos = 32 and 35 mm CR respectively.

Holochilus brasiliensis may be told from the other rat- or mouse-like rodents in the Belém area by the following characteristics:

1.) Rat-sized [as opposed to mouse- (*i.e. Mus musculus*) sized].
2.) Fur on belly consisting of stiff guard hairs and soft woolly underfur.
3.) No spines.
4.) Entire ventral surface of foot not covered with scales. A portion of heel smooth.
5.) Ears densely furred on inside (as opposed to ears appearing virtually naked).

Rattus norvegicus norvegicus (Berkenhout)

= *Mus decumanus* (part?): Goeldi and Hagmann (1904)

A specimen of the Norway rat was live-trapped along the road in Utinga in June of 1968.

Goeldi and Hagmann (1904) distinguished three different "kinds" of commensal rats. They appear to have used the name *"Mus decumanus"* for any *Rattus* which did not have slate-colored fur (*"Mus rattus"*) or a white belly (*"Mus alexandrinus"*). Their *"Mus decumanus"* therfore was probably a combination of *Rattus norvegicus* and individuals of *Rattus rattus* which had brownish backs and gray bellies — assuming that *Rattus norvegicus* had established itself in Belém by 1904.

Rattus norvegicus is the only rat- or mouse-like rodent under consideration which has the following combination of characters:

1.) Fur on underside of head grakish or gray-based (not immaculate white to the roots).
2.) Rat-sized rather than mouse- (*Mus musculus*) sized.
3.) Fur on belly consisting of two types of hairs — *i. e.*, long straight guard hairs and soft woolly underfur as opposed to but one kind of hair being present.
4.) Dorsal fur coarse but not spiny.
5.) Ventral surface of hind foot not completely or mostly covered with scales but mostly smooth.
6.) Ears essentially naked inside (as opposed to ears manifestly hairy inside).
7.) Tail (including that of adults) shorter than head plus body lenght. Rear portions of temporal ridges forming sub-parallel, rather straight lines as opposed to strongly bowed lines.

See discussion under *Rattus rattus* for additional means of distinguishing *R. norvegicus*.

Rattus rattus rattus (Linnaeus)

= *Mus rattus* : Goeldi and Hagmann (1904)
= *Mus alexandrinus* Goeldi and Hagmann (1904)
= *Mus decumanus* (part?) : Goeldi and Hagmann (1904)
= *Rattus rattus alexandrinus* : Avila Pires (1958)
= *Ratus* [*sic*] *ratus* [*sic*] *alexandrinus* : Travassos and Kloss (1958)
= *Rattus rattus alexandrinus* : Carvalho and Toccheton (1969)
= *Rattus rattus frugivorus* : Carvalho and Tocheton (1969)

A specimen was taken in Utinga during June of 1968. Carvalho and Toccheton reported this rat from Utinga and the city itself.

The stocks of "black rats" or "roof rats" which man has in-advertently introduced into the New World show color phases which have been regarded as separate subspecies by many workers who designate them as *R. r. rattus*, *"R. r. alexandrinus"* and *"R. r. frugivorus."* It has been well documented for some time that these separate "subspecies" may be found in one litter and the genetics involved have been worked out. For use of the name *Rattus rattus rattus* for populations disseminated by ships see Johnson (1962).

For a person with some experience, *R. rattus* is not difficult to distinguish from *R. norvegicus*. The two differ in the following ways :

Rattus rattus : Tail slender, longer than head and body in adults, tail same color above and below (not bicolored). Hairs on top of foot not all white (some grayish), often with white belly. Ears and eyes relatively larger. Temporal ridges bowed outward rather than forming two sub-parallel lines. *Rattus rattus* differs from the remaining rat-like rodents from near Belém in prossessing the same characters as given for *Rattus norvegicus* under "1-6".

Rattus norvegicus : Tail less slender, shorter than head and body length, tail tending to be bicolored (lighter below with many white hairs near base). Hairs on top of foot all white, belly not white in normal individuals. Ears and eyes relatively smaller. Temporal ridges forming two sub-parallel lines.

Mus musculus Linnaeus

= *Drymomys musculus* : Goeldi and Hagmann (1904)

The house mouse has been reported from Belém by Goeldi and Hagmann (1904). I have seen no specimens from there.

The house mouse may be most easily confused with *Oryzomys delicatus*. When an upper front tooth (incisor) of a house mouse is viewed, from the side one can see a notch in the edge of its worn surface. No other mouse-sized rodent in the Belém area has such a notch. This mouse is quite small with a tail of about head and body leigth. The dorsal surfaces of the feet are generally quite dark, not noticeably lighter than the surface of the back. The belly, also, is usually dark gray or dark brown (occasionally whitish). *Zygodontomys lasiurus* has similar distribution of color but is much larger and has a tail a good deal shorter than the head and body. *Oryzomys bicolor* is reddish-colored dorsally and has a white belly. Sometimes, however, *Oryzomys bicolor* lives commensally with man (in structures with thatched roofs) and may become covered with soot. I have seen this happen in Mato Grosso and unless one tried to wash the skin it was not obvious that the dark coloration was not natural. The best character to use in identifying *Mus musculus* in the notch in the front incisor. If one wishes, he can expose the first upper cheek tooth. It has three longitudinal rows of cusps. All other mice (*Rattus* has them too) found near Belém have but two. This character doesn't show up if the teeth are heavily worn.

Coendou prehensilis prehensilis (Linnaeus)

Coendou prehensilis : Goeldi and Hagmann (1904)

Goeldi and Hagmann (1904) reported this porcupine, from the vicinity of "Pará". According to Dr. C. O. Handley, Jr. (personal communication) who has examined the type, *Coendou tricolor* (Gray) 1850b is a synonym of *Coendou prehensilis*. Thomas (1904) recorded a *Coendou* which he compared with *C. tricolor* from "Igarapé-Assu, near Pará". Moojen (1952) gave "Igarape-Açu próximo a Belém, Pará" as the type locality. Vieira (1955) gave Belém as

the type locality. Cabrera (1961) noted that the type locality of *C. tricolor* was not mentioned by Gray, implied (incorrectly) that the name is based solely on a broken skull [an error repeated by Carvalho and Toccheton (1969), assumed the type came from Bolivia and treated the name *tricolor* as a junior synonym of *boliviensis* Gray.

This species may be distinguished from the one following by its larger size and by (hopefully) having more extensive light-colored tips to its quills (see following account).

Coendou sp.

= *Coendou tricolor*: Moojen (1952)?
= *Coendou platycentrotus*: Carvalho and Toccheton (1969)?

Dr. Karl F. Koopman of the American Museum of Natural History first called it to the attention of Dr. C. O. Handley, Jr. that this porcupine is a "good" species and that it occurs sympatrically with *C. prehensilis*.

This species differs from the preceding in that it is smaller and darker. Dr. Handley and I are currently conducting a study of the affinities of this species.

A juvenile female (weighing 650 g.) was taken in Utinga in 1963.

Hydrochoeris hydrochaeris hydrochaeris (Linnaeus)

This subspecies of capybara is probably the one which must have once occurred in the Belém region.

The capybara is the only rodent which approaches domestic hogs in size. The nails resemble those of hooved mammals and the pelage consists of coarse bristles.

According to D. C. Carter (personal communication) the flesh of the capybara is regarded as being poisonous in some parts of Perú. Dr. Carter ate one with no ill effects.

Agouti paca paca (Linnaeus)

= *Coelogenys paca*: Goeldi and Hagmann (1904)

Goeldi and Hagmann (1904) reported this animal from the vicinity of "Pará".

The paca is about the same size as a smooth-haired fox terrier and is virtually tailless. It is the only rodent in the Belém area with longitudinal rows of white spots on its flanks and back. It seems to be a favorite article of diet wherever it occurs.

Dasyprocta prymnolopha Wagler

See Cabrera (1961) for comments on the type locality and geographic range of this species. The range given by Moojen (1952) differs from that I have seen given elsewhere.

A specimen (n.° 2339) of this agouti taken in Utinga is in the Goeldi Museum. USNM 394734 is from Capim. Goeldi and Hagmann recorded it from the *"Vizinhança do Pará"*.

This is the only cat-sized mammal from Belém which has a dark blackish-brown middorsal area (especially pronounced posteriorly) and orange hind flanks. The nails of this rodent are almost hoof-like and there is a riddiculously short, naked tail no more than an inch long.

Hershkovitz (1969) stated all the agoutis belong to one species *(Dasyprocta leporina)* but unaccountably identified a figure of an agouti as *Dasyprocta aguti* in the same paper. For a discussion of the use of the name *Dasyprocta aguti aguti* see Carvalho and Toccheton (1969).

Proechimys guyannensis oris Thomas

= *Echinomys cayennsis*: Goeldi and Hagmann (1904)
= *Proechmys* [*sic*] *guayanensis* [*sic*] *oris*: Travassos and Kloss (1958)
= *Proechimys oris*: Nery-Guimarães, Azevedo and Damasceno (1968)
= *Proechimys guyannensis*: Shaw and Lainson (1968)

This terrestrial spiny rat is abundant in Utinga. Goeldi and Hagmann (1904) noted its abundance in the outskirts of Belém and Avila Pires (1958) recorded it from Utinga as have subsequent authors.

The tail is frequently missing in wild *Proechimys*. There is a point at the base of the external tail where the breakage occurs I have found it impossible to skin *Proechimys* from Belém without breaking the tail. I have

occasionally managed to skin *Proechimys* from the Serra do Roncador, Mato Grosso without breakage occurring *Proechimys semispinosus panamensis* Thomas which I have skinned in the Panamá Canal Zone rarely lost their tails at my hands. Perhaps "breakability" may prove to have taxonomic significance. The skin of this animal, like that of certain other spiny rodents, is quite delicate and is difficult to remove without tears appearing.

This spiny rat appears quite "tame" when handled. I have seen an individual grasped by the back and removed from a live trap without the animal struggling in any way or attempting to bite. In my experience, adult *Proechimys semispinosus panamensis* will not bite when handled although they will kick and scratch. The young do bite.

The genus *Proechimys* is in a state of extreme taxonomic confusion. This is owing largely to the great geographic and individual variation exhibited by its various forms (whatever they may be).

Proechimys guyannensis oris has a spiny back but has no spines on the rump. The ventral surface is usually immaculate white although there may be a "collar" of brownish hair in the throat region and there may be areas of clear orange-tawny on the belly. This "rat" is about the same size as members of the genus *Rattus*. The young are precocial.

Echimys armatus (I. Geoffroy St. — Hilaire) ssp.

= *E* [*chimys*]. *armatus* : Thomas (1916)

A specimen of this arboreal spiny rat was taken in Utinga in April of 1968. Thomas (1916) previously reported this species from Belém. It is either rare or quite difficult to trap.

This is the only spiny mammal in the Belém area which has the rump fully spined and a more or less naked-appearing tail. There are short, fine hairs on the tail but these are hard to see when the animal is held at arm's length. Another useful character is the rusty-colored "nose" and the grayish, tan or buffy-colored belly not sharply demarcated from the color of the flanks. The size and proportions resemble those of a Norway rat *(Rattus norvegicus)*.

Proechimys guyannensis oris has no spines on the rump, has a white belly sharply demarcated from the color of the flanks and has but two large pads in the area immediately adjoining the attachment of the three central hind toes (in *Echimys armatus* there are three).

Some specimens of *Rattus rattus* have rather spiny fur (most people would merely call it coarse) and on this basis might be confused with *Echimys armatus*. *Rattus rattus*, however, has a grayish (rather than rusty-colored nose) and has rectangular-shaped scales on its tail which are arranged in annular fashion. The tail of *Echimys armatus* is covered with circular or somewhat hexagonal scales. The ears of *Rattus rattus* are smoothly oval in outline whereas in *Echimys armatus* they are somewhat square.

Male *Echimys armatus* have a naked, apparently glandular, area on the chest. *Echimys semivillosus* (I. Geoffroy St.-Hilaire) males have the same character.

Echimys chrysurus paleaceus (Kuhl)

= *Echimys chrysurus paleacea* : Carvalho and Toccheton (1969)
= E. [*chimys*] *paleaceus* : Thomas (1916)

A specimen of this arboreal spiny rat was taken in Utinga in 1963. It seems to be rare there. Carvalho and Toccheton (1969) have reported one other specimen Thomas (1916) mentioned a specimen from Peixe Boi.

This is the only mammal in the Belém region which is covered with spines (including the rump) and has the terminal half of its tail colored white. Other useful characters are the white blaze on the forehead, the well-haired tail and size and proportions approximating those of a Norway rat.

There has been a bit of a problem concerning the proper authorship of the name of this animal. Tate (1935) noted that Illiger's (1811) usage of this name constituted a *nomen nudum*. He cited Lichtenstein (1820) as the author but suggested the usage of the name by Kuhl (1820) might have priority. Tate *(loc. cit.)* gave the type locality as the "Province of Pará, Brazil". Ellerman (1940) listed Illiger as the author although he admitted that Illiger's

usage was a *nomen nudum.* Lichtenstein's usage of the name was listed for reasons which where not made clear and Kuhl's use of the name was not mentioned at all. The "Province of Pará, Brazil" was again given as the type locality. Cabrera (1961) stated that nineteenth century authors (who were presumably in a better position to judge priority) regarded Kuhl as author of the name and for this reason he attributed the name to the latter. Cabrera gave the type locality as "Pará".

Kuhl (1820) did not tell us what continent *L[oncheres]. paleacea* Illiger" came from and Illiger (1811) merely noted the animal was *"e Brasilia"* and stated that it was, at that time, represented in the Berlin Museum. Lichtenstein (1820) wrote *"Vaterland: die Provinz Para in Brasilien"* and *"Von dieser Art befindet sich im Berliner Museum nur ein Exemplar, nach welchem Illiger die Kennzeichen seiner Gattung Loncheres gebildet hat".*

Inia geoffrensis (Blainville)

I have seen no specimens of this freshwater dolphin from Belém. Dr. John P. Woodall informs me, however, that there are two kinds of dolphins in the fresh waters near Belém and this must be one of them.

The inia can be distinguished from *Sotalia* by virtue of having a keel along the middle of the back rather than a distinct, roughly triangular dorsal fin. The keel of *Inia* might be thought of as roughly triangular but the apex angle would then be quite obtuse instead of acute as in *Sotalia. Inia* also possesses a rather bulbous forehead rising up above the long "beak" and the rear teeth are provided with lingually directed "shelves" instead of being simply conical in shape.

The manatee does not have a beak and the tail is shaped like the blade of a canoe paddle instead of being divided into two flukes.

Dolphins which live in fresh water are the subject of various strange beliefs throughout the Amazon basin. Dr. Woodall informs me that in some areas it is believed that they occasionally take human shape and then, owing to their irresistible charm, seduce and impregnate village girls. This would seem to be a beneficial superstition, providing an explanation for an unexpected pregnancy which could result in a minimum of social upheaval. For earlier reference to such beliefs see Goeldi (1893).

Another belief is that souls of dead people occupy dolphin bodies and for this reason the locals will not kill *Inia* or *Sotalia.* Perhaps a a belief of this sort explains why Dr. Dilford Carter (personal communication) could not induce the locals to help him capture *Inia* in Peru. See also Ihering (1904). Such superstitions probably beneficit the dolphins considerably. *Inia* at least is quite palatable as Dr. Carter and I can state from personal experience (we ate a zoo animal).

I once spent an entire afternoon watching a couple of dolphins (*Inia*, I believe) playing about at the junction of the Rio Araguaia and Rio Garças. Although the dolphins were between the twin towns of Barro do Garças, Mato Grosso and Aragarças, Goias, they were not molested.

Sotalia fluviatilis (Gervais and Deville).

This dolphin ranges widely in the Amazon basin. I have seen no specimens from Belém but am including it here for reasons given in the discussion of *Inia* (where differences between the two animals are given).

Dusicyon thous thous (Linnaeus)

Dr. Charles O. Handley, Jr. found one of these animals dead on the road in Belém in 1965.

This is a wild dog or "fox" similar in appearance to the North American coyote although it is a bit smaller and less "rangy" looking.

The easiest animals to confuse with *Dusicyon thous* are the other two wild dogs *Speothos venaticus* and *Atelocynus microtis*. *Dusicyon thous* differs from *Speothos venaticus* in that it has a soft underfur and "normally proportioned" ears, legs and tail. *Speothos venaticus* is a more stoutly built animal with "disproportionately short" ears, legs and tail. It has a covering of coarse hair without a soft underfur.

Atelocynus microtis has short crisp fur with a "salt and pepper" effect above and below. The overall coloration appears dark gray (becoming somewhat browner below). *Dusicyon thous* has longer fur (somewhat similar to that of a German shepherd). The belly is variously clear pinkish, buffy, or whitish but shows no "salt and pepper" effect.

Atelocynus microtis (Sclater)

This wild dog seems to be quite rare throughout its range. It has not been recorded from the immediate vicinity of Belém although Goeldi and Hagmann (1904) reported it from nearby (Castanhal). Hershkovitz (1961) showed the range of *Atelocynus* as overlapping the area where Belém is located on the basis of this record although at the top of page 511 he seems to question his localization of the collecting site. Considering the short distance between Castanhal and Belém and the lack of natural barriers between them, it is probably safe to say that *Atelocynus* once roamed where the city now stands.

Hershkovitz *(loc. cit.)* summarized existing knowledge concerning this animal. In view of its rarity it seems worthwhile to record two specimens which have not been previously reported. One of these is of a male zoo animal which died at the National Zoological Park in 1965 and which supposedly originated "from area where Perú and Ecuador join". The other specimen, represented by a skin, is unsexed and was taken near Parinari on the Río Marañon, Loreto, Perú at 4°37'S, 74°27'W by William Thomas Cox in December 1941. These localities fill in the gap in the previously known distribution between the Ecuadorian and southern Peruvian localities.

Langguth (1969) mapped two (unidentified) Bolivian localities not mentioned by Hershkovitz.

Atelocynus microtis differs from *Speothos venaticus* in having a soft underfur. For a discussion of how *A. microtis* differs from *Dusicyon thous* see the discussion of the latter.

Speothos venaticus venaticus (Lund)

In the Goeldi Museum there are two specimens of this wild dog which have "Aurá" and "Belém" written on their tags. The catalog has notations indicating the specimens date back to the *"antiga coleção"*. The tags bear the note *"jard. zool."* These therefore appear to have been zoo specimens and I would regard their origins as somewhat doubtful if Aurá (the name of a local stream) had not been given. Carvalho and Toccheton (1969) treated the species as being monotypic but without explanation.

This is the only dog-like mammal considered here which has a coarse coat with no soft underfur. The head and shoulders are generally grayish, brownish or reddish (most common) with the rear portions and extremities of the body becoming black but there may be some departure from this general scheme.

Procyon cancrivorus cancrivorus (Cuvier)

A specimen (no. 2716) of the crab-eating raccon taken in 1963 at the *Instituto Agronomico do Norte* is in the Goeldi Museum.

This is the only mammal in the Belém area which has a black mask (similar in shape to the masks worn by burglars in cartoons) around the eyes and has rings of black around its tail. In size, it is similar to a small to medium-sized dog.

Nesua nasua nasua (Linnaeus)

= *Nasua socialis*: Goeldi and Hagmann (1904)

This animal was mentioned as being in the Belém region by Goeldi and Hagmann (1904). Carvalho (1960) reported coatis from the *"área de Belém"* [*sic*]. I have examined a specimen in the Goeldi Museum from Utinga taken in 1956. This individual, an immature, is a quite reddish coati with pronounced rings on the tail, indistinct facial markings and dark front feet and hind toes.

Carvalho and Toccheton (1969) treated the species as being monotypic without explanation.

The coati has teeth, has black rings around its tail but does not have a black mask. Other useful characters are the long muzzle and highly mobile nose, a tail length which is approximately equal to the head and body length. Adult size is that of a small to medium-sized dog.

Potos flavus flavus (Schreber)

= *Cercoleptes caudivolvulus* : Goeldi and Hagmann (1904)

This animal was recorded from Belém by Goeldi and Hagmann (1904). A specimen was taken in Utinga as recently as 1964.

The kinkajou is a nocturnal, arboreal, largely fruit-eating member of the order Carnivora. It has a prehensile tail and is generally regarded as a monkey of some sort by the rural people of Latin America.

The kinkajou is the only cat-sized mammal in the Belém region which has large, virtually naked glandular areas situated at the corners of the mouth (the rest of the muzzle except for the "nose" is furred) and on the throat. Other useful characters are the woolly fur, uniform tan or reddish coloration and cylindrical tail which approaches the length of the head and body.

I have eaten kinkajou and found it quite palatable. It should be cooked in such a way as to reduce its toughness, however.

Mustela (Grammogale) africana africana Desmarest.

= *Putorius* (*Mustela*) *brasiliensis paraensis* Goeldi (1897)
= [*Putorius* (*Mustela*) *brasiliensis*] *paraensis* Goeldi (1901)
= *Putorius paraensis* : Goeldi and Hagmann (1904)
= *Mustela paraensis* : Tate (1931)
= *Grammogale africana africana* : Carvalho (1959)

This animal is a rare weasel of unknown habitats. It is known from a mere handful of specimens. Tate (1931b) reported seeing a caged individual of this species while visiting "Pará" (Belém). It had reportedly been caught while "swimming in the salt water of the estuary about half a mile away from the shore".

I have examined a specimen in the *"Museu Goeldi"* apparently from "Ramal de Pinheiro" in Belém. The tag also notes *"Jard. Zool."* All told, several specimens are known from the vicinity of Belém. The holotype of *M. paraensis* Goeldi is from the forest preserve of Marco de Legoa near the city. Cabrera (1961) restricted the type locality of *M. africana* to the vicinity of Belém also.

According to Ralph M. Wetzel (personal communication) a specimen represented by a skin and skull in the *Museu Goeldi* was taken in 1967. Locality data consists of the notation, "Maracácuera-Icoaraci, Pará". A specimen represented by a skull (skin lost?) was taken at Irituia, Pará, in 1959. These records are included here owing to the rarity of reports concerning this animal.

Although subgenera have not been indicated (with one exception) in the headings of accounts of other animals in this article I have here included *Grammogale* Cabrera in the heading because Cabrera (1961) and Stains (in Anderson and Jones, 1967) regarded it as a full genus. Hall (1951) treated it as a subgenus.

This form is the only one in the area under discussion wich has an elongate body and neck, short legs, is generally a bit larger than a Norway rat, is chestnut brown above and has a mid-ventral stripe of the same color. The ventral surface otherwise is an orangish tan. The tan and chestnut areas are sharply demarcated from each other. The fur is rather short.

Eira barbara poliocephala (Traill)

= *Galictis barbara* : Goeldi and Hagmann (1904)

A tayra was killed by an automobile in Utinga as late as 1966.

The tayra is about the same size as a fox terrier dog but is differently built, being more slender and having a rather long tail. In appearance it resembles a large mongoose. Specimens from Belém may be expected to have tan or gray heads and necks. These colors blend with the black coloration which covers the rest of the body except for a cream-colored patch on the throat. Probably most of the tayras in the Belém area are similary marked although considerable variation in color occurs in other parts of South America (including an all-over cream phase).

The tayra may be distinguished from coati by the latter's ringed tail and almost "anteater-like" snout. The bush dog *(Speothos)* has a much shorter tail (less than half the head and body length) and is obviously a dog (as is *Atelocynus*). The grisón has a black face and

throat while the top of the head, dorsal surface of the neck and back are covered with a grizzled gray mantle. A whitish or cream-colored stripe running through the ear separates the gray dorsal surface of the neck from the black throat. The grisón is also smaller, much mare weasel-like and has a tail of less than half the length of the tail and boddy. Otters have webbed feet.

Galictis vittata vittata (Schreber)

= *Grisonia allamandi* : Goeldi and Hagmann (1904)

A specimen in the Goeldi Museum was taken in Utinga in 1959 and another specimen was taken in the vicinity of Belém in 1963.

Goeldi and Hagmann (1904) reported a specimen from "Marco da Legua". They believed there were two species in Pará — a large *"Grisonia allamandi"* and a small *"Grisonia vittata"*.

The grisón is an elongate weasel-like, short-tailed, short-legged carnivore about the size of a 3/4 grown cat. It has a black face and throat. The forehead, back of the neck and remainder of the dorsal surface are covered with a grizzled mantle. On the sides of the neck and head the black and gray areas are separated by a cream-colored streak. This is the only animal in the area with such markings.

Lutra enudris enudris F. Cuvier

= *Lutra mitis* Thomas (1908)

Thomas (1908) reported this otter from "Pará". The specimen on which this record is based is probably B. M. 1904.7.4.49 collected by A. Robert on 2 May 1904 at Igarape Assu (= Igarapé Açu), Pará, east of Belém according to Ralph M. Wetzel (personal communication).

This animal is the only housecat-sized mammal to be expected in the area which has four completely webbed feet and a tail without obvious flanges on each side.

Pteronura brasiliensis brasiliensis

= *Lutra brasiliensis* : Goeldi and Hagmann (1904)

Goeldi and Hagmann (1904) reported the giant river otter from Belém. I know of no subsequent records although Pohle (1920) recorded it from "Pará".

This otter reaches total lengths of over two meters. It is the only mammal known to have occurred in or around Belém which has four completely webbed feet and a dorsoventrally flattened tail which bears a prominent keel on either side. The fur is brown. There are usually cream-colored markings on the lower jaw and/or throat and chest. The area between the nortrils is completely furred.

Felis concolor discolor Schreber

Felis concolor discolor Hershkovitz (1959)

Edwards (1848) reported a puma shot at "Magoary" 12 miles from Belém. This species undoubtedly roamed the area that now forms the site of Belém prior to the founding of the city.

The adult puma is at least a slarge as a very large domestic dog and several times again as large as a domestic cat. The adult is colored a more or less uniform tawny except that it is darker along the midline dorsally and buffy midventrally. The tail is tipped with dark brown or black. On the head the outer surface of the ears is covered with blackish fur. There may be a whitish rim of fur around the edge of the ear but there is no whitish patch on the outer surface. The insides of the ear are white. There is a prominent black patch on each side of the muzzle where the "whiskers" originate. Strongly contrasting with this black are a pair of roughly triangular patches of white which are bounded by the black patches, the naked "nose" and the lips.

Young pumas are marked with spots and short bars of black. They may be told from all the other spotted cats from near Belém as follows :

In the other spotted cats :

1.) There is a white patch on the outer surface of the ear (except in melanistic individuals).

2.) Markings tend to consist of more or less closed figures containing a color darker than the surrounding "ground" color (and may enclose a black spot or spots as well) — as opposed to spots being simple and dot-like.

3.) The area from which the "whiskers" grow does not consist of a solid black patch but of black spots and stripes on a white background (usually each "whisker" grows from a black spot).

Felis yagouaroundi in the tawny phase is colored much as is an adult puma. The former species, however, is not boldly marked at any time during its life and as an adult is about the same size as an adult housecat to slightly larger (although it is of a more slender build). *F. yagouaroundi* may show some indications of the facial markings but never as *black* contrasting with *white*.

Felis pardalis maripensis J. A. Allen

Goeldi and Hagmann (1904) reported the ocelot from the vicinity of "Pará".

Felis pardalis attains a size considerably larger than a domestic cat although it does not become as large as the puma.

It may be told from all other cats (except for *Felis weidii*) by the following combination of characters :

1.) Hair on nape of neck directed forwards.
2.) Area where "whiskers" insert spotted or striped, not occupied by a prominent black patch.
3.) Body prominently marked with spots and stripes.
4.) Pattern on nape of neck consisting in part of prominent longitudinal stripes- as opposed to nothing but spots present.

It is difficult to explain in words how to differentiate *Felis pardalis* from *Felis weidii*. Immatures in particular present difficulties. *Felis weidii* is generally smaller, has a rounder (rather than more elongate) head, proportionately larger eyes and a proportionately longer tail which tends more toward fluffiness and which has more of a tendency to be completely ringed than in *pardalis*. The dark markings usually merely form saddles on the dorsal surface of the tail in *pardalis*. The temporal muscles have less tendency to meet at the midline of the skull at a sagittal crest in *weidii*.

Felis tigrina tigrina Schreber

I know of no records of the tiger cat from near Belém. Its occurrence there at one time or another is not unlikely, however.

This is a small spotted cat of about the same size as a house cat. It may be told from all the other cats in the area by the following combination of characters :

1.) Hair on nape of neck directed backward.
2.) "Whiskers" growing from spotted area rather than from black patch.
3.) Body covered with spots and stripes. Occasionally melanistic ("black") individuals may be taken but if these are held in strong light at the right angle the markings should still be visible (this includes spots on the dorsal surface).
4.) Markings on nape of neck elongated into stripes.

Felis wiedii vigens Thomas

= *Leopardus wiedii vigens* : Pocock (1941)

This subspecies of the margay occurs in the lower Amazonian area. The type locality, "Igarapé-Assu", is near Belém. Pocock's (1941) "Para" [*sic*] specimen was from the menagerie in Belém.

The margay may be distinguished from all the cats under consideration except for *F. pardalis* by characters 1-4 given under the latter species. For a discussion of differences between the two consult the same account.

Felis yagouaroundi yagouaroundi É. Geoffroy St. - Hilaire

= *Felis jaguarondi* : Pelzeln (1883)

Pelzeln reported the jaguarundi from "Pará".

This wild cat is somewhat larger than a housecat with a proportionately longer body. It is essentially unicolored although faint markings similar to those seen on the spotted cats may sometimes be seen on the ventral surface or limbs. I have never seen indications of such markings on the dorsal surface as is (always?) the case in melanistic (black) specimen of the spotted cats.

Although often said to have red and gray "color phases" actual variatibility is greater than this statement would indicate. Colorations range through various grays, browns, tans, reds and include black. The grayish animals show a "salt and pepper" coloration similar to that of *Atelocynus microtis.* The *black* and white muzzle markings found in *Felis concolor* are not developed as in that species.

Leo onca onca (Linnaeus)

The jaguar undoubtedly once occurred where the city of Belém is now located. Pocock (1939) recorded specimens from "Pará". The context seems to indicate Pocock had the city in mind rather than the state. The specimens were probably shot some distance from Belém and then sold there.

This is one of the great cats (attaining greater weights than does the leopard). It is the only cat treated here with the following combination of characters:

1.) Spots but no stripes present on the nape of the neck [markings should still be visible even in melanistic ("black") individuals].

2.) Spots on back arranged into more or less closed figures (often with spots inside).

Trichechus inunguis (Natterer)

= *Manatus inunguis*: Goeldi and Hagmann (1904)

There is a specimen of a manatee (no. 1518) in the Goeldi Museum taken at "Icoaraci, Belém, Pará" on 20 August 1958. This is presumably the same specimen reported by Carvalho and Toccheton (1969).

The manatees are the only mammals which lack hind limbs and have a tail shaped like the blade of a canoe paddle. The muzzle is bluntly truncated instead of being produced into a beak. The muzzle is bluntly truncated instead of being produced into a beak.

Goeldi and Hagmann (1904) reported manatees as rare in the waters about Ilha Marajó and stated that living individuals turned up occasionally in the market at Belém. Vieira (1955) stated that this animal once ranged south to the Rio Doce in Espirito Santo but that *"Atualmente parece não passar da ilha de Marajó"*.

Tapirus terrestris terrestris (Linnaeus)

This species of tapir must have once occurred in what is now Belém. Hershkovitz (1954) showed its range as occupying that area and he listed four specimens from "Pará".

This animal has about the same stature as a pony but is much more heavily built. The young bear longitudinal white stripes and rows of white spots creating a pattern somewhat similar to that seen in *Agouti paca.* The tapir is the only mammal in the vicinity of Belém which has (1) four toes on each front foot and three toes on each hind foot and (2) the longest hairs between its ears much shorter than its ears.

Tayassu pecari (Link)

= *Dicotyles albirostris*: Pelzeln (1883)

The white-lipped peccary was reported from "Para" [*sic*] by Pelzeln (1883).

This animal somewhat resembles a hog of some sort and is similar in size to a small domestic hog. It is the only mammal in the Belém area which has the following combination of characteristics:

1.) Four toes on each front foot and three toes on each hind foot.

2.) Hair between the ears as long as or longer than the ears.

3.) No light "collar" around the neck but with whitish hairs on its lower jaw.

The nomenclature of this animal was covered by Hershkovitz (1963) who appears to regard the species as monotypic although the North American named form *T. p. ringens* Merriam recognized by Hall and Kelson (1959) was not mentioned in Hershkovitz synonomy. Hershkovitz' later (1969) identification of a figue of the collared peccary as *Tayassu pecari* is presumably a *lapsus* since he used the epithet tajacu for this animals in his text.

Tayassu tajacu tajacu (Linnaeus)

Assuming that the collared peccary once occurred in the Belém area the above form would be the one expected. Ralph M. Wetzel (personal communication) reports a specimen numbered 2689 in the *"Museu Goeldi"* from "Retiro de Nazare, Mun. Benevide [= Benevides ?] Pará".

This is an animal similar in appearance to the white-lipped peccary and shares with it "characters 1 and 2" given under that form. The collared peccary is somewhat smaller than the white-lipped peccary and appears to have a proportionately smaller head. There is a light-colored "collar" around the "neck" and "shoulders" and the hair of the lower jaw is not contrastingly paler than on the adjacent regions.

Mazama americana americana (Erxleben)

This deer may once have occurred on the site of Belém. Miranda-Ribeiro (1919) mapped this species as occurring in the area.

This is a small deer. The males have spike-like unbranched antlers. The deer of the genus *Mazama* are the only hooved animals discussed here which have four toes on each hind foot. *Mazama a. americana* can be told from *Mazama gouazoubira* in Venezuela in that the former has a more or less uniformly reddish coat dorsally. The latter should be grayish or brownish dorsally with the individual hairs having strongly contrasting buffy tips. These characters are useful in telling the two species apart in most places. Unfortunately, I have not seen a specimen of *M. g. superciliaris* and from available information (which is quite limited) it seems as thoug it might sometimes be difficult to distinguish it from *M. a. americana*. The type of *M. g. superciliaris* is described and figured as being largely reddish. Dr. Ralph M. Wetzel of the University of Connecticut has examined the type and has found it to be a light red in color. A specimen of *M. gouazoubira* he examined in the British Museum (Natural History) from "Igarape Assu, Pará" "had typical light tan-tipped guard hairs; red-brown dorsum... gray laterally". Specimen of *M. gouazoubira* from the upper Capim were described by Goeldi and Hagmann (1904) under the name *Coassus nemorivagus* as having a coat which was" ... *amarello-acinzentado claro* [*mistura sal e pimenta*]..."

Goeldi and Hagmann (1904) stated that the deer now known as *Blastocerus bezoarticus* (Linnaeus) occasionally made an appearance in the city. I assume they were referring to animals brought to town by traders who had acquired the animals some distance away.

Mazama gouazoubira superciliaris (Gray)

The type, a menagerie specimen, is supposedly from "Pará".

For a discussion of ways in which this animal might be told from *M. a. americana see* the account of the latter.

Cabrera (1961) had much to say of interest concerning the status of this subspecies.

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Resumo

São relacionados os mamíferos não voadores vivendo presentemente em Belém do Pará e imediações. A lista é considerada completa à luz dos conhecimentos atuais e inclui os animais que poderiam ter vivido na região estudada durante o tempo histórico.

Figuram naquela relação mamíferos aquáticos e terrestres, num total de 72 espécies, sendo fornecida as sinonímias mais importantes. São descritos também caracteres para o reconhecimento de cada espécie com notas sobre taxonomia e história natural. Uma chave, não-técnica, é apresentada para auxiliar os pesquisadores não especializados em mamalogia, na tarefa de identificar mamíferos não voadores da região de Belém. Aquela chave poderá ser particularmente útil aos pesquisadores para-médicos.

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