



MUSEO DE LA PLATA
Universidad Nacional de La Plata - Facultad de Ciencias Naturales y Museo



Huge extinct
south american
MAMMALS
from the late quaternary
(late pleistocene)

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Historical overview

Note: Through a series of maps, it will be displayed the paleogeographical history of the South American continent, beginning with the Pangeic stage, i.e. when it was part of PANGAEA, the great and discrete supercontinent (ca. 200 million years before Present), to finish with the present geographical situation. On a map indicating the geographical relationship of the Americas, by means of the figure of one conspicuous genus of mammal we indicate the families that participated in what is known as **The Great American Interchange**, as well as those families that became extinct in the continent by ca. 10.000 year before Present, i.e. *The Megafaunal Extinction* (Figures encircled with dashes), plus those that presently integrate the Neotropical Region (with black dot). On the present world map, also by means of figures of conspicuous genera of the families that during the Cenozoic and Present inhabited the South American Continent, it is indicated the known geographical origin of the groups represented by the genus figured. On each one, by means of arrows, it is indicated the paths followed by the distinct immigratory events that led to the South American population, as it is explained below.

Present South America is well known by having a peculiar mammal fauna. With Central America and Antillas, it is part of the Neotropical Biogeographical Region, recognized by a distinctive flora and fauna. Historically, its mammal fauna represents a mixture of mammals originated all over the world, and most of the Cenozoic originated in situ from those oldest immigrants. Most of the immigrants came from North America through Central America, with the exception of the primates and rodents who came from Africa. For example, cervids originated in Asia, camelids in North America, tapirs in Europe, rodents and monkeys in Africa, and armadillos, apparently, in the South American continent, whose unknown ancestors probably lived in the joined African-South American supercontinent, probably before the Cenozoic. Among the most typical mammals are the llamas, guanacos, vicuñas ungulates (Family Camelidae), armadillos (Family Dasypodidae), tree-sloths [three toed (Family Bradypodidae) and two toed (Family Megalonychidae)], and anteaters (Family Myrmecophagidae) edentates. Most of these peculiar extant Neotropical mammals represent survivors

of an even more peculiar mammal fauna that populated the South American continent up to a decisive event occurred around 8.500 years before Present. This is known as the Megafaunal Extinction because most of the huge mammals became extinct. Up to this event, and from approximately 30.000 years before Present, these huge mammals lived with native human beings. The mammals here exhibited represent the most conspicuous beasts that populated South America just before the Megafaunal Extinction, some of them related to extant mammals living in Neotropica. But, most of them, e.gr. *Toxodon platensis*, *Macrauchenia patachonica*, *Hippidion bonaerense*, *Stegomastodon superbus*, *Smilodon populator*, and *Doedicurus clavicaudatus* became extinct without leaving descendants. In its turn, most of these extinct huge mammals were the relictual offspring of at least two immigratory events: **(1) the oldest one** --occurred about 66 million years ago and when the continent was an enormous island.continent-- is here represented by the descenders *Toxodon platensis*, and *Macrauchenia patachonica*; **(2) the younger one** --occurred about 3 million years ago, when Central America was onset, and provided the "Panamanian Bridge" that marked the end of the South American isolation and its connection with North America, affording in such a way the path for an active American overland interchange that followed up to recent-- is here represented by *Stegomastodon superbus*, *Hippidion bonaerense*, and *Smilodon populator*. On a third position, *Megatherium americanum*, *Doedicurus clavicaudatus* and *Propaopus grandis*, pertaining to the edentate Orders Tardigrada and Cingulata, apparently had their primaeval origin in our proper continent, from unknown South American or African ancestors, at a time when both present continents were geographically connected. Except *Propaopus grandis* and *Eumegamys paranensis*, the mammals here exhibited coexisted with Man, and represent the last species that lived just up to before the Megafaunal Extinction. In relation to the other mammals, man was a new incomer (about 30.000 years ago) that met these long existing mammals, taking advantage of them: it has been proven that some of these big mammals, for example *Megatherium americanum* and *Stegomastodon superbus*, were part of man's diet.

In relation with the history of mammals, the South American continent is unique, not only because it is the only continent that, throughout its history, received mammals originated in all the remaining continents, but because man is one of the last incomers (South America was the last big continent populated by mankind), who survived the Megafaunal Extinction. Contrariwise, in Eurasia and Africa there was not such severe Megafaunal Extinction, permitting that such huge mammals as rhinos, hypos, elephants, giraffes, camels, and horses remained living with man up to Present.

About the exhibition

This exhibition consists in 8 skeleton or cranial casts of large South American mammals, extinct since approximately 10.000 years before Present. The casts are made in plastic (expanded polyurethane), with their respective internal supports (iron structures).

Exhibit material and measurements

| | | (length x width x height) |
|---------------------------------|--------------------|---------------------------|
| <i>Megatherium americanum</i> | Complete skeleton | 3,90 x 1,60 x 3,30 m |
| <i>Macrauchenia patachonica</i> | Complete skeleton | 3,10 x 0,80 x 2,30 m |
| <i>Toxodon platensis</i> | Complete skeleton | 3,10 x 1,20 x 1,40 m |
| <i>Hippidion bonaerense</i> | Complete skeleton | 2,70 x 0,55 x 1,55 m |
| <i>Stegomastodon superbus</i> | Skull and mandible | 1,90 x 0,92 x 2,18 m |
| <i>Doedicurus clavicaudatus</i> | Complete skeleton | 3,80 x 1,30 x 1,65 m |
| <i>Smilodon populator</i> | Complete skeleton | 2,05 x 0,65 x 1,21 m |
| <i>Propraopus grandis</i> | Carapace | 1,00 x 0,20 x 0,48 m |



Megatherium americanum

Order TARDIGRADA
Family MEGATHERIIDAE
Megatherium americanum

PROVENANCE: pampas of Buenos Aires province, Argentina, Late Pleistocene (Lujanian SALMA = South American Land Mammal Age)

Megatherium americanum is among the largest ground-sloths ever known, particularly one species of the early Pleistocene. They are among the biggest mammals that lived in the South American continent. During the last 30.000 years before Present, and up to its extinction, occurred about 8.500 years before Present "Megafaunal Extinction", it was one of the most common inhabitants of the southern South American plains (pampas). It was about 6 meters long and weighted around 5 tons. The fore and hind limbs were provided of strong claws. This ground sloth was able to stand upon its hind legs (bipedal position), using the robust tail as a tripod. This position allows the animal to feed on trees, pulling out the branches with its hands, supplied with three enormous claws.

Megatherium americanum coexisted with humans in the Argentinian pampas. Recently, there has been found a new site where its skeletal remains show traces that it was eaten by man. This species also was recorded in Bolivia and Perú. Another species, that typically lived in the intertropical forested regions, through the newborn Panamanian Bridge invaded North America, and lived there along its southern territory.

NOTE: The peculiar torsion of its members –as in the remaining Tardigrada here exhibited– appears to be a feature inherited from scansorial or arboreal ancestors, like the living tamandua or the tree-sloths.



Macrauchenia patachonica

Order LITOPTERNA
Family MACRAUCHENIIDAE
Macrauchenia patachonica

PROVENANCE: pampas of Buenos Aires province, Argentina, Late Pleistocene (Lujanian SALMA = South American Land Mammal Age).

Macrauchenia patachonica was the last surviving member of an exclusive South American order, Litopterna, which originated within this continent from immigrants that, departing from North America, populated it during its long isolation, probably following a discontinuous and circumstantial route. Notable morphologic specializations include the great size, the camel-like neck, the retreated nasals, and the hypsodont cheek teeth. It has the nostrils set well back in the skull roof, which almost certainly indicates the presence of an elephant-like trunk, although shorter. The hypsodont cheek teeth with cementum and fossettes, indicate a grazing rather than browsing diet. In relation with this dietetic habits, along with the remaining mammals here exhibited, this species was a common inhabitant of the southern South American plains, known as pampas. The shape of its skull and body, and particularly the splayed bones of the zeugopodium, are features compatible with a cursorial animal, preferably living in plains. Within the pampas region, by the early Pleistocene Ensenadan SALMA—as was the case with many other South American mammals—there lived one species ever larger than this final Late Pleistocene species.



Toxodon platensis

Order NOTOUNGULATA

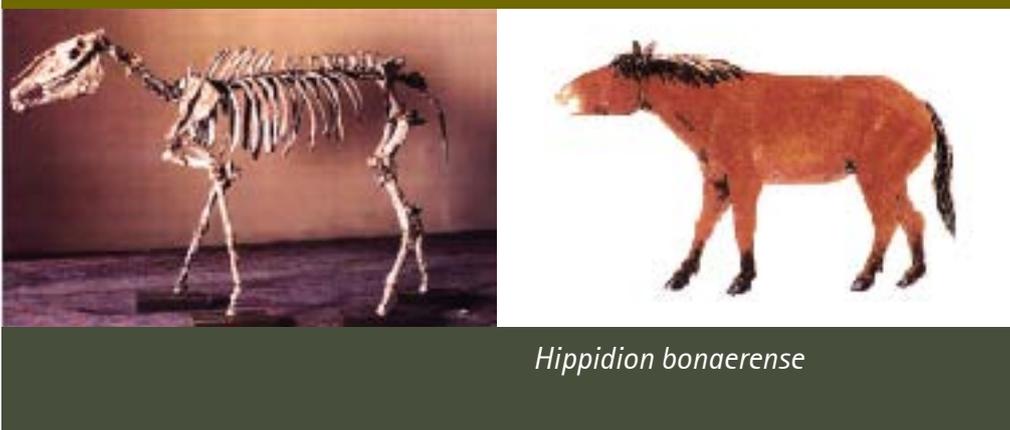
Suborder TOXODONTIA

Family TOXODONTIDAE

Toxodon platensis

PROVENANCE: Buenos Aires province, Argentina, Late Pleistocene (Lujanian SALMA = South American Land Mammal Age)

Toxodon platensis is one of the largest and the latest member of a group, Order Toxodontia, that, like the Litopterna, originated in the South American continent. Within the continent, this order (Notoungulata) differentiated the most regional diversified "ungulates", occupying the role of small and big herbivores, as the present artiodactyls and perissodactyls inhabitant the African prairies. It differentiated animals as small as the smallest living cervids, and as big as the biggest living rhinos. *Toxodon* is built like a short-legged rhinoceros, although the general skeletal structure is more similar to the living hyppopotamus, and apparently had a similar way of life. The dentition shows diastema, with the loss of the last upper incisors and canine, and the first lower premolar, having high-crowned and ever-growing molariforms. Charles Darwin collected the first remains of *Toxodon* in the "pampas" of Argentina. He described it as "...perhaps one of the strangest animals ever discovered". Toxodontids declined in diversity through the late Tertiary, but unlike most other South American ungulate groups survived up the Late Quaternary, and alone among other native "ungulate" groups emigrated northward up to present tropical North America. Like most of the big mammals inhabitant the pampas region, and those from the Early Pleistocene Ensenadan SALMA (South American Land Mammal Age) differentiated the biggest species.



Order PERISSODACTYLA

Family EQUIDAE

Hippidion bonaerense

PROVENANCE: Buenos Aires province, Argentina, Late Pleistocene (Lujanian SALMA = South American Land Mammal Age)

Hippidion bonaerense is characterized by a relative large body size and a greatly retracted nasal notch, in which the nasal bones are delicate, elongated splints. This horse is represented at many late Pleistocene sites in South America. The story of horses (before *Equus*) in South America is in itself interesting: the available evidence indicates that this clade originated in North America, probably from an advanced species of *Dinohippus*, and then dispersed (as a result of the dry-land connection formed by the isthmus of Panamá) into South America. On that continent, a small adaptive radiation resulted in about eight named species within about 2 million years. This species of equid, together with species of the living genus *Equus*, were among the mammals encountered by man when arrived in the continent, and is one of the victims of the Megafaunal Extinction occurred about 8.500 years before Present. That is to say that, there were more than 8.000 years between the time these horses lived in South America and the introduction by Spaniards of the living species. There is none indication that aborigenes domesticated this neither other of the extinct species of horses.



Order PROBOSCIDEA
Family GOMPHOTERIIDAE
Stegomastodon superbus

PROVENANCE: pampas of Buenos Aires province, Argentina, Late Pleistocene (Lujanian SALMA = South American Land Mammal Age)

Stegomastodon superbus pertain to a genus of mastodonts that persisted into the early Pleistocene in North America (as did a related form in Asia). From North America it invaded South America, where they lived up to the end of the Pleistocene. Some fragmentary remains, show that, like most of the Pleistocene big South American mammals, the biggest species lived during the Early Pleistocene Ensenadan SALMA. It was still further advanced in jaw abbreviation, and molar cusps increased to a maximum of seven or eight. The name mastodont refers to its molars features, *mastos*: breast, *mamma*; *dontos*: tooth. This is a feature that differentiates mastodonts (Mammutidae) from the elephants (Elephantidae), whose molar were laminated, and didn't inter in the South American continent. Different localities in South America afforded testimonies that man preyed on mastodonts. Mastodonts are among the victims of men, coconstituing part of its diet.



Doedicurus clavicaudatus

Order CINGULATA
Family GLYPTODONTIDAE
Doedicurus clavicaudatus

PROVENANCE: pampas of Argentina, Late Pleistocene (Lujanian SALMA = South American Land Mammal Age)

This armored mammal was one of the biggest in the Glyptodontidae family: it reached 4 meters in length. As the others glyptodonts, *Doedicurus clavicaudatus* has a complex exoskeleton, constituted by a big and rigid caparace, with thick scutes. The scutes surface is unadorned, but with big perforations. The diameter of the armor is higher than 2 meters. The tail is protected by a caudal tube, with a length between 1,10 and 1,30 meters. Contrariwise to its relative, the still living armadillos (Family Dasypodidae), glyptodonts had a rigid carapace, without having a band of articulate plates that afforded mobility to both rigids dorsal and caudal portions of the carapace. The end of the caudal tube had thick horny spines; the whole tail, with the spines was like a giant club, probably used as a defensive device.

Remains of *Doedicurus clavicaudatus*, together with other glyptodonts, are among the most frequent mammal fossils found in upper Quaternary sediments of the pampas region of Argentina, although it was also recovered in other regions of Argentina, as well as in Uruguay and Brasil. One species Glyptotherium, represents one of the first immigrants that passed to Mexico and southern North America.



Order CARNIVORA
Family FELIDAE
Smilodon populator

PROVENANCE: pampas of Buenos Aires province, Argentina, Late Pleistocene (Lujanian SALMA = South American Land Mammal Age)

Smilodon populator was a saber-toothed cat characteristic of the Pleistocene of America. In the sabertooth felids the upper canines were exceedingly long stabbing and slicing structures; the lower canines were correspondingly reduced. It is believed that the sabertooth preyed mainly upon thick-skinned animals such as Mastodon; the sabers may have been effective in slicing wounds, which would cause death by copious bleeding. Not too long earlier (late Tertiary) to the immigration (early Quaternary) of the sabertoothed felids, there were in the South American continent sabertoothed marsupials, somewhat smaller than *Smilodon* species, but having much more cutting sabertooths. For long it was believed that the competitive action of the newcomers smilodontine was the cause that led to the extinction of the saber-toothed marsupials (*Thylacosmilidae*). It is surprising that none of the saber-toothed felids survived the late Pleistocene, not even in those continents where there was not such strong extinction as the Megafaunal Extinction of both Americas.



Order CINGULATA
Family DASYPODIDAE
Propraopus grandis

PROVENANCE: pampas of Buenos Aires province, Argentina, Early Pleistocene (Ensenadan SALMA = South American Land Mammal Age)

Propraopus grandis was one of the three "giant" armadillos of the Quaternary. Its length was about 1,5 meters and probably weighted around 50 kilograms. It was well adapted to digger activities and could have been one of the builders of large caves and tunnels frequently found in sediments of the early Quaternary in the pampas region. Its skeleton and carapace show very close affinities with the popular living long-nosed armadillo, genus *Dasypus*.

Propraopus grandis diet included invertebrates; it probably feed on anthills or termite nests. This and other big armadillos were living together with its relatives, the herbivore glyptodonts, during the late Tertiary-Quaternary span. This species as other likewise giants, were as big as the smallest glyptodonts, and as them became extinct during the Megafaunal Extinction.



Morenelaphus

Esqueleto completo: 1,60 x 0,55 x 1,80 m

Order ARCTIODACTYLA

Family CERVIDAE

Morenelaphus sp

EPOCH: Pleistocene

LOCALITY: Pampean region, Buenos Aires Province, Argentina

Morenelaphus is a deer characteristic of the Pleistocene of the pampean region of Argentina, and derived from the immigrant fauna of North America. It is similar in size than the recent marsh deer, *Blastocerus dichotomus*. The main difference with other recent and extinct cervids is the morphology of its antlers. They are robust, rounded or oval in transverse section, arched in an S-shape through the longitudinal axis, and with the tips with two or three branches. At the base of the antlers, they have a typical "garceta" (small antler), also with two or three branches. Two species have been registered in Argentina, one in early Pleistocene beds, and another one in late Pleistocene beds.

Order CINGULATA
Family GLYPTODONTIDAE
Sclerocalyptus ornatus

PROVENANCE: Buenos Aires province, Argentina, Late Pleistocene (Lujanian SALMA = South American Land Mammal Age)

The total length of *Sclerocalyptus* was something lesser than 2 meters. In consequence, it was the smallest glyptodont that inhabit Buenos Aires province during the Quaternary.

As the others specimens, the armor is a rigid structure composed by a great number of scutes, with a great variety of shapes. The ornamentation consists in an oval central figure, surrounded by group of smaller figures. The skull is protected by a cephalic scute and the tail by a caudal tube preceded by 4 or 5 rings. At the end of the caudal tube there are 2 oval figures, which probably represent the place of insertion of horny spines or tubercles.

Order RODENTIA
Family DYNOMYIDAE
Eumegamys paranensis

PROVENANCE: Entre Ríos province, Argentina, Late Miocene (Huayquerian SALMA = South American Land Mammal Age)

One of the giant South American fossil rodents were the species of *Eumegamys*. *E. paranensis* had a skull close to 0,70 meters in length, and a bulk presumably comparable to that of a wild boar. It is among the biggest rodents ever known, which populated the South American continent during the Middle Miocene-Late Pliocene span.

Exhibit moving

The exhibition material is protected with airpack and packed in boxes of the following sizes:

| Item | Description | Measurements (mts) (length x width x height) |
|---------------------------------|--|---|
| <i>Megatherium americanum</i> | Skeleton Pelvis | 1,80 x 1,10 x 0,75 1,70 x 1,60 x 1,00 |
| <i>Macrauchenia patachonica</i> | Complete skeleton | 1,20 x 0,80 x 0,70 |
| <i>Toxodon platensis</i> | Complete skeleton | 0,90 x 0,70 x 0,60 |
| <i>Hippidion bonaerensis</i> | Complete skeleton | 0,90 x 0,70 x 0,60 |
| <i>Stegomastodon superbus</i> | Skull and mandible | 1,50 x 1,10 x 1,20 |
| <i>Doedicurus clavicaudatus</i> | Complete skeleton | 2,00 x 1,70 x 1,55 |
| <i>Smilodon populator</i> | Complete skeleton | 1,40 x 0,80 x 1,40 |
| <i>Propaopus grandis</i> | Carapace | 1,66 x 1,05 x 0,70 |
| Other boxes: | 1,00 x 0,66 x 0,77 m 1,45 x 0,76 x 1,05 m | 1,52 x 0,54 x 0,38 m 1,20 x 0,80 x 1,25 m |

Volume: 20 m³

Where was this exhibition displayed

1. "Extinct animals of South America". Tokyo (Japan), July 24-August 31, 1986.
2. "Los alimentos que América dió al Mundo", Expo-Sevilla 92. Sevilla (Spain), 1992.
3. "Extinct mammals -a brief history of mammalian evolution", National Science Museum. Tokyo (Japan), March 18-May 28, 1995.
4. "La 1ra Muestra de Animales Prehistóricos", Predio de Exposiciones de la Dirección de Turismo de Luján (Buenos Aires, Argentina), July 18-September 15, 1996.
5. "2da Feria Artesanal del Mundo y de Comunidades Indígenas", FUNDARQ (Fundación Arqueológica del Litoral). Santa Fe and Rosario (Santa Fe, Argentina), October 1996.
6. "1ra Feria Nacional e Internacional de Artesanos y Culturas del Mundo" auspiciada por la Subsecretaría de Industria y Comercio-Subdirección de Comercio Exterior de la Provincia de Corrientes y la Fundación EXPORT AR. Puerto Corrientes (Corrientes, Argentina), November 21-December 2, 1996.

7. "Últimos grandes mamíferos que convivieron con el hombre", Museo "Dr. Angel Gallardo". Rosario (Santa Fe, Argentina), July 7-November 20, 1997.
8. "Grandes mamíferos fósiles", Centro de Participación Comunal (C.P.C. COLON), Zona N° 4 - Av. Colón 5300. Córdoba (Argentina), May 16-June 30, 1998.
9. "Grandes mamíferos fósiles", Centro Municipal de Congresos y Convenciones de la ciudad de Cosquín (Córdoba, Argentina), July 5-August 18, 1998.
10. "112da Exposición de Ganadería, Agricultura e Industria Internacional", Predio Ferial de Palermo (Buenos Aires, Argentina), July 23-August 16, 1998.
11. "Grandes mamíferos sudamericanos del Pleistoceno", Museo Histórico y Regional de Ayacucho. Ayacucho (Buenos Aires, Argentina), March 4-May 3, 1999.
12. "113ª Exposición de Ganadería, Agricultura e Industria Internacional" (Stand de la Gobernación de la Provincia de Buenos Aires y Comisión de Investigaciones Científicas), Predio Ferial de Palermo (Buenos Aires, Argentina), July-August 1999.
13. "La megafauna de mamíferos sudamericanos. La última extinción", Salón de Bellas Artes (Esquel, Chubut, Argentina), January 10-February 18, 2000.
14. Megatherium and Doedicurus in "Muestra del Redescubrimiento" (Sao Paulo, Brasil). April 2000.
15. "Grandes mamíferos extinguidos", Museo de Arte "Angel María de Rosa" and Museo Histórico de Junín (Junín, Buenos Aires, Argentina). June 10-July 30, 2000.
16. "Grandes mamíferos sudamericanos del Pleistoceno", Centro de Investigaciones Científicas y de Transferencia de Tecnología a la Producción de Diamante-CONICET (Diamante, Entre Ríos, Argentina). August 3-September 5, 2000.
17. "The huge extinct South American mammals from the Late Quaternary Period", National Museum of Natural Science of Taiwan (Taichung, Taiwan). October 18-April 17, 2002.
18. "Conociendo nuestros animales prehistóricos", Museo de Historia Natural de San Rafael (Mendoza, Argentina). July 4-August 15, 2002.
19. "Conociendo nuestros animales prehistóricos", Parque de la Ciencia (Fundación Eureka) (Mendoza, Argentina). August 17-September 29 2002.
20. "Réplicas de mamíferos fósiles del Cuaternario", Segundas Jornadas Universidad/Comunidad ExpoUniversidad, Pasaje Dardo Rocha (La Plata, Buenos Aires, Argentina). September 8-19, 2003.