

# A NEW SAUROPOD FROM THE UPPER CRETACEOUS

*Chubutisaurus insignis* gen. et sp. nov.

(Saurischia-Chubutisauridae nov.)

from the Upper Cretaceous (Chubutiano), Chubut, Argentina\*

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## ORIGINAL ENGLISH SUMMARY

In this work (preliminary) are described the fossil remains of a gigantic Sauropod Reptile from the Upper Chubutian (Upper Cretaceous) – probably Senonian—whose typical locality is in the Departamento de Paso de Indios, province of Chubut.

It is a big Sauropod, of heavy construction, with the cervical vertebrae concave-convex, with great pneumatic cavities in both upper halves, separate by a bony bar. The dorsals are big probably with great neural spines and with great and deep cavities (pleurocoelus condition), structure cavernous, flattened in antero-posterior direction. The proximal caudals big, compact, with proximal surface flattened and the distal one concave, with great transverse apophysis and neural spines separate, short and stout, the more distal vertebrae without such apophysis, which are slightly amphicoelic. Big femur, of solid construction, fourth trochanter slightly prominent. Radius stout, with distal end of triangular shape. The fore limbs shorter than the hind limbs. Due to these characteristics which, by one hand differ completely from those of the known Titanosaurids, and as they are not in accord with those of known Sauropods from the Cretaceous, such Sauropod is named *Chubutisaurus insignis* gen. et sp. nov., and the family *Chubutisauridae* nov. is founded.

## INTRODUCTION

In the month of February of 1965, an excursion was carried out to the province of Chubut, with the objective of extracting dinosaur bones, announced to this Museum by the Ing. Agronomer Julio Fernandez Duque, who in that moment worked in I.N.T.A. of Trelew. In the first of their trips, near the area of Mirasol, approximately 300 kilometers in a straight line from Trelew (toward the interior of the province) and in the area of Cerro Barcino or Cerro Winches (on the maps) they discovered the weathered bones of these large reptiles. The weathered bones and the portion of those that outcrop *in situ*, were located by a rancher of the area, of the name Martínez, around the year 1961. This information was obtained then (1965) by means of Martínez's widow.

The extraction of a large quantity of material took us some 30 days of continuous work, and even diagnosis of the rock is as follows:

"Macroscopic description: rock jagged with ashy aspect and clear gray greenish color. Possesses irregular fractures and earthy appearance. In the middle of the abundant

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aphanitic mass, one sees scarce and small angular clasts of quartz, and isolated opaque feldspathic shards. Greenish and/or lightly reddish stains are darker in the rock, seemingly corresponding to altered femic rocks. Microscopic description: Constituting this rock are diminutive pyroclasts of quartz, plagioclase of subhedral section and flaky remains of chestnut color, attributable to altered biotite. The matrix is constituted by fine ash material partially masked by chloritic flakes and veins, resulting from hydrothermal infiltration. Stains and veins of glassy brown color are also observed that contain silicic projections in some portions.”

The material that was obtained in situ comprises a large amount of bones of a disarticulated skeleton of a gigantic sauropod. Within the sediment that covered the bones appeared unexpectedly five teeth of different size of a carnosaur- *Megalosaurus inexpectatus* del Corro, 1966.

The material mentioned comprises: 9 caudal vertebrae, 1 dorsal vertebra or dorso-lumbar with deep pleurocoels, 1 incomplete cervical vertebra with a large cavity in the preserved half, 1 complete left femur, 1 complete left humerus and other bones of the limbs in a good state of preservation.

## TAXONOMY

Class: Reptilia Linnaeus  
Order: SAURISCHIA Seeley 1888  
Suborder: SAUROPODOMORPHIA von Huene 1932  
Infraorder: SAUROPODA Marsh 1878  
Family: CHUBUTISAURIDAE nov.  
Genus: *Chubutisaurus* nov.  
Type species: *Chubutisaurus insignis* nov.

*Etymology*: Chubut (Argentine province), sauros (gr.) lizard.

*Type species*: *Chubutisaurus insignis*, new species.

*Diagnosis*: the same for that of the type and unique species.

*Chubutisaurus insignis* sp. nov.

*Etymology*: *Chubutisaurus insignis* (lat.), notable, distinguished, in reference to the size of the limbs and of the vertebrae.

*Type specimen*: M.A.C.N. 18.222, a partial and disarticulated skeleton, missing the skull, cervical vertebrae, dorsal vertebrae, sacrum, some caudals and the bones of the phalanges.

*Type locality*: According to cadastral location of the province of Chubut (Argentina) comprising: Section B, fraction D, between the portions 2 and 9 (portion 9, league A), approximately between 68°20' W. Gr. and 43°30', Department of Paso de Indios.

*Horizon*: Upper Chubutiano (probably Senonian).

*Diagnosis*: (preliminary): Large sauropod, of massive construction, with concave-convex cervical vertebrae with large pneumatic cavities in both halves, separated by an

osseous bar. The dorsals large, probably with large neural spines and with double pleurocoels and of flat and cavernous structure. The caudals solid, with the proximal surface flat and the distal concave, with thick transverse apophyses and separate, short and robust neural spines. Femur large, of massive construction, with the fourth trochanter slightly prominent. Humerus large with the deltopectoral crest extremely pronounced, similar to that of *Bothriospondylus madagascariensis*. Ribs generally broad, principally those of the middle part of the body.

*Description:* (preliminary): The cervical vertebra is characterized above all by the large oval cavity that occupies the preserved half (right) in antero-posterior sense, the canal almost begins in the concave border of the vertebra, with a smooth surface, slightly concave, presenting toward the convex extreme two cavities, one larger than the other, then abruptly a deep cavity inclined toward the center of the same, one of whose walls with that of the adjacent one (that has not been preserved) form the bar, somewhat thick that serves for separation among both cavities.

The form of this vertebra and the cavity resembles the vertebra of *Bothriospondylus magnus* figured by Owen in 1875 (pl. VIII) but the cavity present in that of *Chubutisaurus* is larger and of different form. The next vertebra in study presents in its concave portion (distal) a porous structure (they are small sediment spheres, surrounded by fine trabeculae, of dark color of what was osseous tissue); the rest of the body of this vertebra also presents a similar structure.

*Dorsal vertebra:* I believe that it is the first dorsal vertebra (since nothing more than this has been collected) because it presents a concave surface for the insertion of a dorsal, the posterior part is planar. Vertebra of large dimension, smooth profile, unfortunately incomplete, because the apophyses have not been preserved, that apparently were large. On both sides of the centrum large extremely deep cavities (pleurocoels) are observed; the entrance opening has an irregular elliptical form; this cavity has a lightly oblique direction toward the posterior part of the vertebra and is separated from the neural canal by a fine bony partition. In the walls of the pleurocoels spongy tissue is distinguished. In the planar posterior part an irregular surface is seen, with porous osseous tissue of irregular shapes, the measurements of the preserved part of this vertebra, deformed by pressure are: maximum width 36.9 cm., maximum height 31 cm., thickness 16.9 cm.

*Caudal vertebrae:* The caudal vertebrae present the same characteristics, some present deformations by effect of post-mortem pressure. Those of larger size, evidently of the section proximal to the sacrum, are plano-concave, the planar side of the centrum is heart-shaped and the concave is frankly rounded, of practically flat surface, one that presents some irregularity that I attribute to marks left by intervertebral cartilages. Present in the sides of these vertebrae, immediately under the transverse apophyses (that present forward inclination) is an abrupt constriction that, in the ventral part of the same, is transformed in a smooth furrow, in antero-posterior sense, with its borders also of smooth slope. One of these large vertebrae presents two short neural spines above the neural canal, originating separately, they are robust (the same as the transverse apophyses) in their inferior part they are rounded, being smoothed toward the end, in their inferior part, and the form is spatulate. In lateral view these neural spines are extremely inclined (almost horizontal) toward the end of the tail. In none of the vertebrae marks of haemopophyses are seen, only in one of the small, is seen in the postero-inferior

extreme, two triangular marks that indicate the presence of haemopophyses (of which only two were collected in the form of a Y.)

The mentioned vertebra, presents both lightly concave faces and one of them has been polished to show that they are completely compact.

The femur obtained, is complete (left) and is a robust bone, similar to the majority of femora of the sauropods, and as Lydekker noted in 1895, these bones generally do not give well marked generic characters. In the case of *Chubutisaurus*, one can add that it is much more robust and large than the femur of *Antarctosaurus wichmannianus* von Huene, and that the 4<sup>th</sup> trochanter is extremely delicate, somewhat lengthened. In the interior of the parts of the femur that fissured when extracting it, is seen in the central part, irregular figures that indicate that the central part the bone was lightly spongy.

Humerus, large bone, with an extremely pronounced deltopectoral crest that recalls that present in the humerus of *Bothriospondylus madagascariensis* Lydekker, figured by Thevenin in 1907 (pl. II.).

*Comparisons:* The current systematics of the sauropods is characterized by confusion. On one hand, as noted recently by Ostrom (1970: 76), the materials are large and difficult to manipulate, there are very few complete examples and the large majority of the species have been founded on incomplete and undiagnostic fragments, and on the other, different classifications have been made. We see this in that Lapparent and Lavocat (1955) recognized in the sauropods 6 families: cetiosaurids, brachiosaurids, camarasaurids, astrodontids, diplodocids, and titanosaurids.

Romer (1956) recognizes the families Brachiosauridae and Titanosauridae both with four subfamilies. Ostrom (op. cit.) says that this is because most of the taxa referred to any one of these categories, are based on fragmentary material, few are established firmly and the suprageneric categories are but very weakly defined.

In accordance with this the material of the Upper Cretaceous of Chubut is assigned to a new family, since it definitively is not a titanosaurid and the myth that the Argentinean and South American (Brazil) sauropods (the great majority) belonged to this family has collapsed.

Of the available bibliographical material, I have only found similarity of the cervical vertebra with that figured by Owen in 1875, of *Bothriospondylus magnus* of the Wealden of the Isle of Wight (England), and with some of the vertebrae figured by Lydekker (1895) of *B. madagascariensis* of the Middle Jurassic of Madagascar, Thevenin (1907) also has figured some bones of this species. Von Huene (1929:102) has made criticisms of this material, and according to the calculations made by this paleontologist of the measurements of the bones of the extremities, I have the impression that said animal cannot be within the variation that the chubutisaurids could present. Recently L. Van Valen (1969:624) has expressed that "*Antarctosaurus* contains three nominal species, *A. giganteus* and *A. wichmannianus* from Patagonia and *A. septentrionalis* from India. The first two are represented by unique specimens from the same strata and morphologically they are connected by a specimen not assigned to species. Therefore I consider them as stages of growth of the same species and I choose the name *A. giganteus* for conservation. In animals as large as the sauropods, the coexistence of two congeneric species is unlikely and in fact has not been demonstrated in this case or in any other one that I know."

This could well be the case for *Chubutisaurus insignis*, since, apart from some bones, broken into fragments, that could be of *Megalosaurus inexpectatus* del Corro, bones like a portion of scapula with the proximal extreme preserved exist, of smaller size than the scapula of the type, that I in principle attribute to a juvenile individual.

*Affinities:* Outside of that said above, and within the sauropod reptiles of the Cretaceous I have not found similarity with any of the well-known genera.

*Austrosaurus mckillopi* Longman, of the Lower Cretaceous of Queensland (Australia), not sufficiently known, is to my view in the same position as *Ch. insignis*, although Longman (1933:141) placed it tentatively in the family Cetiosauridae, as a specialized member. Romer (1956) locates it in the incertae sedis sauropods.

It seems that Carlos Ameghino already had his doubts that the sauropods of Patagonia didn't exclusively belong to the family Titanosauridae, as shown by Wichman (1918) who, when referring to the Cretaceous sediments with remains of dinosaurs in Neuquén, wrote (p. 96) "in front of General Roca this complex... These layers that give the landscape a picturesque aspect with their lively colors, constitute the location of colossal dinosaurs, of which there have been collected parts of skeletons, those that are now in the Museo Nacional de Buenos Aires<sup>(1)</sup>. According to Carlos Ameghino it is not a *Titanosaurus* but of a genus similar to *Diplodocus*."

As is seen a total revision of the Argentinean sauropods is necessary.

*Chubutisaurus insignis*, in my way of seeing, seems to have some relationship with *Bothriospondylus madagascariensis* Lydekker, but what is disconcerting, is the geologic age of the same, the first of the Upper Cretaceous, the second of the Middle Jurassic. Although we could presume that a nexus of union exists among them, we will have to wait for future discoveries from the Middle and Upper Jurassic of South America and especially from Patagonia. We already have *Amygdalodon patagonicus* Cabrera 1947, from the Middle Jurassic of Chubut (Pampas of Agnía) that Cabrera placed in the family Cetiosauridae.

#### BIBLIOGRAPHY see original publication

#### FIGURE CAPTIONS

Figure 1. – Cervical vertebra of *Chubutisaurus insignis* gen. et sp. nov. Size somewhat smaller than normal. See text.

Figure 2. – Same as previous, seen by the distal part. Measurements see text.

Figure 3. – Lateral view of a dorsal vertebra of *Chubutisaurus insignis*, gen. et sp. nov. The lateral-pleurocoel cavity is noted. Measurements see in the text.

Figure 4. – Lateral view of a caudal vertebra with its neural spine very inclined; note its plano-concave centrum and the depression in the inferior part. Measurements see in the text.

Figure 5. – The same vertebra, seen in inferior view, where the smoothly grooved furrow and the lateral depressions are able to be appreciated.

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<sup>(1)</sup> At the moment I have not been able to locate these remains in the collection of Vertebrates of the Museum.

Figure 6. – Lateral view of a caudal vertebra of *Chubutisaurus* gen. nov. and a caudal vertebra of *Antarctosaurus* sp. (Fam. Titanosauridae). Both, slightly of smaller size than normal.