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A NEW MEGALOSAUR (CARNOSAUR) FROM THE CRETACEOUS
OF CHUBUT (ARGENTINA)*

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INTRODUCTION

This is the study of a tooth from a carnosaur of great size that was discovered by Drs. Ferello and Flores, geologists from the Yacimientos Petrolíferos Fiscales, in the course of the 1949 campaign in the province of Chubut. The tooth, which was given to the Museum, was found together with large bones that for obvious reasons were not extracted.

Order SAURISCHIA
Suborder Theropoda
Infraorder Carnosauria
Family **MEGALOSAURIDAE** Huxley 1870
Genus **Megalosaurus** Buckland 1824¹

* Original title: "Un nuevo megalosaurio (carnosaurio) del Cretacico de Chubut (Argentina)".

¹ F. von Huene (1956) said *Megalosaurus* Cuvier; Romer (1956) *Megalosaurus* Buckland 1822; Walker (1964), *Megalosaurus* Parkinson 1822, Lapparent and Lavocat in Piveteau, *Traité de Paléontologie*, V. 1955, gave *Megalosaurus* Buckland, 1824. von Huene in his

Megalosaurus chubutensis nov. sp.

Type. No. 18.189 Mus. Arg. C. Nat. "B. Rivadavia". Cat. Pal. Vert.

DESCRIPTION.

Incomplete caniniform tooth, worn at the point, of large size, robust, and curved. The tooth in itself is not very well preserved. Its edges are sharp with very fine denticles, which generally are attenuated towards the apex in megalosaurids. The anterior part (convex) bears denticles that stop approximately 1 cm from the base, in contrast to the posterior part (concave) which bears denticles along the entire length of its edge. The posterior face of the tooth is fairly convex, in contrast the anterior is nearly flat towards the posterior border. The surface of this caniniform² tooth is polished, in parts showing enamel that is very finely striated in the vertical direction. The slightly concave undulations towards the point as seen in *M. saharicus* Depéret and Savornin and in *M. inexpectatus* del Corro are not distinguished. Its aspect recalls the tooth of *M. insignis* Deslongchamps, figured by de Lapparent (1943, pl. 1, fig. 1). On the base the tooth has an oval shape.

Measurements: Preserved length, taken on the anterior side, 74mm.

Total length calculated <i>circa</i>	85 mm
Maximum thickness at the base	22 "
Maximum width	35 "

Horizon and Age. Cerro Castillo Formation. Upper Member. Middle Chubutian (= Green Tufas of Feruglio)³. Possibly the upper part of the Lower Cretaceous⁴.

work, "The carnivorous Saurischia in the Jura and Cretaceous formations, principally in Europe," *Rev. Mus. La Plata* v. 29, 1926 (p. 45) expressed that the first description was made in 1824 by W. Buckland in *Trans. Geol. Soc. London*, no. 21, with the title, "Notice on the Megalosaurus or great fossil lizard of Stonesfield," and that the species *M. bucklandi* was thus named by H. von Meyer in 1832.

² De Lapparent (1943) (p. 11) said that it was named thus among the megalosaurids one or various teeth enough larger than the others, situated towards the middle of the tooth row, and that had the functional role of canines in eminently carnivorous animals.

³ Feruglio in "Descripción Geológica de la Patagonia" 1949, vol. 1 (p. 245), mentioning the diverse fossil reptiles of the Chubutensian or Chubutian, wrote: "That end to mention are so only the more important discoveries, because fragments and chips of bone are found in most other points, on all within the Upper Section of the Chubutensian, although not lacking either below, for at least towards the section inclusive of the Green Tufas".

⁴ According to oral communication of Dr. M. A. Flores of Y. P. F.

Geographic locality. North of Cerro Crettón. Mallín Grade farm. Department of Sarmiento. Province of Chubut (Argentina).

Comparisons. The caniniform tooth of *M. chubutensis* nov. sp., different in size, by its form typical of megalosaurids, resembles *M. insignis* Deslongchamps, *M. pannoniensis* Seeley and *M. inexpectatus* del Corro by the denticles of the anterior border, which end on its lower third; it differs from *M. superbus* Savage, *M. crenatissimus* Deperét and *M. saharicus* Déperet by having denticles along the lengths of both sharp edges, from *Dryptosaurus medius* (Marsh) because these teeth also bear crenulations on both edges. Likewise *M. saharicus* shows a series of concentric undulations on the tooth faces that are similar to those presented by *M. inexpectatus* and that are not seen in the aforementioned species.

Considerations. Depéret and Savornin (1927:263) expressed that considering only the tooth characters, a series of "continuous mutations" could be conceived according to the disposition of the denticles on the sharp edges of the teeth. Meanwhile in all the species these denticles extend along the entire extent of the posterior edge, whereas they are limited to the upper third of the anterior edge in older species such as *M. bucklandi* (Middle Jurassic), and are extended onto the upper half of this edge in more recent forms such as *Streptospondylus cuvieri* from the Oxfordian, *M. insignis* (Kimmeridgian and Portlandian), *M. dunkeri* (Upper Jurassic, Purbeckian and Lower Cretaceous, Wealdian); in the Upper Cretaceous species such as *M. superbus* of the Albian and *M. crenatissimus* of the Turonian (lower part of the Upper Cretaceous), the denticles are finer and extend along the entire anterior edge. Without doubt this is neither the case with *M. chubutensis* (probably upper part of the Lower Cretaceous–Cenomanian or Turonian) nor *M. inexpectatus* (Senonian–Upper Cretaceous), wherein as already noted the crenulations do not extend along the entire anterior face.

Likewise, in *M. insignis* (Upper Jurassic) the crenulations of the anterior side begin or leave off slowly, in *M. chubutensis* the denticles are robust and begin or leave off almost brusquely, whereas in *M. inexpectatus* the crenulations begin or leave off as in *M. insignis* and are finer. This weakens in part that which the aforementioned authors expressed.

De Lapparent (1943), according to the figures given by various investigators, is of the opinion that the presence and disposition of the crenulations or denticles are not absolutely constant characters in all teeth of the same individual, and that these variations

could correspond to the position on the mandible, which clearly is impossible to appreciate when isolated teeth are presented.

Commentary. The name Dinosauria was coined by Richard Owen in 1841 in his *Report on British Fossil Reptiles* (p. 103), in which he wrote regarding these reptiles: "However, the combination of such characters, some, as the sacral ones, altogether peculiar among Reptiles, others borrowed, as it were, from groups now distinct from each other, and all manifested by creatures far surpassing in size the largest of existing reptiles, will, it is presumed, be deemed sufficient ground for establishing a distinct tribe or sub-order of Saurian Reptiles, for which I would propose the name of *Dinosauria*."

"Of this tribe the principal and best established genera are the *Megalosaurus*, the *Hylaeosaurus*, and the *Iguanodon*...".

The megalosaurids were large and heavy theropods, with a relatively large skull, compressed teeth with serrated edges, and a long lower jaw. The relatively short forelimbs bore digits with long, curved claws, the hindlimbs had the femur longer than the tibia and feet with functional digits.

According to Smith Woodward (1910), all megalosaur skulls are quite similar and it is difficult to find generic differences among them; they could hardly be distinguished except by the number and disposition of their premaxillary teeth, which seem to be constant in each genus.

According to Depéret and Savornin (1927), towards the middle of the tooth row, above and below, one or perhaps several teeth notably longer than the others and with the functional role of canines are found in megalosaurids, to which these investigators gave the name "caniniform teeth". The other teeth, considerably shorter and less posteriorly curved, are still not entirely free from the alveoli and in this state have the role of incisors and molars. Depéret and Savornin designated them with the name "alveolar teeth".

The megalosaurid family debuted in the Infra-Lias of Mosela, represented by a small species described by Terquen and P. Gervais, but lacking a specific name.

The family continues into the Lias of Lyme Regis (England) and is more abundant in the Lower Jurassic. According to Depéret and Savornin (*op. cit.*), the type of the genus is the species *Megalosaurus bucklandi* Meyer 1832, found in the lower Bathonian of Stonesfield, but it soon existed in the Inferior Oolite of Bridport and next in the Great Oolite and in the Forest Marble (upper Bathonian).

In the Upper Jurassic, megalosaurids are entirely represented by teeth, and have been indicated in England and the north of France. The remains of these dinosaurs are found in almost the entire thickness of Cretaceous terrains.

From the Wealdian of Hanover, Koken in 1887 made known *Megalosaurus dunkeri*, with smaller teeth than *M. bucklandi*. Megalosaurids were discovered in the Albian of the Paris Basin, described by Sauvage in 1882, and were named *M. superbus*, although it is more probable that this species pertains to a different genus than the Bathonian *Megalosaurus* and is closer—but not identical—to *Dryptosaurus* Marsh from the Greensand, New Jersey (U.S.A.). The caniniform tooth of *M. superbus* Sauvage is stronger than that of *M. bucklandi* and the anterior edge is serrated along its entire length. Ch. Depéret in 1896 made known from the Upper Cretaceous of the west coast of Madagascar—Mevarana—*M. crenatissimus*, a form whose have a more recurved point in the posterior part, and edges with denticles along their entire lengths as in *M. superbus*. The describer made evident the affinities with the North American genus *Dryptosaurus*.

In 1881 Seeley described *M. pannoniensis* from the Senonian of Austria. Megalosaurids continue almost up to the end of the Cretaceous, as indicated by the case of *M. bredai* Seeley 1883, based on a femur found in the Upper Cretaceous of Mäestricht (Mäestrichtian).

The results of this is that the megalosaurid family of carnosaurs extended from the Rhaetian to the Mäestrichtian. Depéret and Savornin (op. cit., p. 263) asked whether it was a single phyletic branch, with progressive and continual evolution. The solution of this problem is more delicate because most of the described species, except those from the Middle and Lower Jurassic, are founded only on isolated teeth, and their skeletal characters are very poorly known. And a great danger exists in founding affiliations on the consideration of a single structure.

This is evident in the case of carnosaur teeth, but the tooth of *M. chubutensis* is brought to light with the objective of demonstrating that near the great sauropods of Patagonia and South America lived great bipedal reptiles that preyed on them. In all parts of the world the remains of carnosaurs are scarce enough relative to herbivorous sauropods, but, as is known, there is a biological law that regulates the equilibrium of the fauna; the paucity of carnosaurian remains in our Cretaceous is an enigma when faced with the great quantity of sauropod remains found.

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FIGURE CAPTIONS

Figure 1. Tooth of *Megalosaurus chubutensis* nov. sp. x 2.

Figure 2. Tooth of *Megalosaurus chubutensis* nov. sp., viewed by the anterior edge, in which the places where the denticles of this edge begin and end can be appreciated. x 2.