

**DISCOVERY OF A HADROSAURID DINOSAUR (ORNITHISCHIA,  
ORNITHOPODA) IN THE ALLEN FORMATION (UPPER CRETACEOUS) OF  
SALITRAL MORENO, PROVINCE OF RÍO NEGRO, ARGENTINA\***

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**ORIGINAL ENGLISH ABSTRACT**

A partially articulated skeleton of an hadrosaurid (Ornithischia, Ornithopoda) found in the Lower Member of the Allen Formation (Upper Cretaceous, Maastrichtian) of Río Negro province, is preliminary described. It is considered a Lambeosaurinae? because of the morphology of the axial skeleton. The association of titanosaurid and hadrosaurid dinosaurs at Salitral Moreno is reported.

KEY WORDS: Paleontology – Cretaceous – Dinosaurs – Hadrosauridae – Allen Formation

INTRODUCTION

In contrast with the titanosaurid dinosaurs, the hadrosaurids constitute a poorly represented group in the South American fossil record, being limited at the moment to the discoveries made in the High Upper Cretaceous of Argentina, located in the provinces of Chubut (Brett-Surman, 1979) and Río Negro (Casamiquela, 1964; 1980 and Bonaparte, 1984). Only two taxa are formally described: Secernosaurus koerneri Brett-Surman 1979 and Kritosaurus australis Bonaparte et al. 1984, both included in the Subfamily Hadrosaurinae. On the other hand, Alonso (1980) described ichnites assigned to the Family Hadrosauridae and recently Alonso and Marquillas (1986) have recognized two ichnoforms attributed with doubts to that family that proceed in both cases from the Province of Salta.

The objective of the present contribution is to make known, in a preliminary manner, well preserved postcranial remains of a hadrosaur of great size, that were obtained during a campaign of paleontological exploration made in the month of March of 1984. These tasks were carried out in combined form, by the Facultad de Ciencias Naturales of the Univ. Nac. de Tucumán and the Museo Prov. "Carlos Ameghino" de Cipoletti, Province of Río Negro.

GEOGRAPHIC AND STRATIGRAPHIC ORIGIN

The material that is presented comes from an area located in the southeastern border of the depression of Salitral Moreno that is about 20 kms to the south of General Roca, Province of Río Negro.

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The fossiliferous level is constituted by poorly sorted medium to coarse yellowish, sometimes gray greenish, sandstones, that compose a sequence correlative to the "sandy" Miembro Inferior, described by Andreis et al. (1974) in the area of Lago Pellegrini, of the Allen Formation (Cazau and Uliana, 1973).

The estimated age for this unit is Upper Cretaceous (Lower Maastrichtian) and is based on an association of foraminifera coming from the upper levels of the Allen Formation in the area of Lago Pellegrini (Ballent, 1980).

The levels bearing the material that is described here have provided an abundant collection of isolated remains of the following taxa: Family Titanosauridae - Titanosaurinae and Saltasaurinae - (Powell, 1986); Titanosauridae indet. (bony remains, teeth, and eggs); Theropoda indet. (teeth); Aves (frag. of tibia); Chelonia indet. (bony frags.); Gastropoda indet. and abundant remains of plants, trunks, and fruits.

#### PALEONTOLOGY

ORDER ORNITHISCHIA  
FAMILY HADROSAURIDAE  
LAMBEOSAURINAE? indet.

The material that is made known was found almost completely articulated and includes the following elements: 4 incomplete dorsal, 8 sacral, and 25 caudal vertebrae; fragments of ossified ligaments in original position; several hemapophyses and fragments of ribs; incomplete left scapula; both femora, tibiae, and fibulae complete; left and right calcanea and distal tarsals; left astragalus and foot.

This material belongs to the Museo Prov. "Carlos Ameghino" de Cipoletti, Prov. of Río Negro and it is temporarily deposited in the Colección de Paleontología de Vertebrados Lillo, for its preparation and study.

#### Preliminary description

It is a hadrosaur of great size, somewhat smaller than Barsboldia sicinskii Maryanska and Osmolska 1981. The sacrum is constituted by 8 vertebrae, the anterior endowed with a ventral crest as in the lambeosaurines (Brett-Surman, 1979) and relatively longer neural spines than in Hypacrosaurus Brown 1913 and Barsboldia sicinskii. These progressively increase in width and thickness toward the distal end. The anterior caudal vertebrae have a short body, weak neural arch and very long neural spines (length equivalent to 4.8 times the height of the centrum in the 1<sup>st</sup> caudal); are narrow and of little thickness in the base, progressively increasing in both dimensions toward the distal extreme, as in Barsboldia. The right ilium has been preserved complete, except the distal portion of the preacetabular process and part of the lateral face. Its axis is slightly recurved downward as in Lambeosaurus (Brett-Surman, 1975; fig. 4d). The main body of the ilium is higher than in Kritosaurus incurvimanus (Brett-Surman, 1975, fig. 4c). The antitrochanter is wide, prominent, and its approximately straight distal border is somewhat inclined down and backward. The postacetabular process is wide, with its axis recurved down in the distal end; its ventral border is more concave than in K. australis and its dorsal markedly convex. Its general aspect is intermediate between the "types 4 and 5", exemplified with Lambeosaurus and Parasaurolophus,

of Brett-Surman (1975). Surprisingly, the ischium doesn't have a distal expansion, being more similar to Kritosaurus (Brett-Surman, 1975; 1979; and Bonaparte et al., 1984). The scapular blade widens toward its distal end where it terminates in a straight border, perpendicular to the axis of the blade, that clearly differs from the hadrosaurines (Brett-Surman, 1975; fig. 1a.). The femur has an anterior intercondylar canal almost closed by the foremost portion of the condyles whose borders are separated by only 2 mm. As in most of the hadrosaurids it possesses ossified calcanea. The left foot has been almost completely preserved and articulated. It shows a bony callus in metatarsal II that was surely developed as a consequence of a fracture.

#### COMMENTS

Given the preliminary character of this study, we will not discuss in detail the taxonomic problems that this specimen outlines. The hadrosaurid of Salitral Moreno presents diagnostic features of the lambeosaurids pointed out by Brett-Surman (1979), such as the great relative height of the neural spines and the presence of a ventral crest in the sacral centra. Only the morphology of the distal end of the ischium escapes the diagnostic features of the Subfamily Lambeosaurinae, whose significance should still be evaluated. On the other hand, it differs from the hadrosaurines (among which are classified Kritosaurus australis Bonaparte et al. 1984 and Secernosaurus koernereri Brett-Surman 1979) that possess relatively short neural spines and ventral depressions in the sacral centra. It is, in our opinion, of a new form for South America, of peculiar characteristics that require a broader analysis to be developed soon.

The evidence obtained in the locality of Salitral Moreno indicates that titanosaurid and hadrosaurid dinosaurs cohabited in approximately similar numerical proportions in this area. The association of both types of dinosaurs has already been recognized in other localities in the Province of Río Negro: Ingeniero Jacobacci (Casamiquela, 1980) and Los Alamitos (Bonaparte, et al. 1984), although in these localities the hadrosaurids are more abundant than the titanosaurids. It calls attention, in this sense, to the absence of hadrosaurids in the Miembro Inferior of the Allen Formation in Lago Pellegrini and Cincos Saltos that have provided abundant collections of dinosaur remains of the Family Titanosauridae.

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#### LIST OF WORKS MENTIONED IN THE TEXT

See original publication.

#### FIGURE CAPTIONS

Fig. 1. Area of Salitral Moreno, Province of Río Negro, Argentina. Site of discovery of the hadrosaurid. Level curves: equidistant 62.5 m. Taken from Map 36f. Gral. Roca.-Dir. Nac. de Geología y Minería. Dep. de Geografía, Río Negro.

Fig. 2. Lambeosaurinae? indet. Right lateral view of the sacrum, ilium, and eight articulated caudal vertebrae.

Fig. 3. Posterior view of the second caudal vertebra.