

*ON A PORTION OF THEROPOD MANDIBLE
FOUND IN THE UPPER CRETACEOUS OF MADAGASCAR*

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The presence of theropods in the Upper Cretaceous of Madagascar was noted around 1896 by DEPÉRET, based on teeth that he likened to similar teeth from India, making from the group a new species, *Megalosaurus crenatissimus*. Some other remains, notably an ungual phalanx and vertebrae, were attributed to the same animal. No bones belonging to the head have been published until now, and the portion of mandible that will be described is the first for Madagascar¹. It is a right dentary. I will recall briefly here the circumstances of its discovery. Found, while excavating the sandstones to collect yams, by a native of the country who was naturally entirely unaware of its importance, this dentary, complete and intact in the locality, was broken and fractured by this man. Happily, at the time of my paleontological survey carried a month later, supported with teeth, he saw these teeth and understood at once the interest of his lucky find. A visit to the place, along with subsequent excavation of the spoil, permitted recovering not all, alas, but at least the most essential fragments. The discovery site is three meters above the bed of a river in a box ravine, two or three kilometers north of the Berivotro hotel, this village being located on the route to Majunga near kilometer 527. The bed could be very slightly inferior to that of the strict Berivotro horizon; it is in any case within the continental Upper Cretaceous.

ANATOMICAL DESCRIPTION.

* Original reference: Lavocat, R. 1955. Sur une portion de mandibule de Théropode provenant de Crétacé supérieur de Madagascar. *Bulletin du Muséum*, 2e série, 27(3):256-259. Translated by Matthew Carrano, Department of Anatomical Sciences, Stony Brook University, September 1999.

¹ A fragment recovered by Mr. COLLIGNON (1953) perhaps belongs to the head.

The postero-superior and antero-inferior regions of this dentary, each complete, are assembled in perfect connection. The superior part of the symphyseal region also exists, but does not show any point of contact, so that a small margin of uncertainty remains as to its exact position, and it has not been figured for this first description. The length taken from the postero-superior edge to the edge of the symphysis is 23 cm (fig. 1, A)². The elongate bone is hardly elevated, and it appears to be so even in the posterior region, although it is raised towards the rear. The ratio of height (in the posterior region) to total length seems to be markedly less than in *Tyrannosaurus*, and much closer to that which characterized *Megalosaurus bradleyi* described by A. S. WOODWARD. The inferior part is wide, massive and robust. There are 17 dentary alveoli, a considerable number for a Cretaceous genus. The functional teeth are either lost or broken; some germ teeth are visible, of which some are in the process of eruption, and others are in their very young position against the lingual wall of the dentary alveoli; several teeth were recovered in the spoil and certainly belong to this dentary. If the alveolar proportions are believed, all the teeth would have been of very similar dimensions. They were small, like nearly all the isolated teeth found in this horizon, and of the same form described by Depéret, which besides were found essentially in the same region and the same beds.

On the external side, a series of nutrient foramina, of which the anterior ones are small and the posterior ones are large and elongate, spread out along a line separating the bone in two very distinct regions, the superior part vertical and flat, while the inferior is convex and reinflated exteriorly, particularly under alveoli 8 to 15. This feature does not exist in *Tyrannosaurus*, where the external wall of the bone is appreciably flat from top to bottom.

Judging by the figures and descriptions given, this character does not exist either in the European *Megalosaurus*. The posterior external region of the bone bears a large notch (fig. 1, A) bounded by two straight and fairly long processes, one above and the other below. In the internal plane, the superior process is extended below by a bony lamina having a surface slightly weaker than that of the notch, and descends nearly up to the level of the inferior process, from which it is separated by another long and anteriorly

² The drawings were executed by Mlle. R. CINTRACT, whom I thank highly.

rounded horizontal notch. The shape of this region seems to be fairly close to that of *Tyrannosaurus*; in contrast, there does not seem to be a similar structure in *Megalosaurus*.

On the internal face, the most remarkable character is that of the dentary alveolar wall. In most described theropods, and in any case in *Megalosaurus* and *Tyrannosaurus*, the authors insist on the fact that the alveolar partitions of the internal face are formed from rough bones, of triangular shape depending on the transverse partitions, and well separated from one another. Here, in contrast, a continuous longitudinal wall is observed, entirely symmetrical with the external wall, which is distinguished only by the fact that on the one hand the bone forming it is extremely thin – a simple lamina –, and that on the other hand the notch curving from the superior border which corresponds to each tooth is a little less marked on this internal face. But ultimately complete alveoli are found here, closed on the four sides and perfectly individualized. One finds on the other hand, a very distinct bony dental sac is found for each, whose wall is completely separated on the external face from the external wall of the dentary. The data on this last point are lacking for *Megalosaurus*. What renders indisputable the homology of this continuous partition with the simply bony triangles of other theropods, is the presence of the nutrient groove that runs the entire length of the bone, even at the foot of this partition, as it runs at the foot of the bony triangles (fig. 1, C). A very large, very elongate (the part around the total length of the alveoli) nutrient foramen opens into the inferior part of this groove at the level of each dentary alveolus; at the same time it notches the base of the internal wall laterally. Nothing permits knowing whether a supradentary existed, as for example in *Tyrannosaurus*.

On its internal face, the dentary bears a vast triangular lodging (fig. 1, B) that was certainly at least partly filled by the splenial. Meckel's groove is difficult to locate. In *Tyrannosaurus* it is considered to be a longitudinal groove situated at the mid-height of the dentary. There is a groove here in about the same topographic location; but this is less marked and the attribution remains uncertain.

In transverse section the dentary is observed to be formed from two distinct parts: a wide, low, robust bony body that is convex on the external side, and a straight alveolar superior part with tall vertical walls, situated on the median longitudinal axis (fig. 1, D).

As brief as the preceding description is, it nonetheless clearly reveals that this animal cannot be attributed to the genus *Megalosaurus*. The teeth, taken as the basis for this assignment, cannot provide any serious systematic argument in theropods. The teeth of our specimen being identical to those described by DEPÉRET, it is impossible to prove that they did not belong to the same species. As they are specimens recovered in the same stage of the same locality, the specific identity is more than probable; it is very probable. Under these conditions, it seems preferable to conserve the species name given by DEPÉRET, but by specifying that this name is recognized under the following diagnosis. However, it seems necessary to create a new genus, which we name *Majungasaurus*, the type mandible coming from the province of Majunga. This mandible will therefore be the type of *Majungasaurus crenatissimus* Dep. sp. emend. with the following diagnosis:

Fairly low dentary, with inferior part strongly convex externally. Continuous alveolar partition of the lingual face. Of moderate size.

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FIG. 1. — Right dentary of *Majungasaurus crenatissimus*, type x 1/2. — A. External view. — B. Internal view. — C. Occlusal view. — D. Transverse section at the level of the posterior external nutrient foramen. Drawing R. Cintract.