

**DISCOVERY OF DINOSAURS
AT TSINJORANO, DISTRICT OF AMBATO-BOÉNI***

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Until now, the region to the south of the Kamoro has furnished but few dinosaur bones, in spite of the fact that several localities have been known.

Very recently, my attention was called to this region by three good fragments which were found at Majunga by the Veterinary Service of the province and which the Director, Mr. Guignard, wished to send to me expressly. They were dinosaur remains found at Andranomamy, a village situated near Km. 427 on the route from Majunga to Antananarivo.

I was also informed by Mr. Jégou, associate to Mr. Mérot, Administrator of the Ambato-Boéni district, that a colonist of Tsinjorano, Mr. Aubaric, had noted dinosaur bones in the vicinity of this locality.

When I returned to Antananarivo, I resolved to stop in Tsinjorano to see whether this was in fact the case.

Mr. Aubaric had the courtesy to take me around the environs of Tsinjorano, and it was thus that with him, and thanks to some information provided by the natives, I discovered on September 9 scattered remains on the soil or half-buried, which appeared to me so interesting that I decided to make an excavation.

So I installed my camp in the neighborhood; Mr. Aubaric provided me with workers; the Director of Public Works of Maevatanàna lent me some tools, and my crew was put to work. The result was the discovery of dinosaur remains of great size which are certainly the most complete that have been found in Madagascar until now.

The locality site. – The Tsinjorano road branches off exactly at Km. 435 on the route from Majunga to Antananarivo. The village is only 5 kilometers distant.

* Original citation: Collignon, M. 1954. Découverte de dinosauriens à Tsinjorano, District d'Ambato-Boéni. *Bulletin de l'Academie Malgache* 31:59-61.

All around Tsinjorano, the countryside is very peculiar: there are grassy *tanety* rising here and there, and separated by more or less considerable extents of depressions reserved for pasture. The depressions and slopes of *tanety* are formed of clay marls that are variegated white, green or red, and crowned by very hard sandstone banks. The dinosaur bones are found as much in the marls as in the sandstones.

There are no other fossils than these bones, whose debris is rather common; but above the clays and sandstones, north of the Kamoro, beds with Bathonian Corbules are found which permit fixing the age of the bone-bearing beds with some precision: I refer them to the Middle Jurassic. This is the termination of Isalo III, according to the nomenclature established by Mr. H. Bésarie.

The exploited locality is found exactly 2.8 km from crossroad 435 following the road from Tsinjorano, and 200 meters north of this in a small marly valley enclosed by two slightly elevated ridges. It can be accessed without difficulty by crossing a very low hill that hides the locality when one is on the road.

Some one hundred meters east of this locality, at the base of a marly slope and then on both sides of a crest which it faces, I noted the debris of other dinosaurs in three different localities; in particular, there is a 1.9 m long femur (in three pieces). On the other side, west of Tsinjorano, 2.6 km south-southwest and 0.6 km west, Mr. Aubaric showed me two other localities which provided me superb vertebrae, admirably preserved with their processes.

The dinosaur from Tsinjorano-East. – The bones recovered are very numerous. Here is the enumeration:

Forelimb:

Complete humerus 1.35 m long.

Incomplete radius: the two proximal and distal ends are in perfect condition; the central part was not recovered.

Fragments of ulna.

Hind limb:

Complete femur 1.6 m long.

Complete tibia and fibula 0.9 m long.

Together the two principal bones of the hindlimb are therefore 2.5 m long.

Numerous bones of the carpus and tarsus were recovered with these two limb bones, which should permit at least a partial reconstruction of the limbs.

Pelvis:

The pelvis, probably complete, was exhumed during the excavation; it is broken but could be reconstructed.

Shoulder girdle:

A significant part of the shoulder girdle was found. It could be completed with the bones found at the localities west of Tsinjorano, and which belong to individuals of the same size.

Vertebrae:

14 complete vertebrae were recovered; there are chiefly cervicals and caudals, and several dorsals. But the localities to the west furnished an entire series of magnificent dorsal vertebrae with their neural spines and transverse processes in perfect condition, permitting a better understanding of the structure of the vertebral column.

Ribs:

Innumerable fragments of ribs were found during the course of the excavations; certain ones, also broken but exhumed with care, reached 0.4 m.

Skull:

Unfortunately, I did not find the skull. However, I recovered certain bones that are reasonably those of the skull and, nevertheless, there is a fragment of lower jaw with the symphysis. No teeth were recovered.

Such as it is, this dinosaur seemed to me the most complete of all those which have been found until now; it cannot be doubted because so many recovered bones belonging to the same individual were found on a surface of 20 by 10 meters and at a depth of 1 meter at most.

Besides this, I had carefully recovered the debris (chiefly of vertebrae) found outside of this locality, which could serve to complete the study of this animal.

Determination of the dinosaur. – The exact determination of this dinosaur cannot be made except by a specialist. If it belongs evidently to the order Sauropoda, for the moment I cannot refer it to a well-defined genus. I content myself in reporting that the remains found up until now at Andranosamonta, Antsohihy, and several other localities,

in sediments of the same age, have been determined to belong to the genus *Bothriospondylus* Owen and the species *B. madagascariensis* Lyd.