

PRELIMINARY NOTE ON THE DINOSAUR REMAINS
BROUGHT TO THE MUSÉUM BY MR. BASTARD,

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Mr. Bastard made several shipments to the Muséum of bony remains of dinosaurs. Mr. Professor Gaudry agreed to charge me with the study of these bones. This study will be long. The preliminary task of cleaning is a work of patience. I will have to restrict myself today to giving entirely general information.

It is Mr. Lydekker who made known the first dinosaur remains from Madagascar⁽¹⁾. These remains, brought to England by Mr. Last, came from the NW coast of Madagascar, from a region located about 20 miles east of Narinda Bay. They consist of a certain number of vertebrae that Mr. Lydekker attributed to the genus *Bothriospondylus*, created by Owen for some vertebrae from the Jurassic of England.

More recently, Mr. Depéret had the occasion to study some specimens from the environs of Mevarana, on the right bank of the Betsiboka river, 46 kilometers south of Majunga. These specimens denote the presence of two very different types: a sauropod belonging to the genus *Titanosaurus* and a theropod of the genus *Megalosaurus*. The first time, Mr. Bastard brought to the Muséum a great number of remains from Mevarana, south of Majunga. Unfortunately most of these remains are unusable. They come from broken and crumbled long bones. In this locality, the bones are found enclosed in a very weak sand, probably of Cretaceous age, and their extraction requires a set of precautions that the current state of the country does not permit taking.

The last shipment is by far the most significant. It includes a great number of specimens from a region located about 250 kilometers NE of the first, and east of Narinda Bay. Most of these specimens are indeterminable fragments; but there are good pieces, some vertebrae and ends of long bones, which from now on authorize us to apply to Madagascar that which Mr. Marsh said of the Rocky Mountains, where certain geologic strata, continuing over hundreds of miles of length, contain the bones of dinosaurs everywhere.

* Original citation: Boule, M. 1896. Note préliminaire sur les débris de Dinosauriens envoyés au Muséum par M. Bastard. *Bulletin du Muséum d'Histoire Naturelle de Paris* II:347-351.

⁽¹⁾ *Quarterly Journal of the Geological Society*. Vol. LI, p. 329, 1895.

I. MEVARANA (NEAR MAJUNGA).

According to our knowledge of the geology of the NW coast of Madagascar and the fossil shells that accompany the bony remains brought by Mr. Bastard, these elements come from Cretaceous beds formed by very friable sandstones or sands. This circumstance will singularly facilitate the excavations which can be undertaken there in the future and will certainly render them very fruitful, on the condition that precautions are taken to consolidate the bones in place.

It is probable that the voluminous fragments of long bones which Mr. Bastard brought us, as well as some strongly procoelous caudal vertebrae, belong to a species of *sauropod* noted by Mr. Depéret under the name *Titanosaurus madagascariensis*.

Some fragments of long bones with hollowed interiors, and an amphicoelous vertebra of very compressed form, belong without doubt to a theropod of the genus *Megalosaurus*, or close to this genus.

II. REGION TO THE WEST OF NARINDA BAY.

Here the fossils are found no longer contained in a friable rock, but in a very hard calcareous cement sandstone.

In removing the matrix from some vertebrae, I found specimens of *Mytilus* that seem to me identical to a species found in the Jurassic beds of a nearby locality (Andranosamonta) and described by R. B. Newton under the name *Mytilus madagascariensis*⁽¹⁾. In making a thin cut in this sandy matrix, I ascertained the presence of foraminiferans, the study of which would certainly be interesting. These few data, joined with the general knowledge of the geology of the NW coast of Madagascar, which I drew out from the study of fossils brought by Mr. Gauthier, gave me the conviction that the dinosaurs of this region belong to the Jurassic, whereas those of Majunga are Cretaceous.

Mr. Bastard recovered some specimens from several places of the Narinda region. I must examine each of these places successively.

a. Mevarana. — Mevarana is a locality situated at the end of the small Luza Gulf, which opens into Narinda Bay. It should not be confused with the locality of the same

⁽¹⁾ *Quarterly Journal Geolog. Society of London*, vol. LI, p. 82, 1895.

name that is found 250 kilometers to the south, near Majunga, and where are found the remains noted above, which could be Cretaceous.

Mr. Bastard brought us excellent specimens from this locality: some vertebrae, large pieces of long bones, and two metacarpal or metatarsal bones. By their size and anatomical characters, these remains clearly correspond to the gigantic dinosaurs. The form of the vertebrae and the compactness of the long bones are characteristics of sauropods.

There is a clearly opisthocoelous cervical vertebra that already shows an outline of lateral cavities as developed as in the centra of dorsal vertebrae.

These vertebrae, slightly opisthocoelous or plano-concave, have very variable dimensions according to their position in the vertebral column. All are characterized by lateral cavities of the centrum, cavities that are only separated by a strong, thin bony partition which forms on its superior part the floor of the neural canal. The neural spine and the processes are unfortunately broken. One of the first caudal vertebrae no longer possesses the lateral cavity of the centrum, or its place is occupied in contrast by a parapophysis.

The limb bones are filled, as in all known sauropods. Among the large pieces that we possess, it is easy to recognize the distal end of a femur, furnished with a large tuberosity on the posterior part between the two condyles, and corresponding to the space left between the fibula and tibia. I can further note a good proximal portion of a tibia. The study of other pieces, less well preserved than those preceding, will be made later.

A minute comparison of these bones with the elements described and figured by Mr. Lydekker under the name *Bothriospondylus madagascariensis* leads me to conclude that the remains sent to the Meeting belong to the same species. But the genus *Bothriospondylus* is very poorly known. Numerous specialists place it in synonymy with other genera (*Ornithopsis*, *Pelorosaurus*). By their anatomical characters and great size, our specimens also recall well *Ceteosaurus* [*sic*] from the Oxfordian of England, which could have been 12 meters in length. The genera of sauropods described by Marsh under the names *Morosaurus*, *Brontosaurus*, *Atlantosaurus*, etc. have centra and transverse processes of their dorsal vertebrae hollowed by internal cavities which appear to be lacking in the Mevarana vertebrae.

b. Ankitsanibé. — Other fine elements come from the edges of Lake Ankitsanibé near Antsohihi.

They are lumbar and caudal vertebrae and fragments of long bones which appear to belong to a form very close to that from Mevarana, perhaps identical to it.

The vertebrae are planar in front, concave behind. They show a curious mode of articulation, characteristic of dinosaurs and recalling that observed in snakes and mosasaurs. They have a projecting part or *zygosphene* that lodges in a corresponding cavity or *zygantrum*.

The long bones offer characters like those of Mevarana. They appear hollow, but I think that it is an accident of fossilization and that the interior, formed of very loose bony tissue, was dissolved. Indeed, the internal partition appears to lack the bony table.

I will note further a rounded bone that could only be an occipital condyle. The gigantic proportions which its owner must have presented can be judged by the size of this bone.

c. Antsohihi. — Numerous pieces were recovered 8 to 10 kilometers south of Antsohihi. Unfortunately, these remains, found on the soil surface, must have sustained the action of atmospheric agents for a long time. They are very corroded and are rendered unrecognizable. Nevertheless they show gigantic beings of dimensions like those preceding.

Such is the summary assessment of the shipments made by Mr. Bastard. As one can see, these first works are a happy forecast for future paleontological discoveries. All those among us who know Mr. Bastard know that the voyager from the Muséum joins much energy with a great love of science and that he will do all that is possible to enrich the Muséum with pieces as curious as they are rare.
