

Paleontology – A Complete Skeleton of *Bachitherium* (Artiodactyla, Mammalia) from the Oligocene of Cereste (Alps of the Haute-Provence). Notes on the Systematics of the Primitive Ruminants. Note by **Genevieve Bouvrain** and **Denis Geraads** presented by **Yves Coppens**.*

[An English translation of the abstract is provided in the original]

Filhol (1882) erected the genus *Bachitherium* for three species: *B. insigne*, *B. medium*, and *B. minor*, based on material from the Quercy Phosphorites. Distinguished by their size, these species share the presence of a caniniform lower tooth, which is separated by a long diastema from the cheek teeth row. These species also bear a groove bordered by two longitudinal crests extending from the main tubercle at the rear of the tooth on their last two premolars. Placed among the ruminants since its description, *Bachitherium* was considered a hypertragulid by Lavocat (1946), who first showed that the caniniform lower tooth, being preceded by four alveoli, is therefore not a canine but a p1 [lower premolar 1]. Furthermore, we have noted that this tooth sometimes bears a wear facet on its anterior face. Webb and Taylor (1980) placed *Bachitherium* among the leptomerycids.

The examination of the cast of a complete skeleton discovered by Mr. Loggia in the Oligocene limestone of Cereste, France as well as the study of the previously collected Quercy material led us to refute this assignment and propose a new cladogram for the earliest ruminants.

Missing only the right metacarpals and anterior phalanges, this skeleton is of an adult animal the size of a small gazelle. The skull suffered transverse crushing; the face is short, the back of M3 [upper molar 3] reaches the level of the last third of the orbit. The premaxillary, weakly-elongated and quite straightened, is in contact with the nasal. There is an ethmoid fissure but the condition of the skull does not allow observation of a possible lacrimal fossa. The orbit is closed in the back by a complete postorbital bar. The upper profile of the skull is evenly and weakly convex and it is likely that a pronounced sagittal crest extended back into the quite prominent supra-occipital region above the condyles. The dental formula is:

$$\begin{array}{c} \underline{0\ 1\ 3\ 3} \\ 3\ 1\ 4\ 3 \end{array}$$

With the upper and lower teeth being in occlusion, only their labial faces are visible. The strong upper canine is separated from the cheek teeth by a long diastema. The very strong pillar of the paracone of the upper molars forms a plication towards the front; parastyle and mesostyle are prominent. The angular region of the mandible is quite

* Original citation: Bouvrain, G. and D. Geraads. 1985. Un squelette complet de *Bachitherium* (Artiodactyla, Mammalia) de l'Oligocene de Cereste (Alpes de Haute-Provence). Remarques sur la systematique des Ruminants primitifs. *Comptes Rendus de l'Academie des Sciences à Paris, série II*, 300(2):75-78. Translated by Jess Duran, 2005.

spread out and a crochet was probably present at the back of the condyle, which is clearly lower than the coronoid process. The i1 and i2 are quite reduced. The caniniform p1 is separated from the incisiform canine by a very short diastema to accommodate the upper canine; a much longer space separates it from p2.

The cervical column is rather short and robust. The quite wide wings of the atlas terminate caudally at two points. The body of the axis is short and the spinous process is very high. The articular surfaces for the atlas reach dorsally almost to the top of the neural canal. The anterior member is much shorter than the posterior. The acromion is well-developed. The large ulna remains separate from the radius. The magnum and trapezoid are fused. Metacarpals 3 and 4 are separated; the complete disappearance of the lateral digits does not appear to be an accident of fossilization, taking into account the skeleton's excellent state of preservation. The tibial crest extends over the upper quarter of the bone and connects abruptly to the diaphysis. There remains no vestige of the fibula but with the distal extremity of the tibia being shaped like those among the "Pecora," it was undoubtedly reduced to one malleolar bone bearing two proximal articular surfaces on either side of the spine. Its distal extremity was equally similar to that of the "Pecora" as the corresponding articular surface of the calcaneum shows. There is a tall cubonavicular distinct from the ectomesocuneiform. Metatarsals II and IV are fused except at their distal extremities without a groove on the anterior face. As in the metacarpals, the keel guides remain limited to the posterior and lower faces.

We refer this skeleton to a *Bachitherium* of large size (upper limit of *B. insigne*). Until now, *Bachitherium* was poorly known – only by jaws. Sudre (1977; p. 197 note *inf. pag.*) noted, however, the discovery of a skeleton belonging to this genus at Itardies (Quercy Phosphorites). Unfortunately, he provided only a few characters (non-fused metacarpals, fused metatarsals).

Webb and Taylor (1976, 1980) separate the leptomerycids from the hypertragulids and rightfully dispute the assignment of *Bachitherium* to the former. The hypertragulids constitute a very primitive group with numerous characters derived in a way quite different than in others (sharp cutting premolars, loss of the mesostyle in the molars). The only shared derived character with *Bachitherium* is the presence of a caniniform p1. Webb and Taylor placed *Bachitherium* among the Leptomerycidae, which they defined by an i1 developed into a tusk and a large mastoidian fissure. We can observe the former but we have seen that the first incisor of *Bachitherium* is very reduced. The genus, lacking any autapomorphy of the Leptomerycidae cannot be assigned to this family. Furthermore, in *Leptomeryx* the upper canine is very reduced and the p1 is a small tooth separated by diastemata of the canine as with p2. It disappears among the more advanced leptomerycids such as *Pseudoparablastomeryx*.

We have sought to place *Bachitherium* among the primitive ruminants, limiting ourselves at first to forms defined by synapomorphies of point 1 (fig.). Some of these synapomorphies at least allow the exclusion from this monophyletic group: the Hypertragulidae, the tylopods, *Amphimeryx* and *Archaeomeryx*, although several of these

cited characters are sometimes found among these, indicating either a true relationship or an instance of parallelism.

Some points of the cladogram would necessitate explanations going beyond the scope of this preliminary note and the numerous cases of parallelism (longitudinal groove on the back of p4, fold on the posterior face of the metaconid of the molars, fusing of the metapodials, loss of p1...) would justify more detailed research. In particular, the relative positions of *Bachitherium* and *Prodremotherium* lend themselves to discussion. The P2 and P3 of *Bachitherium* have a more complete internal crescent and are more symmetrical than those of *Prodremotherium*. Among the material from previous Quercy excavations two types of posterior cannon bones can be distinguished. Some are of small size without a splint on their anterior face, unfused to their distal extremity and with a subcircular contour of the proximal articulation. These characters, corresponding to those that can be observed in the Cereste skeleton, we attribute to the metatarsals of *Bachitherium* (medium-sized species – the most common one in the Quercy). The others are of larger size with a splint disappearing into the tunnel at the distal extremity but have a more primitive proximal articulation contour (plantar part better separated from the anterior). We attribute these metatarsals as well as some fused metacarpals of corresponding size to *Prodremotherium*. From the latter character and the more modern appearance of the molars (point 12) this genus is therefore more advanced than *Bachitherium*. It is clear, however, that if we had not accepted the parallel acquisition of advanced premolars and metatarsals with circular proximal surfaces in *Bachitherium* and the higher ruminants, the order of the dichotomies 10 and 12 would have been inverted.

In a future work we will provide a more detailed description of the Cereste skeleton and try to complete and clarify the proposed cladogram.

[Acknowledgements] Mr. Loggia, who discovered the specimen, kindly allowed C. Tribouillard to make a cast of it; assistance of D. Visset, N. Gomez, and G. Martini, Reserve géologique de Haute Provence; loan of comparative material by J. M. Mazin, B. Lange-Badre, L. de Bonis, and H. Thomas.

Submitted November 26, 1984