

**THE SNOUT OF PAULOCNUS PETRIFACTUS  
(MAMMALIA, EDENTATA)**

by

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A specimen of the ground sloth discovered by Mr. P. Stuiver in Curaçao, *Paulocnus petrifactus* Hooijer (1962), recently dressed from the matrix by Mr. P. H. de Buissonjé, comprises the front part of the mandible and the left half of the rostrum of the skull. It holds the left upper and right lower caniniform teeth as well as the first and second right lower cheek teeth, while the first and parts of the second left cheek teeth are in occlusion. The specimen is shown on pl. X; the mandible is presented in dorsal view in fig. 1.

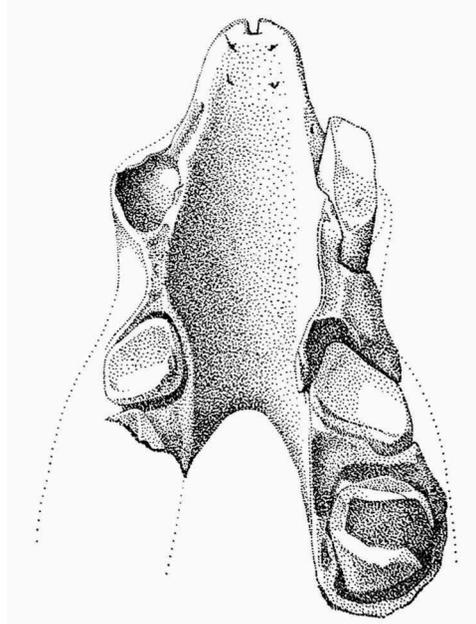


Fig. 1. *Paulocnus petrifactus* Hooijer, top view of mandible, nat. size.  
W. C. G. Gertenaar del.

I have recently been able to compare the specimen with originals of the Cuban ground sloths *Megalocnus rodens* Leidy, *Mesocnus browni* Matthew,

and *Acratocnus antillensis* (Matthew) as well as with the Puerto Rican *Acratocnus odontrigonus* Anthony when visiting the American Museum of Natural History in New York City under the auspices of the Netherlands Organization for the Advancement of Research (Z.W.O.). I am indebted to Dr. Edwin H. Colbert, Chairman, and Dr. Malcolm C. McKenna, Curator of Mammals in the Department of Vertebrate Paleontology of the American Museum, for permission to study these fossils and for generous hospitality.

The front end of the mandible of *Paulocnus* is now available for the first time; this portion differs greatly among the West Indian sloths, the symphyseal tongue being absent in *Megalocnus*, rather long, decurved, and spatulate in *Mesocnus*, and short and roughly pointed in *Acratocnus*. The condition seen in *Paulocnus* resembles that in *Mesocnus* rather more than that in the other genera; the tongue is elongated only to a slightly less extent than in *Mesocnus*, being somewhat more pointed, too, thereby approaching the shape seen in *Acratocnus*. In the last-mentioned genus the symphyseal tongue varies in development individually; the length anterior to the caniniform teeth ( $M_1$ ) in a series of adult jaws of *Acratocnus odontrigonus* runs from 10 mm (A.M.N.H. no. 17719) to 18 mm (A.M.N.H. no. 17718). It is, however, decidedly shorter than that in the *Paulocnus* mandible (see table 1). The width across the caniniform teeth in *Paulocnus* is the same as that in *Mesocnus browni*, 36 mm, which is within the variation limits of *Acratocnus odontrigonus* from Puerto Rico (34-42 mm); *Acratocnus antillensis* from Cuba is slightly more robust, the width across  $M_1$  in the type (A.M.N.H. no. 16880) being 44 mm by a length of the symphyseal tongue of only 17 mm.

TABLE 1  
Measurements of the mandible and lower teeth (mm)

	<i>Paulocnus petrifactus</i>	<i>Mesocnus browni</i>	<i>Acratocnus antillensis</i>
Length of symphyseal tongue anterior to caniniform teeth ( $M_1$ )	25	26	17
Width across caniniform teeth	36	36	44
Length diastema $M_1$ - $M_2$	12	20	14
$M_1$ , anteroposterior	9.5	ca. 10	ca. 13.5
transverse	7.5	ca. 5	ca. 7.5
$M_2$ , anteroposterior	11	8.5	ca. 8
transverse	—	11.5	ca. 12

The length of the diastema between the caniniform tooth ( $M_1$ ) and the anterior cheek tooth ( $M_2$ ) is not more than 12 mm in *Paulocnus*, within

the range of *Acratocnus* (8-15 mm) and shorter than in *Mesocnus* (20 mm).

The lower caniniform tooth, the extra-alveolar portion of which is for the greater part missing in the *Paulocnus* mandible, is straight and trigonal in cross section, with the internal surface convex. This constitutes a difference from the  $M_1$  in the Greater Antillean genera, in which the internal face of these teeth is either concave or flat. In *Megalocnus*  $M_1$  is a broad tooth, convex antero-externally and concave postero-internally. In *Mesocnus*  $M_1$  is nearly semi-circular in cross section, with a concave postero-internal surface. In *Acratocnus*  $M_1$  is most like that in *Paulocnus*, straight, and subtrigonal in section, but with the internal surface either flat or slightly concave, never convex as in *Paulocnus*. The series in the A.M.N.H. does not vary much individually, the largest specimen of *Acratocnus odontrigonus* (no. 17712) measuring 11 mm anteroposteriorly and 7.5 mm transversely, the smallest (no. 17713) 9 mm, and 6.5 mm, in cross section. In the specimens that are concave internally there is no median groove as seen in *Mesocnus*; most of the specimens are perfectly flat on the internal surface, the remainder of the outline being convex.

The lower cheek teeth in *Paulocnus* are subquadrate, and wider transversely than anteroposteriorly.  $M_2$ , the anterior cheek tooth, is broken off in its alveolus but its outline can be plainly seen. The greatest anteroposterior diameter is placed on the lingual side of the tooth, and not on the buccal as in *Acratocnus*. This character holds for all the *Acratocnus* mandibles I have seen, both from Puerto Rico and from Cuba. Of the second lower cheek tooth ( $M_3$ ) the external surface is incomplete in the *Paulocnus* specimen, but is was probably less wide anteroposteriorly than the internal, as in  $M_2$ . In *Acratocnus*, as stated above, the external surface of the anterior lower cheek teeth is wider anteroposteriorly than the internal. The last lower cheek tooth ( $M_4$ ), unfortunately not preserved in the *Paulocnus* specimen, is rather variable in *Acratocnus*, obliquely placed, with the anterior surface facing forward and inward. The obliquity of the last tooth is most marked in the old individual, A.M.N.H. no. 17718.

In *Mesocnus*, in which the lower teeth in the cheek region are rather obliquely placed, the anteroposterior diameter of  $M_2$  and  $M_3$  is greater externally than internally, just as in *Acratocnus*, and the same holds for the large *Megalocnus* (good illustrations of the more important specimens in the American Museum collection of these genera will be found in Matthew & de Paula Couto, 1959, figs. 1-3).

The cheek teeth of *Paulocnus*, which thus appear to be distinguished from those of *Megalocnus*, *Mesocnus*, and *Acratocnus* by being longer anteroposteriorly internally than externally, are further characterized by the

presence of compact dentine layers on their anterior and posterior surfaces. The upper and lower first and second cheek teeth on the left side are in occlusion; the occlusal surfaces have transverse anterior and posterior crests, with a valley in between. The occlusion, as can be seen from pl. X, is such that the posterior crest of the upper tooth is placed in the valley of its antagonist in the mandible, the upper tooth thus being slightly more forward in position than its fellow in the lower jaw. This type of wear of the crowns is also seen in the Greater Antillean genera.

The preservation of the upper and lower jaws of the same individual with the teeth in perfect occlusion would seem to suggest fossilization in situ following mummification, and thus to be indicative of a dry climate at the time of deposition of the remains.

The upper caniniform tooth, M<sup>1</sup>, is perfectly preserved and in situ in the *Paulocnus* specimen. It is trigonal, and curved, as in *Acratocnus*. In my original description of *Paulocnus* I included a fragment of a jaw with part of a tooth that I took to represent M<sup>1</sup>, apparently of subquadrate shape as in *Megalocnus*. The specimen here described, however, proves that the upper caniniform tooth of *Paulocnus* is trigonal instead, and that the tooth portion originally regarded as representing M<sup>1</sup> in reality pertains to a cheek tooth. The cross section of the M<sup>1</sup> in *Paulocnus*, however, differs from that in *Acratocnus* in that the widest face is placed internally rather than externally. The external surface, which is convex throughout and which passes into the posterior face by a rounded edge, is definitely narrower than the internal face, and the two edges, anteriorly and posteriorly, are well-marked. On the other hand, the M<sup>1</sup> of *Acratocnus* (see Anthony, 1926, p. 164 fig. 60, and pl. XLII) is like that in recent *Choloepus*, with the convex external face wider than any of the others and the internal and posterior faces meeting at a right angle. In *Mesocnus* the upper caniniform tooth is sub-oval in cross section, or subtriangular with rounded angles, the external face being the widest, as in *Acratocnus* (Matthew & de Paula Couto, 1959, fig. 2A and pl. 27).

As will be seen from table 2, the upper caniniform tooth (M<sup>1</sup>) is decidedly larger in the Cuban *Acratocnus antillensis* than in the Puerto Rican *A. odontrigonus*; the remainder of the upper jaw of *A. antillensis* is unknown. In the width across the caniniform teeth the skull of *Paulocnus* is about as large as the largest of *Acratocnus odontrigonus* (A.M.N.H. no. 17158); *Mesocnus browni* falls within the limits of this form in this respect, but has a longer diastema between the caniniform and the first cheek tooth than both *A. odontrigonus* and *Paulocnus*, the same difference that obtains in the lower jaw.

TABLE 2  
Measurements of upper jaw and teeth (mm)

	<i>Paulocnus petrifactus</i>	<i>Mesocnus browni</i>	<i>Acratocnus odontrigonus</i>	<i>Acratocnus antillensis</i>
Width across caniniform teeth	ca. 44	ca. 42	35-45	—
Length diastema M <sup>1</sup> -M <sup>2</sup>	ca. 28	34	22-26	—
M <sup>1</sup> , anteroposterior	11	ca. 10	8-10	15
transverse	8	ca. 9.5	10-11.5	11
M <sup>2</sup> , anteroposterior	11	ca. 9.5	6.5-7	—
transverse	—	ca. 9.5	9.5-10	—
M <sup>5</sup> , anteroposterior	9	ca. 9.5	5-6	—
transverse	11	ca. 12	8.5-9.5	—

The anterior upper cheek tooth, M<sup>2</sup>, in situ in the specimen here described, is subquadrate and longer internally than externally, as its fellow in the mandible; although the width cannot be taken it is certainly wider than long. In *Acratocnus* this tooth has the same shape, but with the angles more rounded, becoming almost elliptical in cross section, and it is never quite as large as that in *Paulocnus*. The *Mesocnus* M<sup>2</sup> is more obliquely set, and less extended transversely; that of *Megalocnus* is oblique and more extended transversely than in *Acratocnus*; in contradistinction to M<sup>3</sup> and M<sup>4</sup> the external surface is wider than the internal, a difference from *Paulocnus*.

M<sup>3-4</sup> are unknown in *Paulocnus* as yet, but the last molar (M<sup>5</sup>) was present in the holotype skull described in 1962. As stated in the original description, M<sup>5</sup> in *Paulocnus* is a trigonal tooth as in *Megalocnus*; in *Acratocnus* this tooth tends to become elliptical or rounded.

In concluding the present paper an extended and revised diagnosis might be in order. Taking into account the information derived from the study of the snout and teeth above described this diagnosis would run as follows:

#### ***Paulocnus petrifactus* Hooijer**

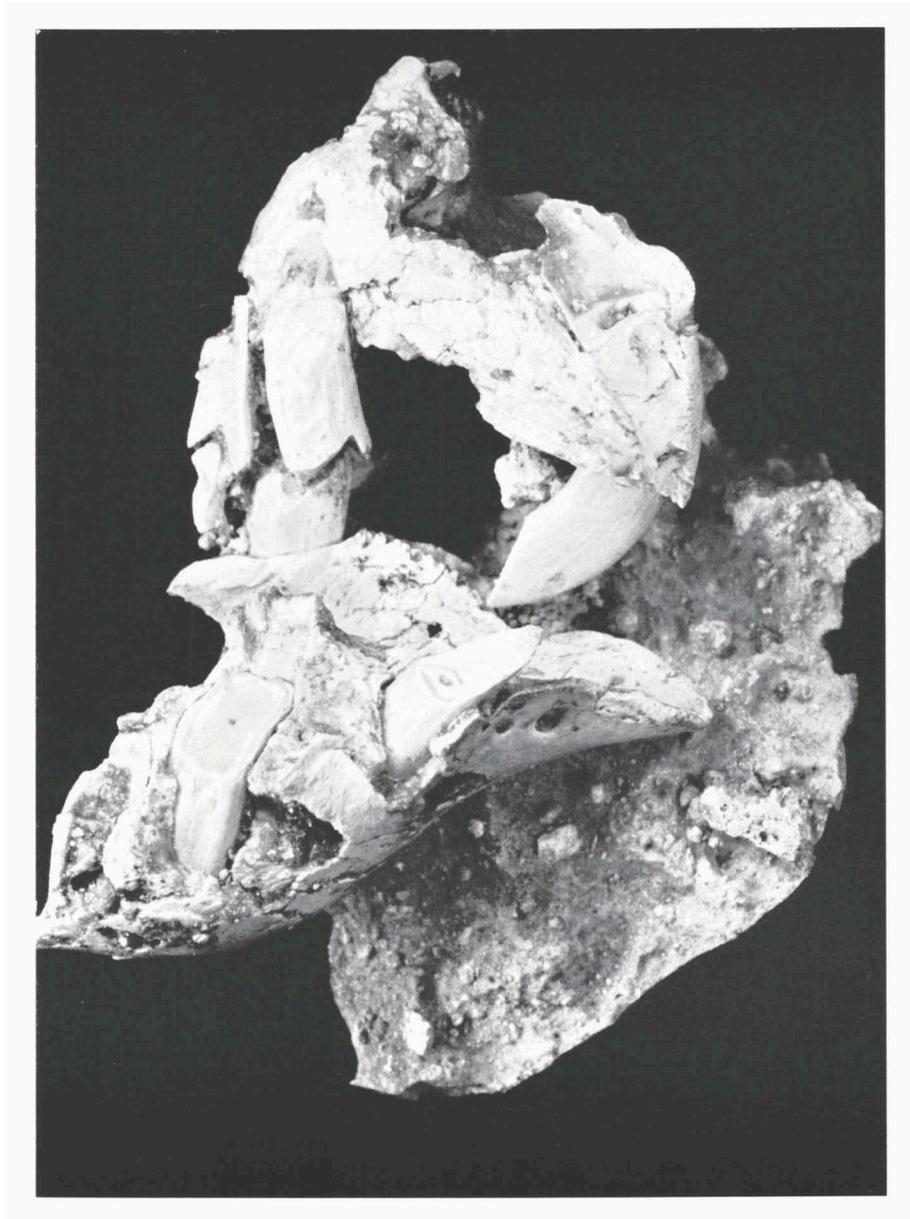
*Paulocnus petrifactus* Hooijer, 1962, Proc. Kon. Ned. Akad. v. Wet. Amsterdam, vol. 65 ser. B, p. 47, pls. 1, 2.

Revised diagnosis: No sagittal crest on parietals, zygomatic arch open. Symphyseal tongue elongated to a slightly less extent than in *Mesocnus*, unlike the short and pointed symphyseal tongue of *Acratocnus*. Lower caniniform tooth straight, trigonal in section; internal surface convex, not concave or flattened as in *Megalocnus*, *Acratocnus*, or *Mesocnus*. Upper caniniform tooth curved, trigonal in section as in *Acratocnus* but with the internal face wider than the external. Diastemata between caniniform and first cheek teeth shorter than in *Mesocnus*. First cheek teeth subquadrate,

but longer anteroposteriorly internally than externally instead of the reverse as in *Acratocnus* and *Megalocnus*. Last upper cheek tooth trigonal in section. Carpus of the generalized Miocene *Hapalops* type, with but little interlocking of elements. Metapodials unspecialized, distal crest on third metacarpal centrally placed. Metacarpals more slender, ungual phalanges more compressed transversely than in *Megalocnus*. Calcaneum with neck more constricted and external astragalar facet as well as external calcaneal facet of astragalus less extensive than in *Megalocnus*.

## REFERENCES

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*Paulocnus petrifactus* Hooijer, front portion of skull and mandible, associated; Geological Institute, Amsterdam University, X 4781; Tafelberg Santa Barbara, Curaçao, Netherlands Antilles, coll. P. Stuiver, right lateral view,  $\times 1.2$ .