

American Museum Novitates

PUBLISHED BY THE AMERICAN MUSEUM OF NATURAL HISTORY
CENTRAL PARK WEST AT 79TH STREET, NEW YORK 24, N.Y.

NUMBER 1861

DECEMBER 6, 1957

Leptarctines from the Florida Miocene (Carnivora, Mustelidae)

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INTRODUCTION

The occurrence of *Leptarctus* in Florida was first recorded over a quarter of a century ago, when G. G. Simpson described an upper P⁴, from the Bone Valley formation, as belonging to this relatively rare mustelid (Simpson, 1930). During the initial stages of excavation at the Thomas Farm quarry, T. E. White collected and described a partial, worn, upper dentition as representing a new genus of mustelid, close to *Leptarctus*, to be known as *Mephititaxus* (White, 1941). Last year the present author, working the same deposit as White, in north central Florida, found a nearly complete right lower jaw and another isolated, unworn M₁ which have been described and provisionally referred rather than definitely assigned to White's new genus (Olsen, in press). Since this discovery and description, another specimen (fig. 2C), representing the same teeth (except for being of the right side) as those on which White based his type description, has been found at the Gilchrist County site. As the cusps of these teeth show no perceptible wear and therefore can be closely compared with the teeth of other known leptarctines (fig. 2A, B, D),² they form the basis for the comparisons and proposed generic change of the species *ancipidens* discussed in the present paper.

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² *Leptarctus wortmani*, from the upper Miocene of Missouri, presents very little difference from *L. primus*, from the lower Snake Creek of Nebraska, except in size and was originally placed in this last-named species by Wortman, but was renamed by Matthew (Wortman, 1894; Matthew, 1924).

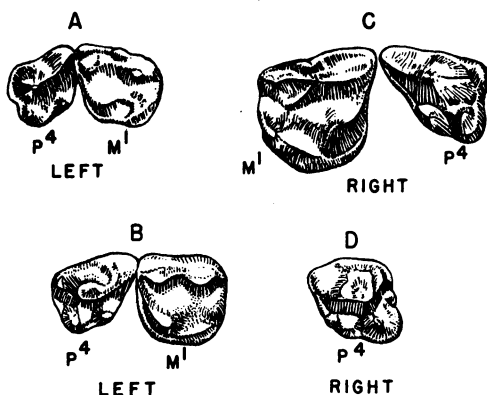
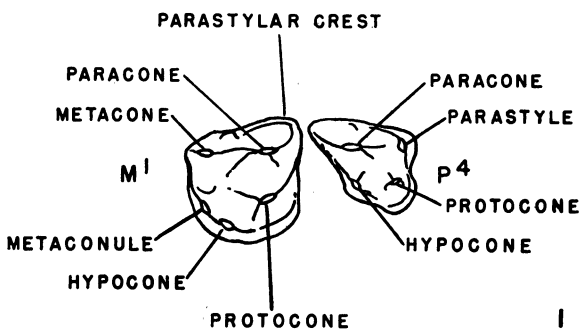


FIG. 1. Nomenclature of the cusps of M^1 and P^4 used in the present paper.

FIG. 2. Occlusal views of leptarctine teeth. A. *Leptarctus oregonensis* (C.I.T. No. 206). B. *L. primus* (A.M.N.H. No. 18241). C. *L. ancipidens* (F.G.S. No. V-5694). D. *L. progressus* (F.G.S. No. V-4255). All $\times 2$.

Because no cranial material of the Florida leptarctines is known to exist in collections to date, comparisons are limited to the diagnostic tooth characters that are known in the other species of this genus. The material is too imperfectly known to lend itself to quantitative analysis, but even such analysis would not abolish the final role of subjective judgment, which in the present study must be relied on entirely for generic assignment of the specimens in question.

The following abbreviations are used:

A.M.N.H., the American Museum of Natural History
C.I.T., California Institute of Technology

F.G.S., Florida Geological Survey
M.C.Z., Museum of Comparative Zoölogy

Leptarctus progressus Simpson

Figure 2D

Leptarctus progressus SIMPSON, 1930, p. 185.

TYPE: F.G.S. No. V-4255, right P⁴.

HORIZON AND LOCALITY: Upper Miocene to lower Pliocene, Bone Valley formation; pit of Phosphate Mining Company, near Mulberry, Florida.

Simpson, in his type description of this form, noted that the general tooth structure differed radically from that of any known form other than *Leptarctus* but varied from that of *L. primus* in having a "small medium cuspule on the anterior border" (fig. 2D). The paracone has been broken, but the other cusps show little wear and compare favorably with specimens of *Leptarctus* found subsequent to Simpson's description. The only significant contribution that can be added to Simpson's original statements is one of stratigraphic rather than taxonomic importance.

At the time of the discovery of this tooth, the Bone Valley formation was generally believed to be entirely of Pliocene age. Recent investigations, too lengthy even to summarize in this contribution, place the age of the Bone Valley in the upper Miocene (which agrees with the stratigraphic position of the other leptarctine finds) and in part in the lower Pliocene. When all the data of both the state and federal geological surveys are finally compiled and evaluated it is hoped that a solution to this problem of dating the Bone Valley agreeable to most of those concerned with this complex area will be reached.

Leptarctus ancipidens (White)

Figure 2C

Mephititaxus ancipidens WHITE, 1941, p. 92, pl. 14, figs. 1, 2; 1942, p. 5.

TYPE: M.C.Z. No. 3658, right and left P²-M¹.

REFERRED MATERIAL: M.C.Z. No. 3659, portion of right maxilla, with P⁴ and the roots of M¹; F.G.S. No. V-5694, right P⁴-M¹ (fig. 2C).

HORIZON AND LOCALITY: Lower Miocene of Hawthorn age,¹ Thomas Farm, Gilchrist County, Florida.

¹ Authors who have used the term "Hawthorn formation" to designate the Thomas Farm deposits are in error, as the Hawthorn formation is essentially marine. When applied to the Thomas Farm, the designation should read "terrestrial deposits of Hawthorn age."

Although White compared the type of *Mephititaxus ancipidens* with similar teeth of the known species of the genus *Leptarctus*, he felt that on the characters of M¹ the Thomas Farm specimen was worthy of assignment to a new genus.

All the material of *M. ancipidens* that White used in his original discussion, with casts of the other known leptarctines that were used for his comparisons plus new material collected subsequent to White's paper, have been used in this analysis.

White states in the description of his new genus, "I have placed this form in a new genus rather than refer it to *Leptarctus* because of the character of M¹. Certainly, the difference between these two is as great as that between *Mustela* and *Martes*, or between *Mephitis* and *Spilogale*. The squarish medial end of M¹, the greater development of the hypocone, the greater development of the antero-internal cingulum, and the width exceeding the length, serve to differentiate this form from *Leptarctus*."

Too often the types of fossil vertebrates in general and the smaller carnivores in particular (with emphasis on monotypic species or genera), which later must be designated as synonyms, owe their origin to an underestimation of individual variation. Hence, the epigram, "A specimen that is difficult to identify represents a different taxonomic group or a transition between two taxonomic groups." As in the case of *Leptarctus*, not enough material, particularly cranial material, is known for a biometric study, so a comparable living group must be resorted to for a gauge as to the amount of variation that can be expected within these similar species. White's use of length versus width of M¹ as a generic character can be best compared to the findings of E. H. Hall in his study of *Mephitis mephitis occidentalis* (Hall, 1936).

Hall lists a number of variations found in this subspecies which can be applied to the Florida Miocene mustelids. He figures an upper molar of a young female which has a width that exceeds the length; in the same tooth of another specimen the length exceeds the width. This last is a measurement from a subadult male. Both specimens are from California. I believe that this variation is the same as that used by White as a generic character of *Mephititaxus*.

Speaking of cusp variations in *Taxidea taxus* which is quite similar to the Thomas Farm form, particularly in the lower jaw and dentition, Hall states, "This kind of variation is appropriately used in most other groups of Carnivora in differentiating between full species and genera. It will be evident, therefore, that the student must exercise unusual caution in designating as of specific or generic worth the mor-

phological differences that he detects between skull and teeth of one badger and the corresponding parts of other individuals. Geographic variation within a single species, plus sexual dimorphism and great range of individual variation may account for many morphological differences" (Hall, 1946).

As stated above, another specimen of *L. ancipidens* with P⁴-M¹ (F.G.S. No. V-5694; fig. 2C) now exists, so that it has been used for comparison with the other species of *Leptarctus*, together with the type. These additional teeth are fully adult but are unworn, whereas the type exhibits considerable wear in the region of the hypocone of P⁴ and the metaconule and the ridge containing the paracone and metacone of M¹.

White, in speaking of M¹, states that "the greater development of the hypocone" is a generic character of *Mephititaxus* as compared to *Leptarctus*. The proportions of the hypocone in relation to the other cusps in the type of *L. oregonensis* (C.I.T. No. 206) is the same as those found in White's type and in the unworn M¹ of *L. ancipidens*. The small metaconule on M¹ of *L. ancipidens* is not present on *L. oregonensis*. But a small cusplule is present in both species on the labial side of M¹ between the metacone and paracone.

Except in size, P⁴ of both species are nearly identical. The species of *L. oregonensis* is known from the Mascall Miocene of Oregon and is represented by a few skull fragments and a left P⁴ and M¹ in the type (Stock, 1930) and an additional left P⁴ which was described by T. Downs in 1956. In the course of his comparisons of this last-named tooth with other specimens, Downs noted that, "*Mephititaxus ancipidens* White (1941) from Florida, is distinct from *L. oregonensis* in its relatively stronger parastyle on P⁴, greater development of hypocone on P⁴, and width greater than length on M¹. These differences are a matter of degree of development but seem specifically important at least. The generic distinction of *Mephititaxus* from *Leptarctus* seems questionable to me." The minute differences mentioned above by Downs are not so apparent when compared with P⁴ of *L. ancipidens* (F.G.S. No. V-5694).

In view of the preceding comparisons and observations, I propose that the genus *Mephititaxus* be abolished and the species *ancipidens* (which should be kept on the basis of stratigraphic and geographic differences or until additional material proves otherwise) be placed in the genus *Leptarctus*.

The comparison between *L. ancipidens* and *L. primus* is limited because of the worn condition of the dentition of *L. primus* (A.M.N.H.

No. 18241). P⁴ agrees in both species, even to the strong parastyle. M¹ is too worn to show the minute cuspule, if it were present, between the paracone and metacone. The parastylar crest tends to be more prominent in *L. ancipidens*.

Matthew, in his discussion of the genus *Leptarctus*, gives a thorough review of Leidy's original description of the genus as well as of the mustelid relationship of these animals (Leidy, 1856; Matthew, 1924).

On the basis of the above material I feel that *L. ancipidens* is more badger-like than any of the other material with which it has been compared.

ACKNOWLEDGMENTS

I wish to thank Profs. A. S. Romer and Bryan Patterson of the Museum of Comparative Zoölogy for the use of the "*Mephitis*" material in that institution. My thanks also go to Dr. G. G. Simpson and Mrs. R. H. Nichols for a cast of *L. primus*, the original of which is in the American Museum of Natural History. Dr. D. E. Savage and Dr. R. A. Stirton lent me the specimen of *L. oregonensis* which is in the University of California collections, and Mr. William Otto of the California Institute of Technology supplied me with a fine cast of the type of *L. oregonensis* which is in this last-named institution.

Permission to use the type of *L. progressus* and the original material for this study was granted me by Dr. Herman Gunter, Director of the Florida Geological Survey.

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