ART. XLI.—*A New Marsupial;* by EDWARD LEFFINGWELL TROXELL.

[Contributions from the Othniel Charles Marsh Publication Fund, Peabody Museum, Yale University, New Haven, Conn.]

The presence of marsupials in the early Tertiary of America has long been assumed. The forms have been variously named: *Herpetotherium* Cope, *Embassis* Cope, *Didelphodon* (*Didelphops*) Marsh, *Peratherium* Aymard, and *Didelphis* Linnæus. Marsh makes the statement in his original description of *Entomacodon* that it may also be a marsupial, reasoning from the resemblance of the teeth to those of the opossum. It may also be noted that the position of the mental foramen in *Centracodon* is identical with that of the opossum (*Didelphis*).

The form of the teeth and the position of the mental foramen in both the marsupials and insectivores are so nearly alike in cases that it is impossible to come to a decision as to the classification of many of the extinct forms. Matthew (1909), however, puts great emphasis on the identification of insectivores by the position of the mental foramen.

Cope (1884, p. 793) has described a number of species of *Peratherium* from the White River (Oligocene) formation of Colorado. One of these he made the type of *Herpetotherium* (1873, p. 1), but afterward gave up the genus in favor of *Peratherium*. He also named *P. comstocki* (1884, p. 269, pl. 25a, fig. 15) from the Wind River Eocene of Wyoming.

Matthew (1909, p. 540, pl. 49) shows a specimen from the Bridger formation which he doubtfully refers to *Peratherium* and leaves without specific designation. It is very close to, and probably identical with, specimen No. 13518, Y. P. M., discussed later. This same author has given us *P. titanelix* (1903, p. 202, fig. 1) from the Titanotherium beds (Oligocene), which is about half the size of the Yale specimen and equal to *P. huntii* Cope.

Osborn (1907, p. 111, fig. 58-2) has figured a tooth of *P. fugax* (Cope) which resembles our specimen No. 13518 but is about one-fifth smaller. This is shown by Osborn to be ancestral to the later carnivorous and herbivorous types of marsupials. He speaks (1910, p. 154) of the noteworthy presence of an opossum as indicating the

continued residence of polyprotodont marsupials in this country in middle and later Eocene time.

Herpetotherium marsupium, sp. nov.

(Figs. 1-3.)

Holotype, Cat. No. 13518, Y. P. M., found by J. W. Chew in 1874 in the Bridger (Eocene) formation of the Bridger Basin, Wyo.

Fig. 1.

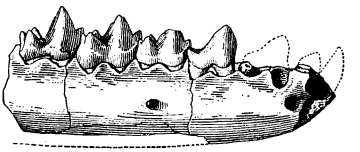

Fig. 1.—*Herpetotherium marsupium*, sp. nov. Holotype. Cat. No. 13518, Y. P. M. Side view of outer side of ramus, with dotted restoration of canine and second and third premolars. × 3.

The type specimen consists of the greater portion of the mandibular ramus with four teeth. The last tooth being lost from the series, those remaining are $P_{3\ 4}$ $M_{1\text{-}2}$ if the specimen is a higher mammal. If, however, it is a marsupial, as we are led to believe, the tooth designation might be P_3 $M_{1\text{-}3}$. Other specimens in the collection have but three molariform teeth; these have been assumed to be near *Entomacodon* Marsh.

Fig. 2.

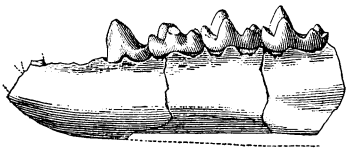

Fig. 2.—Inner view of same. The slight groove below the last tooth suggests an inflected angle. × 3.

There had been two other premolars, as indicated by the alveoli and shown in outline in figure 1; both were two-rooted. The first premolar was small, and the anterior of its two roots was crowded closely against the larger canine. The second premolar was almost as large as the last, P_3. There were four molariform teeth. This fact signifies nothing, for in many mammals the last premolar is molariform.

The first molariform tooth is smaller than the others,

but it resembles them, and like them, has a distinct cingulum on the outer anterior surface. Each molar has a high trigonid, an especially high protoconid, a high

FIG. 3.

FIG. 3.—Crown view of teeth and jaw of *Herpetotherium marsupium*, sp. nov., holotype, showing alveolus of the fourth molar, assuming the animal to be a marsupial. Cf. Fig. 4. × 3.

metaconid, and a moderate paraconid. The posterior face of the trigonid is diagonally transverse and not at right angles to the longer axis of the tooth as in *Entomacodon* and *Didelphis* (cf. fig. 4).

FIG. 4.

FIG. 4.—Crown view of lower teeth of the opossum (*Didelphis virginiana*), a marsupial. × 3.

The broad, basin-shaped heel of each molar has two main lateral cusps, the hypoconid and entoconid, and a small posterior hypoconulid which is distinctive of certain marsupials. A root impression indicates a once additional molar, which we may call M_4 (fig. 3). Beneath the first molariform tooth, M_1, lies the posterior mental foramen, leading steeply toward the posterior. This is in contrast to the opossum (*Didelphis*) where the foramen trends anteriorly. The anterior mental foramen lies, in both forms, under the first premolar tooth.

A shallow groove on the inner side, near the ventral border of the mandibular ramus, may denote an inflected angle, a distinctive feature of the marsupials; but this groove begins at a point further forward, under the penultimate tooth, than it does in *Didelphis*.

This specimen is like no species, perhaps genus, from the American Eocene, therefore it seems fitting to give it a new name. It may be referred for the present to *Herpetotherium* Cope (see *H. fugax* Cope, 1873 A, p. 1), this being the nearest American genus. There is a pos-

sible relationship to *Peratherium comstocki* Cope of the Wind River Eocene.

Identification of the Teeth.—What designation should be given the various teeth of a possible Eocene marsupial is a question not easily settled unless we know the sequence of milk and permanent dentition. Marsh has said that *Entomacodon* has four premolars and three molars, the usual number ascribed to the higher mammals; he, however, thought this to be a marsupial. Flower and Lydekker tell us that there are four molars in the opossum, and three premolars, basing the decision on the fact that there are four molariform teeth behind that which replaces the only milk tooth, always the hindermost of the premolars.

Wiedersheim advances the idea that the premolars which have no predecessors are really "milk teeth" and that the *four molars* may be accounted for by the combination of two sets of teeth, permanent and "deciduous," which, abnormal in the time of development, are contemporaneous. Scott suggests the alternate theory that the milk teeth have been suppressed, an advanced stage of evolution in which the recapitulation of the phylogenetic history has been abbreviated.

Summary of Characters.—Resemblances to *Didelphis,* the opossum, may be seen in: (1) the strong canine, (2) weak anterior premolar, (3) dominance of the protocone in the premolars, (4) fourth tooth of the series molariform, (5) position of mental foramen under this tooth, (6) identical form of the molars, (7) groove on the jaw suggesting an inflected angle.

It is unlike *Didelphis* in (1) absence of diastemata around the anterior premolar, (2) trend of the mental foramen forward instead of backward, (3) the inflected angle, seeming to begin beneath the molars.

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