SMILODECTES OR NOTHARCTUS

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Fragmentary type specimens, representing the first knowledge of a species, in spite of their tremendous importance have always been a trial to the paleontologist; yet, with all the difficulties they present, the stability of systematic paleontology depends upon the retention of these early records, good or bad.

Witness the difficulties that have arisen over an obscure type in Peabody Museum:

Hyopsodus gracilis Marsh
Notharctus gracilis (Marsh) Cope
Microsyops gracilis Leidy not Marsh
?*Sarcolemur* (*Hyopsodus*) *gracilis* (Marsh) Osborn
Smilodectes gracilis (Marsh) Wortman—Genoholotype

Notharctus gracilis (Marsh).—The type of this species, Cat. No. 11800, described by Professor Marsh[1] under the genus *Hyopsodus,* has long been in the Peabody Museum collection. The importance, either of the species itself, or of the correct determination of its systematic position, is seen in the wide attention it has received and in the speculation which has been rife as to its relationships.

As already shown, authors have referred the type at different times to a variety of genera: *Hyopsodus* Leidy, *Notharctus* Leidy, *Sarcolemur* Cope, and *Smilodectes* Wortman; and writers have associated it with the Anaptomorphidæ, Hyopsodontidæ, Apatemyidæ, and Notharctidæ; and to such widely diversified orders as the Lemuroidea, Insectivora, and even indirectly to the Condylarthra and Artiodactyla.

History of the Species.—Describing the species under the genus *Hyopsodus* Leidy, which is thought by some to be near the insectivores, by others the condylarths, Professor Marsh in 1871[2] indicated the chief features of the teeth and the portion of the mandibular ramus. He gave the dominant dimensions and stated that the specimen was found by himself at Grizzly Buttes in the Bridger Basin of Wyoming.

The following year Professor Cope[3] referred several species

[1] Marsh, O. C., this Journal, vol. 2, p. 42, 1871.
[2] Loc. cit.
[3] Cope, E. D., Proc. Am. Philos. Soc., vol. 12, pp. 469-72, 1872.

of lemuroids to *Notharctus,* including *H. gracilis* Marsh; this was, without doubt, the correct assignment of the species, but his hint was lost on succeeding students of this group of Mammalia. In the same year (1872) Dr. Joseph Leidy[4] named a new species and genus, *Microsyops gracilis,* for a specimen which he thought might be the same as *Hyopsodus gracilis;* this designation he believed would be an ingenious way to show the uncertain relationship between the two types—a plan of doubtful expediency.

The last important change and the one which has so influenced later writers was made in 1903 when Dr. Wortman,[5] impressed with the seemingly strange characters of the small, broken jaw, assigned the species to a genus created for its reception—*Smilodectes.*

In a paper of 1899, Dr. Matthew[6] refers to *Hyopsodus gracilis* Marsh and classifies it tentatively with the primates. Professor Osborn[7] in 1902 writes the name of the species: "? *Sarcolemur* (*Hyopsodus*) *gracilis* Marsh," in the family Hyopsodontidæ. More recently (1909) Matthew[8] discusses *Smilodectes* in connection with Apatemys among a group of Insectivora of uncertain position; in another place, however, the type is placed with the Anaptomorphidæ, showing a suspicion on the part of this author that this was indeed a primate.

Smilodectes Wortman.—Dr. Wortman's description of the new genus is as follows: "*Smilodectes* gen. nov. This genus is founded upon the specimen originally described by Professor Marsh under the name of *Hyopsodus gracilis.* Osborn in his synonymy refers it to *Sarcolemur,* but the structure of the teeth distinctly forbids its reference to either of these genera. In certain respects the dentition, as far as known, resembles that of *Microsyops* more than that of any other genus, but in others it exhibits distinct relationship to that of *Notharctus* and *Limnotherium.* The number of teeth in the lower jaw is eight, as against seven in *Microsyops,* of which the most anterior is an enlarged incisor. Just as in *Microsyops,* the succeeding tooth may be rated either as a canine or

[4] Leidy, Joseph, Proc. Acad. Nat. Sci. Phila., Vol. 24, p. 20, 1872.
[5] Wortman, J., this Jour., Vol. 16, pp. 362-4, fig. 118, reproduced natural size.
[6] Matthew, W. D., Bull. Am. Mus. Nat. Hist., Vol. 12, 1899.
[7] Osborn, H. F., Bull. Am. Mus. Nat. Hist., Vol. 16, p. 180, 1902.
[8] Matthew, W. D., Memoir A. M. N. Hist., Vol. VI, pp. 298 and 544-5, 1909.

an incisor; if a canine, there are then three premolars, and if a premolar, there are four. The fourth premolar is not molariform." But Wortman in this same paragraph adds: "The single enlarged incisor distinguishes the genus from *Notharctus* and *Limnotherium,* and the more complex fourth premolar from *Mixodectes.*" He further characterizes the genus: "The jaw has about the same depth as that of the larger species of *Microsyops,* which it otherwise resembles in its general form. The symphysis is deep and rugose, projecting somewhat below the level of the lower border of the ramus,

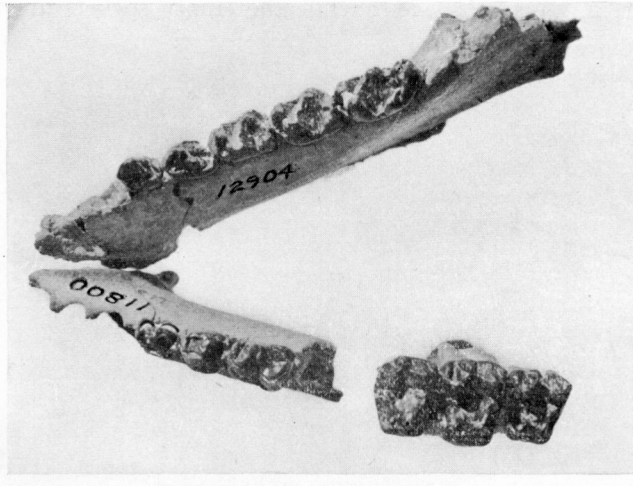

Fig. 1.—*Notharctus gracilis,* Syn. *Smilodectes gracilis* Wortman.
Crown view of the teeth of an Eocene primate represented by two individuals. Twice natural size.
Holotype specimen, Cat. No. 11800 Y. P. M., consisting of a fragment of lower jaw, showing the third and fourth premolars and the first molar.
Heautotype, Cat. No. 12904 Y. P. M., consists of a fairly complete ramus and three upper teeth (lower right corner).
The two rami are placed in juxtaposition along the symphysis to emphasize the similarity.

but exhibits no traces of coösification. The alveolus of the enlarged incisor lies close to the symphysis, and unlike that of *Microsyops* indicates an almost vertical position for this tooth. Immediately behind the incisive alveolus is a medium-sized socket for the first premolar or canine. Behind this comes a two-rooted tooth, with the larger of the roots posterior. The third premolar is likewise two-rooted. A por-

tion of the crown denotes that there was a slight indication of a heel. The rest of the crown is broken away. The fourth premolar is in about the same stage of evolution as that of *Limnotherium* or *Notharctus*. The internal cusp, however, is smaller, but the heel is broader and provided with two cusps instead of one. The first molar also closely resembles that of *Limnotherium tyrannus*, lacking the great transverse breadth of the posterior part of the crown seen in *Microsyops*. The arrangement of the cusps is very similar to that seen in *Limnotherium*."

Wortman designates the teeth found in the type specimen (figs. 1, 2, 3) as P_{3-4} M_1; while the empty sockets are those

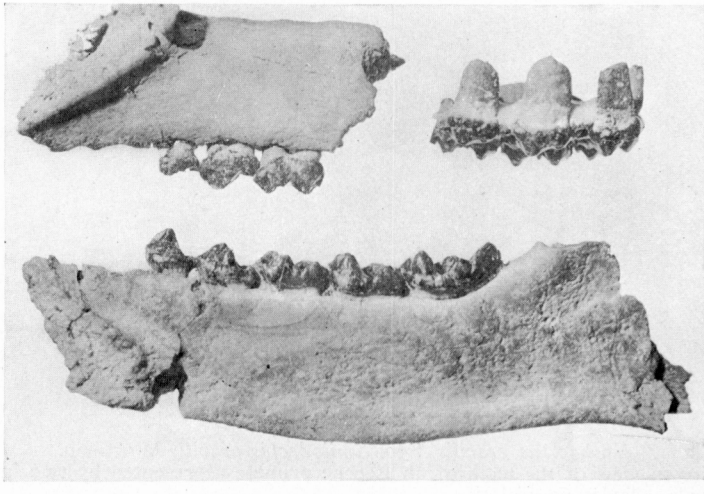

Fig. 2.—Inner view of the jaws and teeth of the same specimens shown in Fig. 1. Twice natural size.

of I P_1 C P_2, implying doubt about the identification of those anterior ones.

Gregory (1922)[9] settles this point with the Eocene primates, of which our specimen is certainly a representative, by assuming that there are four premolars, a canine and two incisors; and his dental formula 2-1-4-3 conforms to the conception Wortman had of certain other primates such as *Omomys*, figured in his monograph. Dr. Wortman's probable

[9] Gregory, W. K., Origin and Evol. of Human Dentition, Williams and Wilkins, p. 134, 1922.

error, in judging the generic position of *"H" gracilis,* rested in the fact that beyond the caniniform tooth, which he designated an incisor, the symphysis, now broken, is normally considerably elongated to furnish room for the anterior incisors. Without seeing this spout-like extension one easily gains the impression that there never could have been enough room for additional incisors.

Other specimens were associated by Dr. Wortman with his type, but it is not possible at this time to pick out these parts. It seems probable, however, that he could not have known the moderately complete ramus Cat. No. 12904 (figs. 1, 2, 3) with which are associated other upper and lower teeth, distinctly lemuroid.

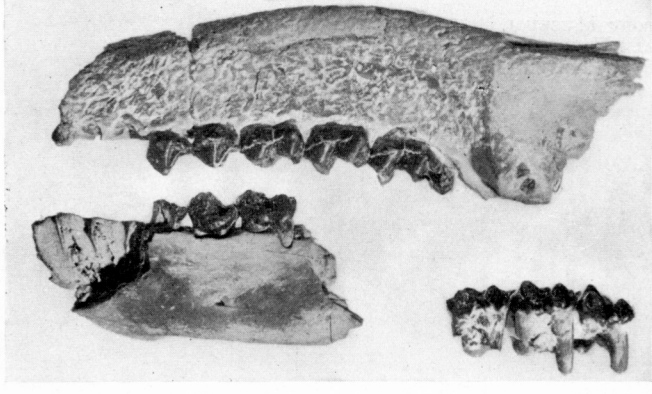

Fig. 3.—Outer view of rami and teeth of *Notharctus gracilis,* shown in Figs. 1 and 2. Twice natural size.

Related Forms.—In a part of his description, Wortman recognizes the distinction between *Limnotherium,* a primate, and *Microsyops,* and notes the greater similarity of *Smilodectes* to the former.

Osborn (1902),[10] Granger and Gregory (1917)[11] and others have proven conclusively and stated positively that there is no distinction between *Notharctus* and the other primates such as *Limnotherium, Prototomus, Tomitherium, Telmatolestes,* and *Hipposyus,* and to this list, without reservation, we add *Smilodectes.*

[10] Loc. cit.
[11] Granger and Gregory, W. K., Bull. A. M. N. H., Vol. 37, pp. 41-59, 1917.

Another species close, if not identical, to *H. gracilis* Marsh is *Notharctus matthewi* Granger and Gregory. It is described as having unusually primitive characters, and the distinctive ones listed are almost exactly those of the Marsh type.

Notharctus osborni Granger and Gregory, on the other hand, has the rounded chin which resembles most nearly that of *N. tyrannus*. *N. matthewi* has a slight deflection of the posterior border of the symphysis; this we see in *H. gracilis*.

Conclusions.—Notharctus gracilis (Marsh) Cope, variously referred and finally made the type of a new genus *Smilodectes* Wortman, is beyond doubt a notharctid, and our main purpose has been to demonstrate this.

Notharctus gracilis is apparently identical with *N. matthewi* Granger and Gregory, and, if so, replaces it as a species name.

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