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A NEW PROCYONID FROM THE MIOCENE OF NEBRASKA

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Phlaocyon was briefly diagnosed by Matthew in 1899. Later in the same year Wortman and Matthew described and figured the type. It was the opinion of those authors that *Phlaocyon* was a primitive procyonid that bridged a gap separating *Pseudocynodictis* and *Procyon*. In 1927 Romer and Sutton described *Aletocyon multicuspis*, a form close to *Phlaocyon*, but separated from it by slight differences in general molar form and basicranial details. The molars in the type of *Phlaocyon leucosteus* were, unfortunately, so heavily worn that the cusp pattern could not be determined. In every other character there is great similarity to *Aletocyon*. Hence, in describing the teeth of *Phlaocyon* (McGrew, 1938) I supplemented the description with the relatively unworn molars of *Aletocyon*, regarding the molars of the two genera as structurally the same. It turns out that I was not justified in so doing.

The new specimen described herein, although considerably advanced over *Phlaocyon leucosteus*, possesses certain characters which link it with that species, and it establishes the fact that *Phlaocyon* and *Aletocyon* are quite distinct in dental structure. The view of Romer and Sutton, that "the two are to be considered as primitive procyonids, probably not distantly related but not in generic sequence," is supported by the discovery of this specimen.

Phlaocyon marslandensis sp. nov.

Holotype.—F.M. No. P26314, left maxillary and premaxillary, with $I^{\underline{3}}$, $C^{\underline{1}}$, $P^{\underline{4}}$, and $M^{\underline{1}}$.

Horizon and locality.—Upper Marsland beds near Dunlap, Nebraska. Early middle Miocene.

Diagnosis.—Larger than *Phlaocyon leucosteus*. $P^{\underline{4}}$ without parastyle; $M^{\underline{1}}$ shorter transversely and antero-internal cingulum slighter than in *P. leucosteus*, protoconule greatly reduced, hypocone

and metaconule close together and no extra cuspules. Premaxillary and maxillary as in *P. leucosteus* and *Aletocyon multicuspis.*

Description.—The third incisor and canine are rather large and long but do not differ from those of *Procyon* in any significant way. The first, second, and third premolars are represented by alveoli which indicate that the premolars were crowded much as in *P. leu-*

FIG. 12. *Phlaocyon marslandensis* sp. nov. F.M. No. P26314. Type. × 1.

costeus, Aletocyon, and *Procyon.* P^4 is rather canid-like, with a well-developed, although short, paracone-metacone blade. No distinct parastyle is present. The protocone is strongly developed and behind it lies a distinct cingular cusp (hypocone). In no respect does this tooth differ from that of *Phlaocyon leucosteus.* M^1 is more quadrate than that of *P. leucosteus* but much less so than in *Procyon.* The inner portion is much broader than in M^1 of the Caninae or *Bassariscus.* A moderately strong cingulum extending back only half the length of the tooth is present external to the paracone. The paracone, metacone, and protocone form an equilateral triangle. The metaconule is much stronger than in either the dogs or *Bassariscus* and lies more internally—almost directly behind the protocone. The protoconule is so reduced that it can hardly be distinguished. The internal cingulum is very slight anteriorly; posteriorly it is raised into a rather strong hypocone. The hypocone and metaconule lie close together.

Discussion.—Few molar characters in the new specimen can be compared in detail with those of the type of *Phlaocyon leucosteus,* due to worn condition of the latter. However, it seems certain that the reduced antero-internal cingulum and the absence of a parastyle on P^4 were characters common to both species. These two characters unite *P. leucosteus* and *P. marslandensis* and separate them from *Aletocyon.*

P. marslandensis differs from *P. leucosteus* in being larger and having more quadrate molars. The last is a progressive character,

and in view of the fact that *P. marslandensis* occurs in later deposits it is possible that the species is directly descended from *P. leucosteus*.

As pointed out by Wortman and Matthew (1899), the genus *Phlaocyon* is almost perfectly intermediate between *Bassariscus* and *Procyon*. Development of the *Procyon* type of dentition, outlined previously (McGrew, 1938), need not be repeated here, but in general is supported by the unworn teeth of *Phlaocyon*. One slight modification should be mentioned, however. It was stated that the postero-internal cusp of $M^{\underline{1}}$ in *Procyon* was probably the metaconule and that the hypocone must have been lost. The close proximity of the metaconule and hypocone in *Phlaocyon* suggests that in *Procyon* these two cusps are united to form one postero-internal cusp.

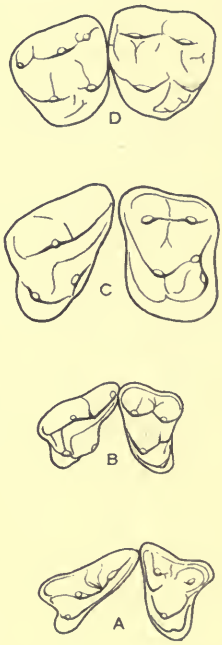

FIG. 13. Possible steps in structural development of *Procyon* $P^{\underline{4}}$, $M^{\underline{1}}$. A, *Pseudocynodictis;* B, *Bassariscus;* C, *Phlaocyon;* D, *Procyon.*

The similarity in general skull structure and basic tooth pattern between *Phlaocyon* and *Aletocyon* leaves no doubt that the two are closely related. The differences in dentition that appear to be of real consequence are the presence of strong proto- and metaconules, an extra conule, and a strong antero-internal cingulum in the molars of *Aletocyon*. This is sufficient difference to place the genera in separate lines of descent.

Aletocyon approaches *Cynarctoides* in those characters in which it differs from *Phlaocyon* (multiplicity of cusps and strong antero-internal cingula on molars). *Cynarctoides*, however, possesses other molar characters which are more divergent from the *Bassariscus-Procyon* line than those of *Aletocyon*, such as an antero-internal cingular cusp and prominent external styles. In no sense, however, can *Aletocyon* be regarded as genetically annectant between *Bassariscus* and *Cynarctoides* because of the absence in the latter of a hypocone on $P^{\underline{4}}$ and the reduced external shelf of $M^{\underline{1}}$ in *Aletocyon*. The only reasonable conclusion is that *Aletocyon* is a procyonine that has diverged from the main line in the direction of *Cynarctoides* and that the similarity to the latter does not signify relationship; it is, rather, probably due to convergence.

Romer and Sutton (1927) and I (1938) believed *Aletocyon* to bear relationship with the pandas. The molars of *Cynarctoides* and *Ailurus* have characters in common (prominent external styles) which seem to separate them from all other carnivora and, in combination with the otherwise fundamentally similar molar pattern, seem certainly to link them genetically.

If, as pointed out above, the similarity of *Aletocyon* to *Cynarctoides* is due to convergent evolution it is improbable that any relationship exists between *Aletocyon* and the pandas.

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