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PHILIP D. GINGERICH

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ANN ARBOR

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ALETODON GUNNELLI, A NEW CLARKFORKIAN HYOPSODONTID (MAMMALIA, CONDYLARTHRA) FROM THE EARLY EOCENE OF WYOMING

By

Philip D. Gingerich

Abstract.— Intensive collecting in the type area of the Clarkforkian land mammal age in northwestern Wyoming indicates that a distinctive mammal fauna of early Eocene aspect characterizes this interval. Among the mammals in the Clarkforkian fauna, a new condylarth genus and species *Aletodon gunnelli* is reasonably common. *Aletodon* appears to have been derived from a Paleocene ancestor such as *Litomylus* or *Promioclaenus*, and it became extinct with introduction of Wasatchian faunas in the early Eocene.

INTRODUCTION

In August, 1911, a field party from Princeton University and the American Museum of Natural History discovered a small mammal fauna in the bluff north of Ralston, Wyoming (Polecat Bench) and in the head of Big Sand Coulee nearby. This collection came in part from the "Ft. Union" formation and seemed to be stratigraphically below typical Wasatch or "Knight" faunas, well known, even at that early date, from the Big Horn Basin. After two additional brief expeditions to the area in 1912 and 1913, Granger (1914) proposed that the lower beds such as those exposed at the southwest end of Polecat Bench, in the head of Big Sand Coulee, between Big and Little Sand Coulees, on the west side of the Clark's Fork River between Line and Little Rocky Creeks, and at the southwestern base of McCulloch Peak be called the "Clark Fork" beds, and he characterized the Clark Fork fauna as lacking perissodactyls, artiodactyls, rodents, and primates.

Rodents, archaic primates, and possibly a perissodactyl are now known from Clark Fork beds, so the early faunal distinction is no longer entirely correct. Jepsen (1930) and Simpson (1937) each added a number of new taxa to the Clark Fork fauna, and in 1941, H. E. Wood *et al.* proposed that this interval be recognized as a North American Land Mammal "Age," the Clarkforkian, with its only designated index fossil being *Plesiadapis cookei*. R. Wood (1967) subsequently reviewed all of the "Clarkforkian" collections at Princeton University and the American Museum of Natural History and concluded that recognition of a Clarkforkian provincial age or faunal zone was unwarranted. Without here going into the problems raised by Wood's study, it is sufficient to say that there does appear to be a distinctive *Plesiadapis cookei* zone in the type area of the Clark Fork beds and elsewhere (Gingerich, 1976). Our field work of the past two summers has shown that there is a distinctive Clarkforkian fauna in a stratigraphic interval perhaps as much as 700 meters thick in the Sand Coulee area (Gingerich and Rose, 1977), and *Plesiadapis cookei* remains an important index species found only in this interval. The new genus and species described below is an additional Clarkforkian index fossil.

Abbreviations used herein are as follows: AMNH, American Museum of Natural History (New York); FMNH, Field Museum of Natural History (Chicago); PU, Department of Geological and Geophysical Sciences, Princeton University (Princeton, N. J.); and UM, University of Michigan Museum of Paleontology (Ann Arbor).

SYSTEMATIC PALEONTOLOGY

Order CONDYLARTHRA

Family HYOPSODONTIDAE

Aletodon, new genus

Type species.— *Aletodon gunnelli*, new species.

Included species.— Type species, and possibly an unnamed smaller ancestral form from the lower part of the Clarkforkian.

Diagnosis.— *Aletodon gunnelli* is easily distinguished from other Hyopsodontidae by its relatively long, simple, pointed P_4, which lacks any distinct paraconid, metaconid, or entoconid accessory cusps (see following discussion also).

Discussion.— *Aletodon gunnelli* differs markedly in size and/or cheek tooth morphology from all contemporary Clarkforkian species. It is closest to *Ectocion parvus*, but differs from all species of *Ectocion* and *Phenacodus* in having a large simple P_4 with a single major protoconid cusp, a relatively narrower M_1, an M_2 with the trigonid distinctly wider than the talonid, and an M_3 with a much more reduced preprotocristid. In addition, *Aletodon* differs from *Ectocion* in lacking any trace of a mesostyle on the upper molars. *Aletodon* differs from *Haplomylus* in being significantly larger and having a simple P_4 without a metaconid. The latter feature and the relatively long narrow M_1 with an open trigonid distinguish *Aletodon* from later *Hyopsodus*.

It is difficult to compare *Aletodon gunnelli* with Paleocene Hyopsodontidae, because that group is so badly in need of a thorough quantitative study and revision. Nevertheless, the form bearing closest resemblance to *A. gunnelli* would appear to be the mid-Tiffanian species "*Litomylus*?" *ishami*, a poorly known species described by Gazin (1956) from his Twin Creek locality near Fossil, Wyoming. The *Plesiadapis* from the Twin Creek locality is *Plesiadapis rex* (Gingerich, 1976, p. 27), indicating that the locality is approximately the same age as the Cedar Point locality in the Big Horn Basin. Several good mandibles from Cedar Point (PU 19963, 21449) appear to be indistinguishable from "*Litomylus*?" *ishami* and probably belong to that species. By comparison with the Cedar Point mandibles, *Aletodon* differs from "*Litomylus*?" in having a relatively larger, simpler P_4, and a more open trigonid on M_1. *Aletodon* could be derived from "*Litomylus*?" relatively easily, and it appears to be the most likely ancestor of *Aletodon*. I am, however, not certain that "*Litomylus*?" *ishami* really belongs in *Litomylus* – it may in the future prove to belong to a new genus, or conceivably to be an early species of *Aletodon* itself. A possible intermediate form is known by an isolated P^4 (AM 101509) and a maxilla with M^{1-3} (PU 14583) from the Mason Pocket in southern Colorado. This intermediate cannot be compared with "*Litomylus*?" since no upper teeth of the latter are known. *Aletodon* differs from the Mason Pocket intermediate in having distinct hypocones and lingual cingula on the upper molars. *Aletodon* could also be derived from *Promioclaenus* (*sensu* Wilson, 1956), but differs from it in premolar structure as outlined above.

The large, simple, pointed P_4 of *Aletodon* resembles superficially the large P_4 in pentacodontid ?condylarths such as *Phenacodaptes* and *Apheliscus*, but in molar structure and the presence of an almost equally large P_3 (in UM 67196 and PU 18087/19850) *Aletodon* differs from these genera and other pentacodontids, and its affinities appear to be with the Hyopsodontidae.

TABLE 1 – Measurements of the type specimen of *Aletodon gunnelli* from the upper part of the Clarkforkian, and two specimens from the lower part of the Clarkforkian interval in Sand Coulee. Measurements in mm. Compare with Table 2.

		UM 66301 TYPE Locality SC-90	UM 66629 Locality SC-108	PU 18938 NE¼, S29, T57N, R100W
P_4	L	6.0	—	—
	W	3.4	—	—
M_1	L	5.0	—	—
	W	3.7	—	—
M_2	L	—	4.7	4.4
	W	—	4.2	3.8
M_3	L	4.9	—	—
	W	3.5	—	—

Etymology.– *Aletodon* Gr. (masc.), grinding tooth, in reference to the relatively large flat molars of this genus.

Aletodon gunnelli, new species

Text-figs. 1, 2, 3

Type.– UM 66301, a broken right mandible with P_4, M_1, and M_3 well preserved.

Type locality.– University of Michigan locality SC-90, in the NE¼, Section 11, T56N, R102W, Park County, Wyoming. This locality is in the upper part of the Clarkforkian section in the Sand Coulee drainage basin.

Distribution.– Clarkforkian (early Eocene) of northwestern Wyoming, possibly also western Colorado.

Diagnosis.– Only species of *Aletodon* known, see generic diagnosis.

Etymology.– Named for Mr. Gregg Gunnell, who found the type specimen, in recognition of his many contributions to our expeditions in 1975 and 1976.

Description.– The type specimen is a broken right mandible, in which the various pieces of ramus unfortunately do not contact. The specimen preserves P_4, M_1, and M_3 intact. Measurements of the type specimen are given in Table 1. Note that almost all specimens from upper Clarkforkian localities are larger than the two isolated teeth found lower in the Clarkforkian interval in Sand Coulee. Dental measurements for the combined sample of all specimens from the upper Clarkforkian are summarized in Table 2.

The mandibular dentition of *Aletodon gunnelli* is illustrated in text-figure 1, a composite based on the type specimen with M_2 restored from UM 65059. Both P_3 and P_4 in *Aletodon* are long narrow teeth with a simple pointed crown lacking any significant accessory cusps. (P_3 is preserved in UM 67196 and PU 18087/19850, see text-fig. 3). M_1 is a relatively long tooth usually lacking a distinct paraconid. The preprotocristid curves forward to the anteromedial corner of the tooth, forming an open trigonid. The talonid on M_1 is about the same width as the trigonid. M_2 is similar to M_1, but its preprotocristid loops back to join the metaconid, making a smaller closed trigonid.

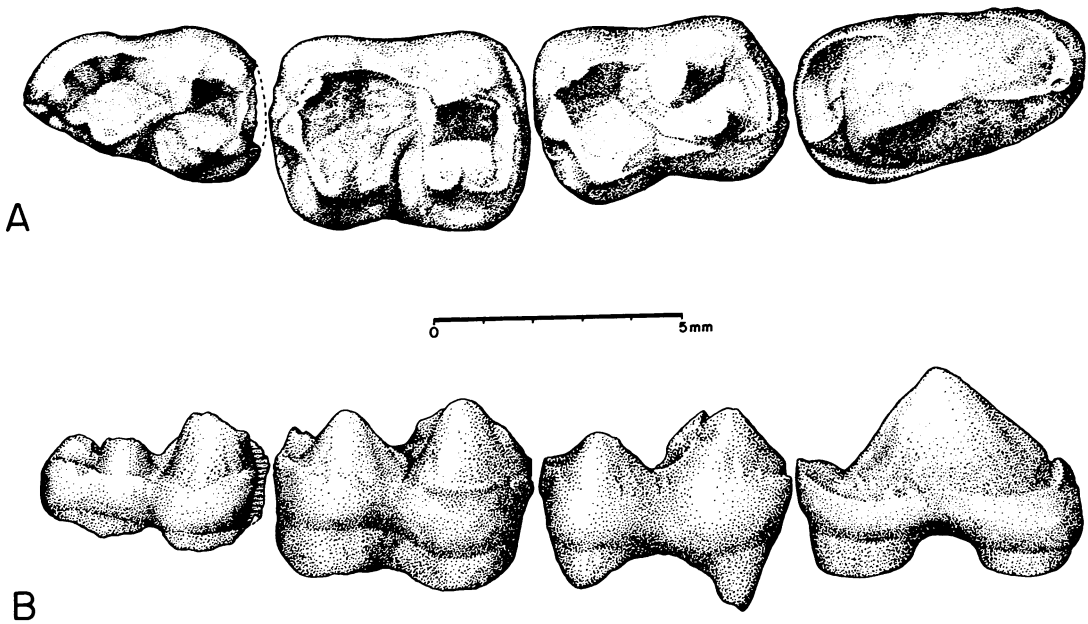
TABLE 2 – Summary of measurements for all specimens of *Aletodon gunnelli* from the upper part of the Clarkforkian interval in Sand Coulee. Measurements in mm. Compare with Table 1.

		N	OR	$\bar{x}$	s	V
P_3	L	2	5.3 – 5.6	5.45	---	---
	W	2	2.5 – 2.6	2.55	---	---
P_4	L	4	5.3 – 6.0	5.73	.34	5.9
	W	3	3.2 – 3.4	3.27	.12	3.5
M_1	L	7	4.7 – 5.0	4.86	.13	2.6
	W	8	3.5 – 3.9	3.69	.13	3.4
M_2	L	10	4.7 – 5.4	4.95	.21	4.3
	W	11	4.1 – 4.4	4.22	.10	2.3
M_3	L	2	4.9 – 5.0	4.95	---	---
	W	2	3.5	---	---	---
M^1	L	4	4.6 – 4.9	4.73	.15	3.2
	W	5	4.9 – 5.4	5.18	.19	3.7
M^2	L	4	4.3 – 5.1	4.78	.40	8.3
	W	4	5.8 – 6.6	6.08	.38	6.2
M^3	L	1	3.5	---	---	---
	W	1	4.2	---	---	---

The trigonid on M_2 is invariably wider than the talonid. M_3 has the trigonid structure of M_2, but the talonid is very narrow, with a prominent hypoconid. A prominent hypoconid and entoconid and a distinct hypoconulid are present on all the lower molars.

An upper M^2 was found associated with the mandible UM 65059 (of which M_2 is illustrated in text-fig. 1), and this M^2 is illustrated in text-figure 2. One specimen preserves M^{1-3} (UM 63307) and another preserves M^{1-2} (PU 18087/19850), but no upper P^3 or P^4 has yet been found. M^1 has a relatively square crown with the three major cusps forming an almost equilateral triangle. M^2 is larger than M^1, relatively wider than long, but otherwise similar to M_1. Both have a small distinct hypocone on the basal cingulum and small paraconule and metaconule cusps. M^3 is a relatively small triangular tooth with a much reduced metacone and hypocone. All of the upper molars lack any trace of a mesostyle, and a weak lingual cingulum is present on most (but not all) upper molars. Unworn molars resemble those of *Hyopsodus* to some degree, but worn molars sometimes develop the appearance that the paracone and metacone have been pinched together, somewhat like one sees in pentacodontids. Nevertheless, as discussed above, the closest affinities of *Aletodon* appear to be with the Hyopsodontidae.

Hypodigm.– Two mandibles of *Aletodon gunnelli* are known from the type locality: UM 66290 and 66301 (type). In addition, 18 specimens are known from the upper part of the Clarkforkian interval in Sand Coulee: UM 63280, 63297, 63307, 65059, 65637, 66159, 66173, 66850, 67196,



TEXT-FIG. 1 – Lower dentition of *Aletodon gunnelli* in occlusal (A) and lateral view (B). P_4, M_1, and M_3 are from type specimen, UM 66301. M_2 is restored from UM 65059.

67223, 67248, 67462, 67463, 67464, PU 18087/19850, 19603, 21210, 22017. Two specimens come from middle and lower Clarkforkian levels, respectively: UM 66629, PU 18938. Undescribed specimens come from the Togwotee area, western Wyoming (AMNH collection). One specimen from Plateau Valley in Colorado is possibly this species: FMNH P-14952.

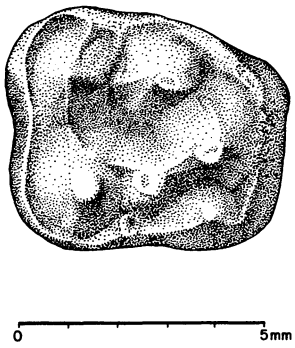
STRATIGRAPHIC AND GEOGRAPHIC DISTRIBUTION

Most of the specimens of *Aletodon* found to date have come from the upper part of the Clarkforkian, where they are found associated with *Plesiadapis cookei* and *Plesiadapis dubius*. One specimen, PU 18938, comes from a lower level apparently yielding *Plesiadapis simonsi* and *Plesiadapis fodinatus*. As noted in the tables, that specimen is significantly smaller than the others and it may prove to represent a different species. Further collecting is in progress to try to find more specimens of this small *Aletodon* and to fill an important gap in the faunal record of the Tiffanian – Clarkforkian transition as well.

In addition to the specimens discussed here from the Sand Coulee area of the Big Horn Basin, *Aletodon gunnelli* is present in the Togwotee faunas of Clarkforkian age from western Wyoming (M. C. McKenna collection, American Museum of Natural History), and it is possibly represented by a small M_3 (FMNH P-14952) from the Plateau Valley fauna of western Colorado.

NOTE ON A PRINCETON LOCALITY

In studying *Plesiadapis cookei* several years ago, I noted the curious fact that one Sand Coulee collection including this species came from a Princeton locality in the NE¼, S1, T56N, R101W,

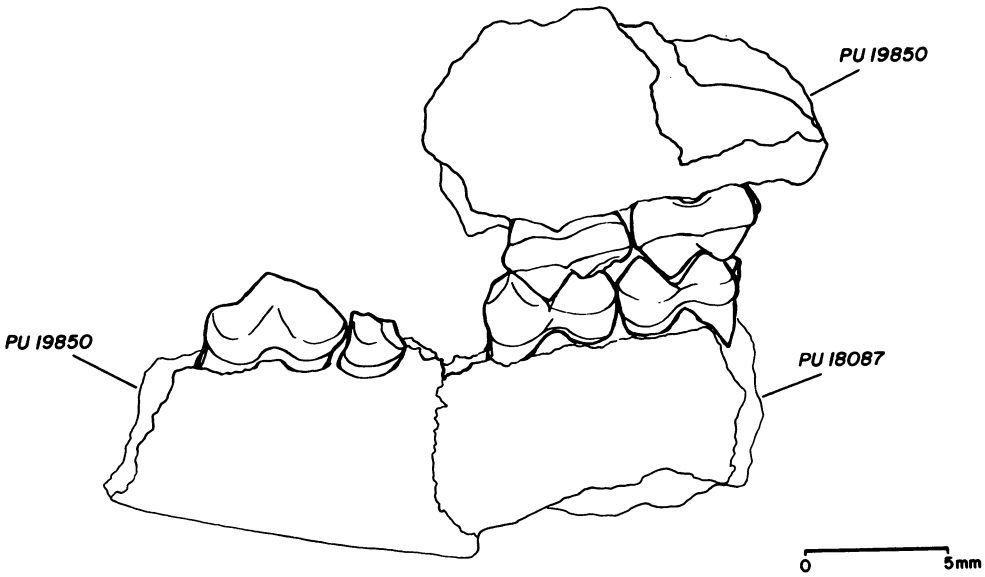


TEXT-FIG. 2 – Right M^2 of *Aletodon gunnelli* in occlusal view, UM 65059, found in association with mandible including M_2 illustrated in text-figure 1.

Park County, Wyoming, and another collection came from the NE¼, NE¼, S1, T56N, R102W, exactly six miles to the west. The former seemed somewhat out of place (see Gingerich, 1976, fig. 14), but not demonstrably so. However, in studying *Aletodon gunnelli* from the same collection recently, I found a mandible with M_{1-2} (PU 18087) collected by G. L. Jepsen in 1962 from the former locality that occluded rather well with the maxilla PU 19850 having M^{1-2} from the latter locality. Much to my surprise, a mandible fragment associated with the latter specimen contacts PU 18087 perfectly (text-fig. 3). I personally collected PU 19850 in 1967 while employed by Professor Jepsen, and remember well the general locality where it was found. We have since found additional specimens of *Aletodon* at this locality (SC-136), and it is almost certain that Jepsen erred in recording the locality data on PU 18087. (It should be added that this is a very easy error to make, since the locality in question is in the extreme corner of a township in R102W that is bordered to the east and to the north by townships in R101W, and the locality must be approached through the latter.)

This discovery of an error in locality records is of significance, since the fauna in the 1962 collection includes several diagnostic Clarkforkian elements. All of the following were collected by Jepsen on August 28, 1962 and should be recorded as coming from the NE¼, S1, T56N, R102W [not R101W]:

PU 18086	*Ectocion* sp.
PU 18087	*Aletodon gunnelli* (joins PU 19850)
PU 18088	Unidentified
PU 18089	Oxyaenid
PU 18092	*Coryphodon* sp.
PU 18093	*Plesiadapis cookei*
PU 18094	*Ectocion* sp.
PU 18095	*Ectocion* sp.
PU 18096	*Phenacodus* sp.
PU 18097	*Plesiadapis cookei*
PU 18098	*Plesiadapis cookei*
PU 18176	*Esthonyx* sp.
PU 18177	*Ectocion* sp.



TEXT-FIG. 3 – Princeton University specimen of *Aletodon gunnelli*, PU 18087/19850. The mandible fragment with M_{1-2} (18087) was collected in 1962 and it was supposedly found six miles from the other two fragments (labeled 19850) collected in 1967. In fact all belong to the same specimen and fit together perfectly. See text for discussion.

PU 18178	Misc. teeth
PU 18179	Indet.
PU 18180	*Ectocion*

Moving this collection westward to its locality of origin raises it stratigraphically by several hundred meters. All of the forms in question are typically found in the middle to upper part of the Clarkforkian, and they fit better at that level than in the earlier Clarkforkian implied by their previous locality position.

ACKNOWLEDGMENTS

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