FOSSIL FOOTPRINTS FROM THE FORT UNION (PALEOCENE) OF MONTANA

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INTRODUCTION

In 1908 Mr. A. C. Siberling, while collecting mammalian fossils for the United States National Museum in the Fort Union deposits of south-central Montana, also discovered a series of fossil footprints in this same formation.

Apparently these were the first fossil tracks to be discovered in the Paleocene, and as such they appear worthy of record. Recently a series of fossil tracks found in deposits of equivalent age in the Province of Alberta, Canada, have been described by Messrs. Rutherford and Russell,[1] but these tracks are thought to be mammalian in origin, and although their details are somewhat obscurely preserved their tridactyle nature effectually distinguishes them from the tracks here considered.

Originally the Montana tracks were preserved as one large slab, but owing to the vicissitudes of transport this specimen was broken into many pieces and the loss of connecting edges made it impossible to reassemble them in their original relationships. The specimen is now in three slabs, as shown in the accompanying plates.

The tracks are impressed on the slightly undulating surface of a fine grained sandstone that in some instances has preserved the full details of the feet in addition to recording dragging tails, claw scratches, and belly impressions. Due to the breakage of the original slab, only short sections of trackways are now available. The best one at hand, shown in Plate 1, is selected as the type.

AMMOBATRACHUS MONTANENSIS, new species

Plates 1, 2, and 3

Type.—Cat. No. 7635, U.S.N.M., parts of trackways on three slabs that originally formed one large slab. Collected by A. C. Silberling, 1908.

Type locality.—Section 8, range 16, township 5, Bear Butte, Bear Butte Pass, Sweetgrass County, Mont.

Geological horizon.—"Silberling's Fort Union No. 3." Paleocene.

[1] Rutherford, R. L. and Russell, L. S., Amer. Journ. Sci., vol. 15, 1928, p. 262.

The series of tracks selected as being typical of the above-named species is shown on the lower two thirds of the slab illustrated in Plate 1. With the exception of four faint impressions shown on the bottom of Plate 2, all other tracks on the three slabs illustrated in Plates 1, 2, and 3 are regarded as pertaining to the present genus and species.

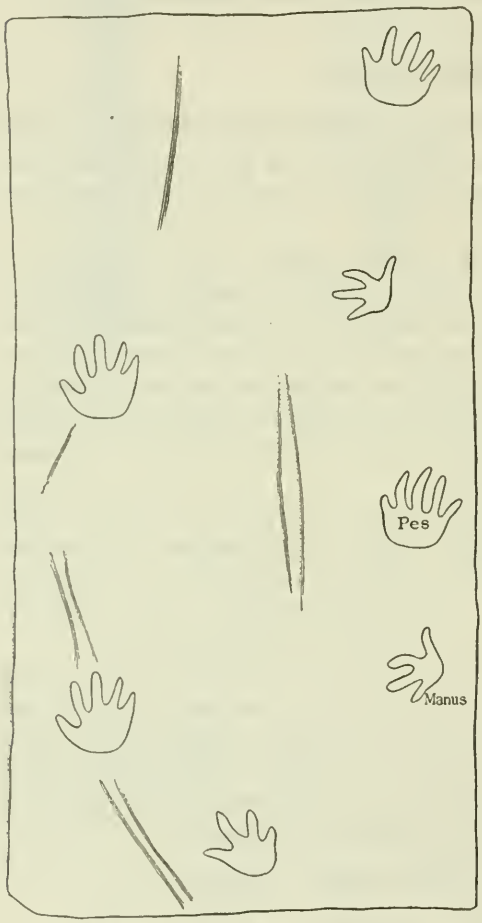

FIG. 1.—AMMOBATRACHUS MONTANENSIS, TYPE NO. 7635 U. S. N. M. DIAGRAM OF TRACKWAY. ABOUT ONE-THIRD NATURAL SIZE

Description.—Stride variable, measuring from 135 to 180 mm.; width of trackway measured from the outside of one foot to a corresponding position on the opposite side, about 162 mm. The manus tracks irregularly placed but usually forward of midway between those made by the hind feet. Fore slightly smaller than hind foot.

Manus.—Tetradactyle, plantigrade, rounded palm, and diverging digits. Length over all, 22 mm.; distance between tips of lateral toes 31 mm.; breadth of palm, 20 mm. Outer toe originates well backward on the side of the palm and is strongly diverted outward away from the three inner toes. The manus as a whole turns strongly inward toward the median line of the trackway. Inner toe shorter than fourth digit. Third longest.

Pes.—Pentadactyle, plantigrade. Sole broadly rounded behind. Length over all, 33 mm.; distance between tips of lateral toes, 33.5 mm.; breadth of sole, about 28 mm. First digit short and originating well back on the side of the sole; divercation slightly less than 45°. Three median toes long, relatively slender, with subacute or rounded terminations. There is some variation in the relative lengths of the digits of opposite feet as is clearly indicated in Figure 1. None of the tracks give clear indication of the presence of

sharp claws although deep scratches are recorded by the toes especially of the pes where they dragged with each step. These are clearly indicated on the left side of the trackway shown in Plate 1. In this same section of trackway a smoothing out of the surface between the two lines of tracks suggest a belly drag leading to the inference that the animal was a low, wide-bodied, short-legged quadruped. The presence of a heavy tail is clearly indicated by an intermittent but deep median groove.

The digital formula of four and five toes, respectively, on manus and pes, a close similarity in arrangement and in the relative lengths of the digits, these tracks have their closest affinities with *Ammobatrachus turbatans* Gilmore recently described[2] from the Supai formation (?Pennsylvanian) of the Grand Canyon. Their specific distinctness, however, is at once indicated by the much greater width of the trackway, longer stride, and more open spacing of the fore and hind foot impressions. The larger foot measurements of *A. turbatans* suggests a bigger animal than the one making the tracks considered here, which accentuates the importance of the differences enumerated.

Comparison of the pes tracks shows the Montana ichnite to have relatively longer and more slender digits with a more strongly divergent digit five. Contrasting the manus tracks the sole of Cat. No. 7635, U. S. N. M., is shorter, the lateral digits relatively longer, and the angulation of the imprint with toes directed strongly inward toward the center of the trackway, at once distinguishes these imprints from the forwardly pointed toes of *A. turbatans*.

The digital formula strongly suggests this new species to be of amphibian lineage, but in the absence of confirmatory evidence there seems no way of definitely determining this point. Neither does a review of the known fauna of this formation give any hint as to the class or the kind of animal to which these tracks might be attributed. There are no amphibians known from the Fort Union and the only reptiles are small lizards, turtles, crocodiles, and the Rhyncocephalian *Champsosaurus*. The two last mentioned with their elongated toes of the hind feet would be at once ruled out, though there is the possibility of their being Chelonian in origin.

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[2] Smith. Misc. Coll., vol. 80, 1928, No. 2956, p. 8, pl. 2.

EXPLANATION OF PLATES

Plate 1

Ammobatrachus montanensis, new species. No. 7635 U.S.N.M. type. Trackway on lower half of slab shows toe scratches, belly drag and tail grooves. About one-third natural size.

Plate 2

Ammobatrachus montanensis, No. 7635 U.S.N.M. Part of type slab. Various imprints of feet. Tracks crossing the slab diagonally at the bottom pertain to some other animal. About one-third natural size.

Plate 3

Ammobatrachus montanensis, No. 7635 U.S.N.M. Part of type slab. Various imprints of feet with distinct tail drag. About natural size.

TYPE SLAB OF AMMOBATRACHUS MONTANENSIS

FOR DESCRIPTION OF PLATE SEE PAGE 4

PART OF TYPE SLAB OF AMMOBATRACHUS MONTANENSIS

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