A NEW PLIOCENE BADGER FROM MEXICO

By Arthur B. Drescher

Introduction

Remains of Tertiary badgers are rare and of fragmentary character. Consequently any new material that is found, adds to our knowledge of the history of the group. This paper describes a new species of badger on the basis of three fragmentary lower jaws and a distal portion of a right humerus. The specimens were collected by the California Institute of Technology in deposits which appear to be middle Pliocene in age, near Rincon, Chihuahua, Mexico.

The writer is indebted to Dr. Chester Stock for supervision in the study of these specimens and for his criticism of the manuscript. He also wishes to acknowledge the aid of Dr. Robert W. Wilson. The photographs shown in the plate were retouched by John L. Ridgway and David P. Willoughby.

Taxidea mexicana n. sp.

Type specimen: No. 2538, Calif. Inst. Tech. Coll. Vert. Pale., plate 13, figs. 1, 1a. An incomplete right ramus with C-M_1.

Paratypes: A right ramus with crown of P_3, and a left ramus with P_2 present, Nos. 2539 and 2540 respectively, Calif. Inst. Tech. Vert. Pale.

Referred specimen: The distal portion of a right humerus broken off from shaft immediately above entepicondylar foramen, No. 2541, Calif. Inst. Tech. Coll. Vert. Pale., plate 13, fig. 4.

Locality: The type specimen and humerus are from C. I. T. Vert. Pale. Loc. No. 276; the two paratypes are from Loc. No. 289; near Rincon, Chihuahua, Mexico. Middle (?) Pliocene.

Specific diagnosis: Size approximates that of the smallest specimens of *Taxidea taxus;* jaw narrow at P_3, widening at M_1; canine small; P_1 absent; P_4 with prominent accessory cusp posterior and external to principal cusp; carnassial stout and broad, paraconid large and directed well toward inner side, metaconid situated almost as far forward as protoconid and forming approximately an equilateral triangle with protoconid and paraconid, trigonid larger than talonid, accessory cusps on talonid strongly developed.

Description: The type specimen is a right lower jaw which, though broken just behind the alveolus for M_2 and in front of the canine, is otherwise excellently preserved. The jaw tapers toward the anterior end and is slightly deeper under M_1 than

near the symphysis. The dentition is that of an adult badger. The carnassial is stout. P_4 possesses a prominent posterior cusp, while P_3 and P_2 have simple crowns. The small canine has a curved crown.

Of the paratypes, the right ramus, Nos. 2539, retains the alveoli for M_1 and P_2; P_3 is present; P_4 and C are broken off at the level of the jaw. In this specimen the area of the symphysis is small and relatively smooth. The left ramus, No. 2540, is similarly imperfect, but retains that portion of the jaw between and including P_2 and the alveolus for M_2. P_2 is complete. No. 2540 represents a very young individual.

In the humerus, referred to *T. mexicana*, the entepicondylar foramen is more heavily bridged, but the foramen itself is smaller than in recent badgers; the inner condyle is not so massive, and is separated from the trochlea by a notch. The condyle in the humerus of *T. taxus* not only lacks this notch, but its lower side is extended so that it forms the most distal portion of the element. Furthermore, the capitellum is relatively large.

Since no other carnivore or, more specifically, no other mustelid occurs in the fauna to which the fragmentary humerus might be referred, and since the specimen does not resemble the humerus of any recent form more closely than it does the badger, the possibility that the specimen also represents the species *T. mexicana* must receive serious consideration. Should this alocation prove correct one might interpret the evolution of the American badgers, at least from the middle Pliocene to Recent, as showing relatively few noteworthy modifications in dentition, but important changes at least in the upper arm bone. The structural features of the fossil humerus, in contrast to those of the living *Taxidea*, suggest that the characters of the fore-limbs in this instance may have generic value. However, in view of the paucity of information concerning skeletal parts of Tertiary badgers, recognition of the present specimen as paratypic material of *T. mexicana* must await unquestioned association of limb elements and dentition from the Rincon deposits or from related horizons.

Comparisons: *Taxidea mexicana* differs from the type *T. nevadensis*, described by Butterworth[1] from the Thousand Creek Pliocene of Nevada, in being about one and a half times larger. M_1 in the Chihuahuan specimen is more slender, the trigonid in this tooth is larger with more robust paraconid and metaconid. The posterior cusp of P_4 of the Nevada specimen is more external in position and a more pronounced cingulum is present than in the comparable tooth of *T. mexicana*. In addition *T. mexicana* shows less crowding of the premolars, relatively greater reduction in size of these teeth, and presence of an additional cusp on the talonid of M_1. The latter characters,

[1] Butterworth, E. M., Univ. Calif. Publ., Bull. Dept. Geol., vol. 10, no. 2, pp. 21-24, 1916.

however, fall within the limits of individual variation of *T. taxus* and are therefore of little diagnostic value, so far as these Tertiary species are concerned.

T. mexicana differs from the Chinese Pliocene *Parataxidea sinensis*[2] in (1) larger size, (2) absence of rudimentary P_1, (3) greater reduction of P_2 and P_3, and absence of a posterior heel in these teeth, (4) less pronounced cingulum in P_4, (5) carnassial with talonid less basin-shaped and occupying less area of tooth; difference in size between hypoconid and entoconid not so great; position of metaconid more anterior; larger paraconid; width of tooth greatest immediately behind metaconid and not at posterior end, and (6) depth of jaw in region of symphysis less than beneath molars.

Parataxidea crassa from China differs from *T. mexicana* in larger size, presence of P_1, remaining premolars not so much reduced. In this species the talonid of the carnassial is basin-shaped and large, and the tooth is wider and stouter than in the Mexican form.

Meles differs from *T. mexicana* in possessing P_1; P_4 lacks the posterior cusp; M_1 has the cutting shear well developed and the basin-shaped heel is larger. Moreover, the metaconid of M_1 has a position farther back with reference to the protoconid than in *T. mexicana;* the paraconid is smaller, and the carnassial is more slender and tapers slightly from back to front.

Taxidea mexicana appears to resemble more closely the modern badgers than it does known representatives among fossil forms. It exhibits, however, the following dissimilarities, which appear to deserve specific recognition: (1) canine smaller than in modern badgers, (2) metaconid of carnassial more anterior; paraconid more massive; cusps forming horseshoe-shaped ridge at back of talonid relatively larger; trigonid smaller with respect to talonid, (3) jaw narrower at P_3 and wider in back of M_1, tapers more noticeably toward anterior end; symphyseal area suggests that rami were not so strongly united as in Recent badgers of similar age. In addition to the above characters, and those which probably exist in the humerus, the following differences are recognized, with one or two exceptions, in a comparison with eighty skulls of Recent badgers from the United States and Mexico: (1) smaller size of fossil specimen, (2) less prominent cingulum on P_4, and (3) greater curvature of crown of canine.

A lower carnassial tooth, No. 30442, U. C. C., from Optima, Oklahoma, described by Hesse,[3] is intermediate in its characters between *T. nevadensis* and *T. mexicana,* but seems to be closer to the latter species. A similar tooth, No. 30559 U. C. C., from

[2] Zdansky, O., Palaeontologica Sinica, Ser. C, vol. 2, fasc. 1, pp. 47-55, pls. 10, 11, 1924.

[3] Hesse, C. J., Univ. Calif. Publ., Bull. Dept. Geol. Sci., vol. 24, no. 3, pp. 57-70, 1936.

the Hemphill horizon of Texas, is too worn to display diagnostic characters, but the specimen probably belongs to the same type of badger as No. 30442. $M\frac{1}{1}$ and $P\frac{4}{4}$, Nos. 30441 and 30440 U. C. C. are presumably also of this species.

Relationships: Comparison and measurements of the Pliocene and Recent badgers indicate clearly that the Mexican species, as well as that from the Thousand Creek beds of Nevada, are more like *T. taxus* than like *Parataxidea sinensis* or *P. crassa.* Although *P. sinensis* and *T. nevadensis* are of nearly equal size, the latter species shows marked structural similarity to the living *T. taxus.* Butterworth indicated that the Thousand Creek form is more closely related to *Taxidea* than to *Meles.* Likewise, Pilgrim[4] has pointed out the *Meles*-like type of dentition in *Parataxidea.*

In view of the large size of $M\frac{1}{1}$ as compared to $P\frac{4}{4}$, the heel region of the lower carnassial in the Old World badgers, *Meles,* and in *Parataxidea,* is relatively more prominent than in American forms. In the latter, the talonid approaches the trigonid in size, corresponding in this respect to the subequal size of $P\frac{4}{4}$ and $M\frac{1}{1}$. Although, as Butterworth has observed, the heel of $M\frac{1}{1}$ in *T. nevadensis* is larger than that displayed by any of the described mustelid forms with the exception of *Meles,* the heel, nevertheless resembles that in *Taxidea* more than it does that in Old World forms. Moreover, the anteroposterior alignment of the cusps of $M\frac{1}{1}$ of *Meles,* with corresponding basin-shaped heel in $M\frac{1}{1}$ are in marked contrast to the characters of the American forms in which transverse position of these cusps is associated with an entirely different appearing talonid in the lower carnassial. Similar differences are likewise displayed by *T. mexicana,* and it appears, therefore, logical to conclude that the American Pliocene forms were derived from a *Meles*-like ancestor, leading up to modern *Taxidea.* In this development it seems probable that *T. mexicana* and *T. nevadensis* represent separate lines of descent, with that of *T. mexicana* standing nearer the line leading to *T. taxus.*

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[4] Pilgrim, G. E., Catalogue of the Pontian Carnivora of Europe in the Department of Geology, Brit. Mus. Nat. Hist. Publ., p. 48, 1931.

MEASUREMENTS (IN MILLIMETERS) AND RATIOS OF FOSSIL AND LIVING BADGERS

	T. mexicana n. sp. Type No. 2538 C. I. T.	T. mexicana n. sp. Paratype, No. 2539 C. I. T.	T. nevadensis Type No. 22290 U. C. C.	P. sinensis* China	Taxidea t. berlandieri No. 221844 U.S.N.M.	T. t. neglecta Dickey K-728	T. t. neglecta No. 14693 Dickey Coll.	T. t. neglecta No. 13971 Dickey Coll.	T. t. berlandieri No. 6841 Dickey Coll.	T. t. neglecta No. 14695 Dickey Coll.	T. t. neglecta No. 46970 U. C. C.	T. t. neglecta No. 17682 Dickey Coll.	T. t. berlandieri No. 14842 Dickey Coll.
$M\bar{1}$, length	12.8	....	9.5	10.5	13.3	13.8	12.3	13.6	13.1	13.2	13.7	13.2	13.4
$M\bar{1}$, width	6.1	....	5.2	6.4	5.4	5.3	5.7	5.8	5.9	5.4	6.1	5.9	5.9
$M\bar{1}$, length / $M\bar{1}$, width	2.10	....	1.83	1.64	2.46	M 2.60	m 2.16	2.34	2.22	2.44	2.24	2.24	2.27
Thickness of jaw below $M\bar{1}$	9.0	9.4	....	....	7.6	8.2	9.0	8.8	8.0	7.5	9.5	8.5	7.3
Thickness of jaw below $P\bar{3}$	6.7	7.5	....	....	8.4	7.9	8.9	8.0	8.4	7.0	9.0	8.0	7.4
Thickness of jaw below $M\bar{1}$ / Thickness of jaw below $P\bar{3}$	1.34	1.25	....	....	m .91	1.04	1.01	M 1.10	.97	1.07	1.05	1.06	.99
C-$M\bar{2}$, length	44.4	....	....	....	48.5	49.6	52.0	46.3	48.0	48.9	51.3	51.1	47.7
C-$M\bar{2}$, length / $M\bar{1}$, length	3.42	....	....	....	3.64	3.59	M 4.22	m 3.41	3.66	3.70	3.82	3.87	3.56
Length of trigonid in $M\bar{1}$	7.8	....	4.8	....	8.6	9.2	7.9	9.2	8.3	9.1	9.3	8.6	8.8
$M\bar{1}$, length / $M\bar{1}$, length of trigonid	1.65	....	1.98	....	1.55	1.50	1.56	1.48	M 1.57	m 1.45	1.48	1.54	1.52
$P\bar{3}$, length	5.4	5.7	....	4.4	6.1	6.3	5.5	5.2	5.1	5.7	6.2	5.6	5.5
$P\bar{2}$, length	4.1	....	....	3.7	3.6	3.6	3.3	4.0	3.4	3.9	4.3	3.7	3.9
$P\bar{3}$, length / $P\bar{2}$, length	1.32	....	....	1.19	1.70	M 1.75	1.67	m 1.30	1.50	1.46	1.44	1.51	1.41
$P\bar{3}$, width	3.1	3.0	....	3.3	3.1	3.3	2.8	2.9	2.9	2.9	3.0	3.3	2.9
$P\bar{3}$, length / $P\bar{3}$, width	1.74	1.90	....	1.33	1.97	1.91	1.96	1.79	1.76	1.97	M 2.06	m 1.70	1.90
$P\bar{4}$, length	7.8	....	6.0	5.5	8.3	8.8	8.3	7.2	7.7	7.9	9.0	8.6	9.3
$P\bar{4}$, width	4.2	....	3.3	4.1	4.2	4.3	4.2	4.2	4.5	3.8	4.3	4.5	4.3
$P\bar{4}$, length / $P\bar{4}$, width	1.86	....	1.82	1.34	1.97	2.04	1.97	m 1.71	m 1.71	2.08	2.09	1.91	M 2.16

M, maximum. m, minimum. *, measurements taken from photograph.

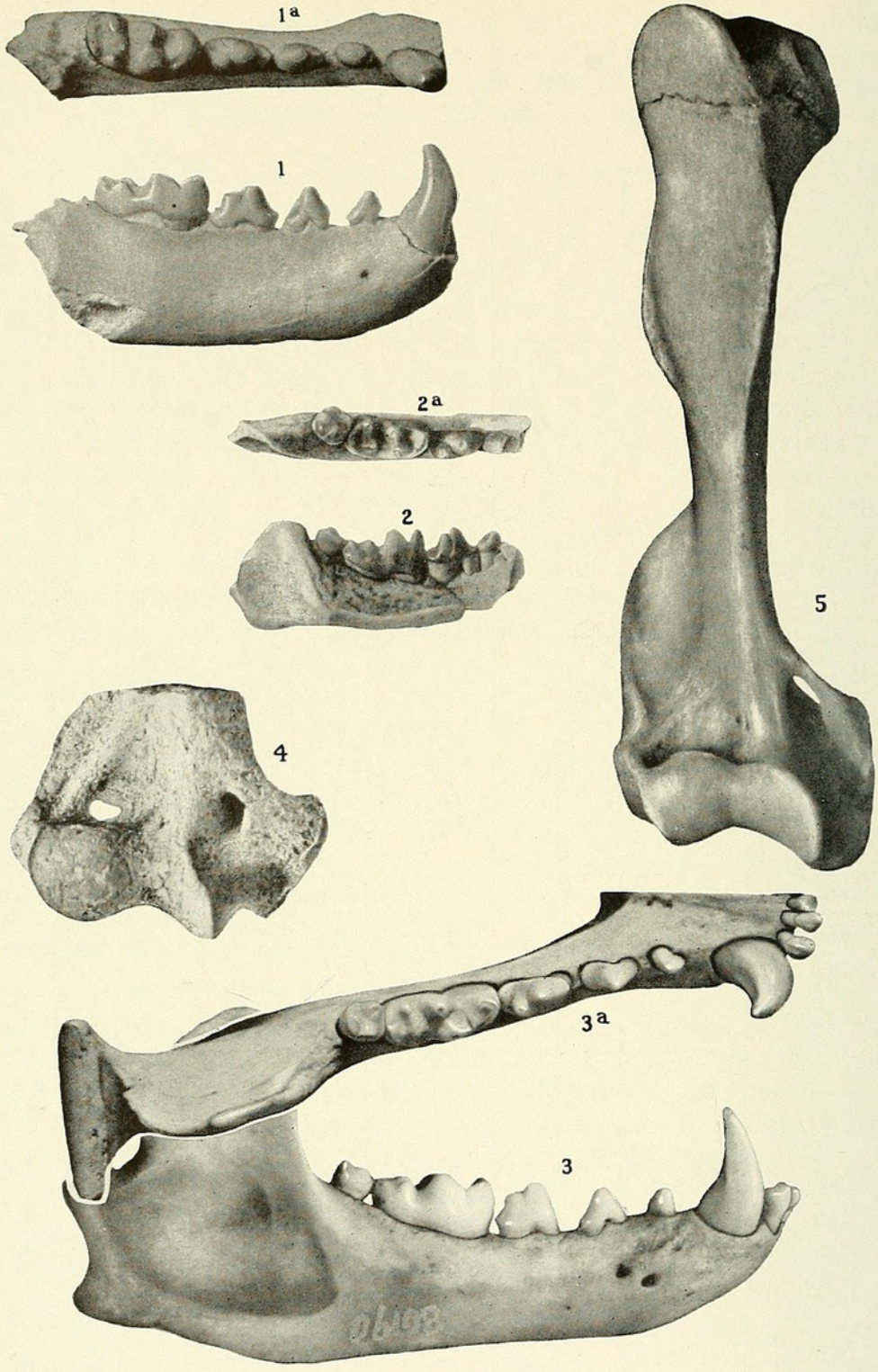

PLATE 13

Figures 1, 1a, *Taxidea mexicana*, n. sp., type specimen, ramus with C - $M\bar{1}$, No. 2538 C. I. T., Pliocene, Rincon, Chihuahua; figs. 2, 2a, *Taxidea nevadensis* Butterworth, type specimen, ramus with $P\bar{2}$ - $M\bar{2}$, No. 22290 U. C. C., Pliocene, Thousand Creek, Nevada; figs. 3, 3a, *Taxidea taxus berlandieri* (Baird), ramus with lower dentition, No. 80190 U. S. N. M., Recent; fig. 4, *Taxidea* ? cf. *mexicana*, n. sp., distal portion of humerus, No. 2541 C. I. T., Pliocene, Rincon, Chihuahua; fig. 5, *Taxidea taxus* (Schreber), humerus, No. 13768 Dickey Coll., Recent. All figures natural size.