

Second Record of the Pleistocene Saber-toothed Cat, *Smilodon fatalis*, in Oklahoma

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Few records of Pleistocene saber-toothed cats have been found in Oklahoma. In 1997, an isolated tooth of a saber-toothed cat was found in association with several dental and postcranial skeletal elements of a mammoth in northwestern Oklahoma. These specimens represent only the second record of *Smilodon fatalis* and the first association of this species with *Mammuthus columbi* in Oklahoma.

The site in which these fossils occurred was discovered by L. Anderson in October 1997, on the shore of Canton Lake in Blaine County (Oklahoma Museum of Natural History [OMNH] locality V1085; T19N, R13W, sec. 18). Bones were exposed at the site by the erosion of the lake bank, probably due to wave action during high winds. The bones occurred at the base of a bank, 2 m high, that was eroded to a vertical face. Approximately the basal half of the exposure consists of Permian red beds of the Dog Creek and/or Marlow Formations (1). The vertebrate fossils occurred in a small deposit of Quaternary age that unconformably overlies Permian beds and incorporates clasts of sand, silt, and clay derived from the Permian beds. The Quaternary deposit may represent the third terrace of the North Canadian River (R. Burkhalter, written comm.), which in Blaine County is thought to reflect the Illinoian glacial stage (1). A modern, grass-covered soil horizon overlies the fossil deposit. Shells of small, freshwater gastropods occurred in a green-gray clay within the bone-bearing deposit. Although no radiometric dates are available for the Canton Lake deposit, similar deposits and lacustrine beds in northwestern Oklahoma typically date to the late Pleistocene (D. G. Wyckoff, pers. comm.) and frequently contain vertebrate fossils from the Rancholabrean land mammal age.

The saber-toothed cat is represented by an isolated tooth (OMNH 2554), a left upper carnassial (Fig. 1), found in the midst of the mammoth bones. Because of breakage and/or resorption, its roots are missing. However, the pulp cavity is widely open, and remnants of the roots at the base of the crown suggest that the roots were flared. Despite only moderate wear indicated on the cusps, the enamel layer is exceedingly thin with wear on the paracone causing a small opening into the pulp cavity. These features indicate that the tooth is a deciduous carnassial, dP3.

The tooth is highly sectorial, laterally compressed, and possesses trenchant cusps. No protocone is present. The paracone is well developed. The parastyle is completely separated from the paracone, with a small but

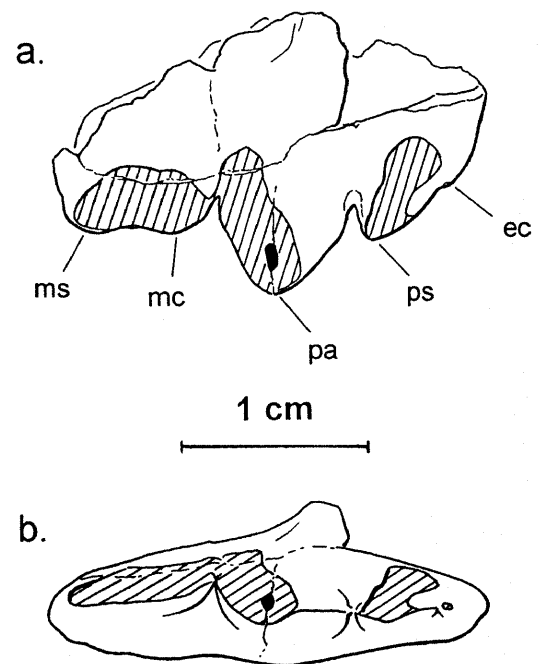


Figure 1. *Smilodon fatalis*, left dP3 (OMNH 2554), (a) lingual, (b) occlusal views. ec = ectoparastyle; mc = metacone; ms = metastyle; pa = paracone; ps = parastyle.

distinct ectoparastyle. The metacone and metastyle together form an elongate shearing surface that is separated from the paracone by a notch. Wear facets are present on the lingual sides of the metacone-metastyle, paracone, and parastyle. An especially tiny wear facet is evident on the apex of the ectoparastyle.

The lack of a protocone and the presence of an ectoparastyle on the permanent upper carnassial (P4) are derived features shared by members of the tribe Smilodontini, including *Smilodon* and *Megantereon*. *Megantereon* was restricted to the Blancan (Pliocene) in North America and the early Pleistocene in Eurasia (2). In another North American Pleistocene saber-toothed cat, *Dinobastis serus* (= *Homotherium serum*, tribe Machairodontini), the P4 (and presumably also the dP3) lacks an ectoparastyle (3). Thus, the tooth from Canton Lake represents a species of *Smilodon*. The tooth differs from dP3 of *Smilodon gracilis*, an early Pleistocene species, in that it lacks a protocone and the triangular shape characteristic of a dP3 of this species (2). The tooth does possess features that are characteristic of *Smilodon fatalis* (4). Moreover, the crown of the dP3 from Canton Lake is nearly identical in size and shape to a deciduous carnassial of *Smilodon fatalis* from Rancho La Brea, California, as illustrated by Merriam and Stock (4). The tooth is herein identified as a dP3 of *Smilodon fatalis*.

The mammoth bones found at the site include parts of ribs, tusks, fragments of a mandible, and a right lower third molar (m3). The bones appear to represent an individual mammoth (OMNH 2556) and, with the exception of some ribs, are generally in poor condition. One tusk was badly damaged by weathering and wave action. The other tusk, nearly 2.5 m long and moderately curved, is almost complete, with only the tip of the tusk broken.

The m3 is the most diagnostic molar for *Mammuthus* (5). The m3 from Canton Lake is in relatively good condition, with the anterior roots still in place, and only a small portion of the anterior end missing. The tooth is relatively broad with widely spaced lamellar plates. It possesses characteristics considered diagnostic for the Columbian mammoth, *Mammuthus columbi* (5) (Table 1). *Mammuthus columbi* was widely distributed in North America during the Pleistocene, with its greatest abundance in the central Great Plains (6).

TABLE 1. Right m3 of *Mammuthus columbi* (OMNH 2556) from Canton Lake, Oklahoma.

No. of plates	17
Lamellar frequency	4 – 5
Length, mm	38.60
Width (plate 5), mm	103.02
Height (plate 8), mm	146.65
Enamel thickness, mm	2.60 – 3.00

Remains of Pleistocene saber-toothed cats in Oklahoma are rare. There has been only one published record of *Smilodon californicus* (= *S. fatalis*) (7) and two of *Homotherium serum* (8,9) in the state. With the exception of the tar pits at Rancho La Brea in California (where *S. fatalis* occurred) and Friesenhahn Cave in Texas (where *H. serum* occurred), remains of saber-toothed cats found in association with mammoths are very uncommon (3). Interestingly, the original description of *H. serum* was based on a specimen that was associated with the remains of a Columbian mammoth (9). The occurrence of these species at Canton Lake thus represents only the second record of *Smilodon fatalis* in Oklahoma, and the first association in the state of this saber-toothed cat with *Mammuthus columbi*.

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REFERENCES

1. Fay RO. Geology and mineral resources of Blaine County, Oklahoma. OK Geol Surv Bull 1962;89:1-258.
2. Berta A. The sabercat *Smilodon gracilis* from Florida and a discussion of its relationships (Mammalia, Felidae, Smilodontini). Bull FL St Mus Biol Sci 1987;31(1):1-63.
3. Meade GE. The saber-toothed cat, *Dinobastis serus*. Bull TX Mem Mus 1960;2(2):25-60.
4. Merriam JC, Stock C. The Felidae of Rancho La Brea. Washington (DC): Carnegie Institution of Washington; 1932. Publication 422, 273 p.
5. Maglio VJ. Origin and evolution of the Elephantidae. Trans Am Phil Soc 1973;63:1-149.
6. Agenbroad LD. New world mammoth distribution. In: Martin PS, Klein RG, editors. Quaternary extinctions: A prehistoric revolution. Tucson (AZ): University of Arizona Press; 1984. p 90-108.
7. Kitts DB. A saber-tooth cat, *Smilodon californicus* Bovard, from Logan County, Oklahoma. OK Geol Notes 1968;18(1):19-23.
8. Akersten WA, McDonald HG. *Nothrotheriops* from the Pleistocene of Oklahoma and paleogeography of the genus. Southwest Nat 1991;36(2):178-185.
9. Cope ED. A new Pleistocene sabre-tooth. Am Nat 1893;27:896-897.

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