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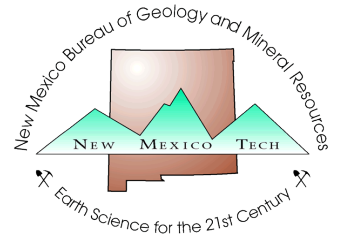
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The sabertooth cat *Smilodon fatalis* (Mammalia: Felidae) from a Pleistocene (Rancholabrean) site in the Pecos River valley of southeastern New Mexico/southwestern Texas

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Abstract

We describe a nearly complete dentary of the sabertooth cat *Smilodon fatalis* from the 25 Mile Stream site, a Pleistocene (Rancholabrean) fluvial/alluvial deposit of the ancestral Pecos River system near Carlsbad in southeastern New Mexico. The original field data for this site are somewhat conflicting, so it is not certain whether the locality is in Eddy County in southeastern New Mexico or in Culberson or Reeves Counties in the Trans-Pecos region of southwestern Texas. This sabertooth dentary is very similar in size and morphological characters to dentaries of *S. fatalis* from the late Pleistocene Rancho La Brea tar pits in southern California. Because of its larger size, reduced mandibular flange, and absence of p3, it differs from the late Pliocene (late Blancan) and early Pleistocene (Irvingtonian) sabertooth species *S. gracilis*. This mandible represents the first record of *S. fatalis* from southeastern New Mexico/southwestern Texas. The only other fossil of *S. fatalis* in New Mexico is from the late Rancholabrean Blackwater Draw site in the east-central part of the state. The horse *Equus laurentius* and *Bison* are also present in the 25 Mile Stream site. The presence of *Bison* is indicative of the Rancholabrean, but a more precise age assignment is not possible with the limited fauna currently known from this site.

Introduction

The sabertooth cat *Smilodon fatalis* has a widespread distribution in North American late Pleistocene (Rancholabrean) faunas, but it is more common in the southern part of its range, particularly California, Texas, and Florida (Kurtén and Anderson, 1980). A review of New Mexico Pleistocene faunas (Harris, 1993) listed only one published record of *S. fatalis* from New Mexico, a juvenile dentary from the late Rancholabrean Gray Sand local fauna, Blackwater Draw locality number 1, Roosevelt County, in the east-central part of the state (Lundelius, 1972). There are no published records of *S. fatalis* from southwestern Texas (Harris, 1985; Graham, 1987). The smaller late Pliocene (late Blancan) and early Pleistocene (early Irvingtonian) species *S. gracilis* is represented by a mandible from the Camp Rice Formation in the Mesilla Basin, Doña Ana County in southernmost New Mexico (Vanderhill, 1986). Here, we report and describe the first specimen of *S. fatalis* from

southeastern New Mexico/southwestern Texas, a complete left lower jaw of an adult sabertooth from a site in the Pecos River valley south of Carlsbad. We also briefly describe fossils of horse and bison found in association with the sabertooth mandible.

The specimens reported here are from the vertebrate paleontology collection of the Denver Museum of Nature and Science (formerly the Denver Museum of Natural History [DMNH]), Denver, Colorado. Dental terminology includes: incisors (I/i), canines (C/c), premolars (P/p), and molars (M/m). Upper teeth are indicated by upper-case letters (e.g., P4, M2), and lower teeth are indicated by lower-case letters (e.g., p3, m1). All measurements of fossils are in mm.

Locality

Harold J. Cook and J. D. Figgins collected the sabertooth cat jaw and other fossils described here in November 1927, from the western drainage slope of the Pecos River, supposedly in Eddy County, southeastern New Mexico (DMNH locality 263; Fig. 1). We have not been able to relocate this site, and thus have reproduced the exact locality description from the collectors' field notes: "On the western drainage slope of

the Pecos River on 25 Mile Stream below the southern high point of the Guadalupe Mountains, 50 miles south of Carlsbad on the Carlsbad-Pecos highway, then 8–10 miles west." We cannot find "25 Mile Stream" on any map of New Mexico or Texas, including maps dating to the time period when the fossils were collected. Indeed, it is possible that this locality is actually in Culberson County or Reeves County in Texas, based on the fact that 1) the collectors stated the site was "50 miles south of Carlsbad" (it is 32 mi from Carlsbad to the Texas border on US-285—the Carlsbad-Pecos highway; Fig. 1) and that 2) it was "below the southern high point of the Guadalupe Mountains" (the Guadalupe Mountains extend from New Mexico south into Texas, but the "southern high point," perhaps Guadalupe Peak, is in Texas; Fig. 1). Despite these discrepancies, the original collectors placed this locality in Eddy County in New Mexico. The state and county boundaries in New Mexico and Texas were well established by the 1920s, and thus we are inclined to follow the original collectors who placed this site in New Mexico, not Texas. However, because of the conflicting site information, we feel it is most prudent to consider both possibilities. This site, hereafter referred to

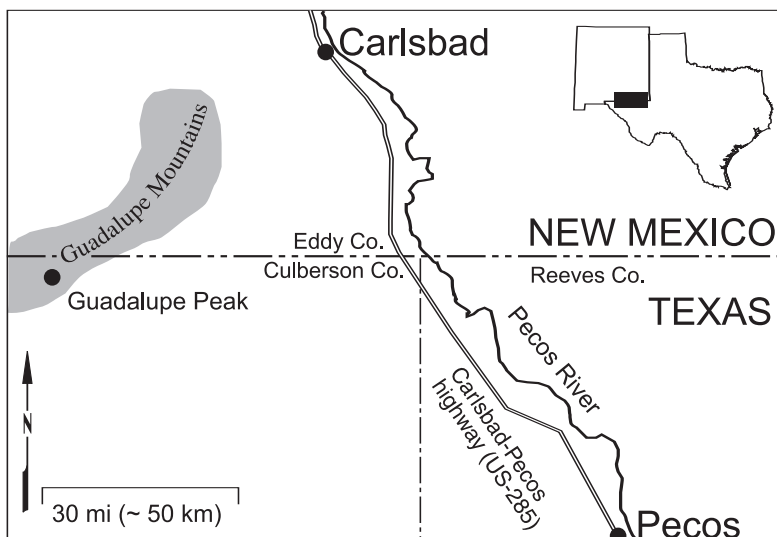


FIGURE 1—Map of part of southeastern New Mexico and southwestern Texas. The 25 Mile Stream site (DMNH locality 263) is located south of Carlsbad and east of the Guadalupe Mountains in one of the drainages flowing eastward into the Pecos River in southeastern Eddy County, New Mexico, northeastern Culberson County, Texas, or northwestern Reeves County, Texas.

as DMNH site 263 or the 25 Mile Stream site, is located south of Carlsbad and east of the Guadalupe Mountains in one of the drainages flowing eastward into the Pecos River in southeastern Eddy County, New Mexico, northeastern Culberson County, Texas, or northwestern Reeves County, Texas.

There is no geologic information recorded for DMNH site 263. However, one of the fossil specimens had a small amount of sediment adhering to it, which consists of a very coarse to conglomeratic sand with chert and quartzite pebbles. This suggests that the site was in fluvial or alluvial sediments that were part of the Pleistocene Pecos River system.

Vertebrate fauna

Smilodon fatalis

The sabertooth cat *Smilodon fatalis* is represented at the 25 Mile Stream site by a complete left dentary with m1 and roots for the canine and p4 (DMNH 1229; Figs. 2A–C). This specimen possesses the morphological characters of *S. fatalis*, including: large size, long post-canine diastema, reduced mandibular flange, single large mental foramen positioned below diastema near ventral margin of ramus, greatly reduced coronoid process, reduced lower canine, p3 absent, and posterior edge of protoconid on m1 serrated. The only other specimen of *S. fatalis* from New Mexico, a juvenile dentary with partially erupted deciduous canine and dp3 from the Gray Sand local fauna at Blackwater Draw in Roosevelt County (Lundelius, 1972, figs. 122a,b), cannot be directly compared to the 25 Mile Stream dentary because they lack equivalent teeth. The single specimen of *S. gracilis* known from New Mexico (Vanderhill, 1986), a dentary with p3 and m1 from a Blancan–Irvingtonian transitional fauna in the Mesilla Basin, is considerably smaller than DMNH 1229 (length of m1: 22.1, 29.3, respectively), and also differs in having a p3. Measurements in Table 1 clearly demonstrate that the 25 Mile Stream *Smilodon* mandible falls within the observed range for all measurements of the dentary and lower dentition in the large sample of *S. fatalis* from the Rancho La Brea tar pits in southern California.

For use of the name *Smilodon fatalis*, we follow Kurtén and Anderson (1980) and Kurtén and Werdelin (1990), who regarded all North American late Pleistocene *Smilodon* as a single species, *S. fatalis*. These authors considered *S. fatalis* and the contemporary South American species *S. populator* to be separate species, although Berta (1985) referred all late Pleistocene *Smilodon* in North America and South America to *S. populator*.

Equus laurentius

There are four fossils of an extinct species

of the horse *Equus* in the 25 Mile Stream fauna: left P3 or P4 (DMNH 1230), left M2 (DMNH 1231; Figs. 2D, 2E), distal metapodial (DMNH 1232; Fig. 2F), and a proximal phalanx (DMNH 1232; Fig. 2G). Both of the upper cheek teeth are comparatively large and have a fairly complicated enamel pattern. The partial metapodial and proximal phalanx also represent large horses. Measurements of the upper cheek teeth of the 25 Mile Stream *Equus* are (DMNH 1230, 1231, respectively): anteroposterior length (= ectoloph length), 30.5, 27.7; width perpendicular to ectoloph, 28.2, 26.9; mesostyle crown height, 72.5, 86.5. Harris and Porter (1980) provided a comprehensive series of measurements for the extensive late Pleistocene sample of five species of *Equus* from Dry Cave, also located near Carlsbad in Eddy County, New Mexico. The 25 Mile Stream *Equus* teeth are most similar in morphology and size to teeth referred to *E. niobrarensis* from Dry Cave (Harris and Porter, 1980, table 2). Measurements of the proximal phalanx from 25 Mile Stream (DMNH 1232: total length, 89.0; proximal width, 60.7; distal width, 50.5) are also within the observed range of proximal phalanx measurements of *E. niobrarensis* from Dry Cave (Harris and Porter, 1980, table 1). Although identified as *E. niobrarensis* by Harris and Porter (1980), we follow Winans (1989) and Harris (1993), who referred the large late Rancholabrean horse from Dry Cave to the *Equus laurentius* group. *E. laurentius* occurs in more than 20 Rancholabrean sites throughout New Mexico (Harris, 1993).

Bison sp.

Bison is represented in the 25 Mile Stream site by a partial left mandible with m1–m3 and roots of p3–p4 (DMNH 1234; Figs. 2H, 2I). Measurements of the teeth of DMNH 1234 are: m1 length, 29.0; m1 width, 20.6; m2 length, 31.7; m2 width, 19.5, m3 (damaged, not measurable). Because *Bison* can be identified to the species level only with well-preserved horn cores, we have not

attempted to place a species name on this bison jaw. The only other bovid of similar size known from Rancholabrean sites in New Mexico, the musk ox *Bootherium*, has a much simpler enamel pattern on the lower molars than do the m1 and m2 in DMNH 1234. The presence of *Bison* in the 25 Mile Stream site is significant because it establishes a Rancholabrean age.

Discussion

The 25 Mile Stream site is not particularly rich or diverse, consisting of six specimens representing three taxa. Certainly, the presence of *Smilodon fatalis* is the most significant feature of this site. The only other record of *S. fatalis* from New Mexico is from the latest Pleistocene (late Rancholabrean) Gray Sand local fauna in Blackwater Draw (Lundelius, 1972), located approximately 300 km (186 mi) northeast of the 25 Mile Stream site. The Gray Sand fossils were preserved in sediments deposited in a spring-fed pond (Lundelius, 1972). The 25 Mile Stream site apparently represents fluvial/alluvial deposits associated with the ancestral Pecos River system. It may be significant that the only records of *S. fatalis* in New Mexico are in two open sites characterized by freshwater deposits. Although *S. fatalis* is widespread in North American late Pleistocene faunas (Kurtén and Anderson, 1980), it is generally rare, with the notable exception of Rancho La Brea where over a thousand individuals have been documented (Merriam and Stock, 1932; Miller, 1968; Stock and Harris, 1992). The sabertooth cat is absent from late Rancholabrean cave faunas in New Mexico, including the large concentration of cave deposits in the Guadalupe Mountains in Eddy County, most of which are located within 50 km (30 mi) or less of the 25 Mile Stream site (Harris, 1993). With the exception of Muskox Cave, large cats are represented in the Guadalupe Mountains caves only by the mountain lion *Puma concolor*, which still inhabits this

TABLE 1—Measurements (in mm) of the dentary and lower teeth of *Smilodon fatalis* from the 25 Mile Stream site and the Rancho La Brea local fauna in southern California. Measurements of the Rancho La Brea *S. fatalis* are from Merriam and Stock (1932) and Berta (1985), and include the mean and observed range (in parentheses) for 25 individuals.

Measurements	25 Mile Stream site, New Mexico/Texas (DMNH 1229)	Rancho la Brea, California
Total length (mandibular symphysis to articular condyle)	208.7	209.5 (178.3–230.0)
Length of post-canine diastema (c–p4)	70.6	61.7 (46.3–71.8)
Alveolar length of mandibular toothrow (p4–m1)	57.6	54.1 (48.3–60.9)
Depth of ramus below m1	45.3	40.3 (36.0–45.6)
Height of coronoid process	66.5	68.9 (60.3–76.3)
Length of lower canine	13.7 ¹	14.7 (13.0–16.6)
Length of p4	25.9 ¹	24.6 (22.5–26.8)
Length of m1	29.3	28.7 (25.9–32.1)
Width of m1	13.6	14.3 (12.8–16.1)

¹The length of the lower canine and p4 in DMNH 1229 are measurements of the alveolus, as these two teeth are missing in this specimen.



A



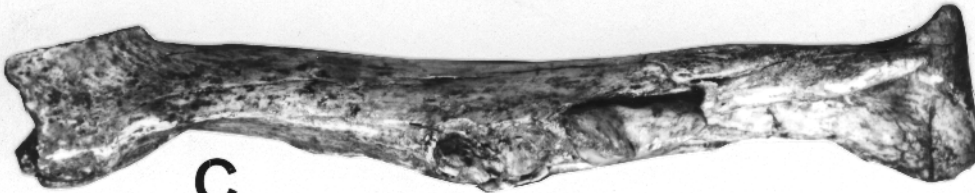
D



B



E



C



H



F



G



I

FIGURE 2—Mammalian fossils from the Rancho Labrean 25 Mile Stream site (DMNH locality 263), southeastern New Mexico/southwestern Texas. A. medial view, B. lateral view, C. occlusal view, *Smilodon fatalis*, left dentary with m1, DMNH 1229, D. occlusal view, E. medial view, *Equus laurentius*, left M2, DMNH 1231, F. *Equus laurentius*, distal metapodial, DMNH 1232, G. *Equus laurentius*, proximal phalanx, DMNH 1232, H. lateral view, I. occlusal view, *Bison* sp., left dentary with m1–m3, DMNH 1234. Scale bars are 1 cm for D, E; 2 cm for A–C, F–I.

region, and the jaguar *Panthera onca* (Harris, 1993). The cheetah-like cat *Miracinonyx trumani* and the American lion *Panthera atrox* occur in Muskox Cave, together with *Puma concolor* (Logan, 1981).

The presence of *Bison* establishes a Rancho Labrean age (probably between 300 and 10 ka) for the 25 Mile Stream site, but a more precise age assignment is not possible with the limited fauna present. The species of *Bison* in the site cannot be determined, and the horse *Equus laurentius* (previously referred to *E. niobrarensis*) occurs throughout the Rancho Labrean. *Smilodon fatalis* is known from late Irvingtonian through late Rancho Labrean sites (Kurtén and Anderson, 1980; Berta, 1985), so its presence does not help to limit the age of this site within the Rancho Labrean.

Two other Pleistocene sites are known from ancestral Pecos River deposits in southeastern Eddy County, not far north of the 25 Mile Stream site. The Nash Draw fauna (Harris, 1993) from Nash Draw, a tributary of the Pecos River, contains two species of *Equus* and the camel *Camelops*. The threadfin shad, *Dorosoma petenense*, was reported from the type locality of the Gatuña Formation in the Pecos River valley near Loving (Miller, 1982). The age of these two faunas is unclear because they lack age-diagnostic mammals, although both are presumed to be Pleistocene.

The best documented Pleistocene vertebrate fauna from ancestral Pecos River deposits is the Roswell fauna, collected from a series of gravel pits on the east side of the Pecos River northeast of Roswell, approximately 200 km (125 mi) north of the 25 Mile Stream site (Lucas and Morgan,

1996). The mammalian fauna from the Roswell sites consists of a large horse of the *Equus laurentius* group, *Camelops*, *Bison*, and the Columbian mammoth *Mammuthus columbi*. Like the 25 Mile Stream site, the age of the Roswell fauna cannot be determined more precisely than Rancho Labrean. Pecos River deposits in the vicinity of Fort Sumner in De Baca County have produced fossils of *Mammuthus*, *Equus*, and *Camelops* (Lucas and Effinger, 1991; Morgan et al., 2001). Axial river deposits of the ancestral Pecos River system, extending from the vicinity of Fort Sumner in De Baca County south approximately 300 km (186 mi) to the vicinity of the Texas border, have produced a fairly typical Pleistocene large mammal fauna, including sabertooth cat, several species of horse, camel, bison, and mammoth. Most of these sites are Rancho Labrean in age, but more field work is necessary to further refine the ages of these faunas within the Rancho Labrean.

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