Fossil evidence of Eocene age of Baca Formation, New Mexico

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FOSSIL EVIDENCE OF EOCENE AGE OF BACA FORMATION, NEW MEXICO

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INTRODUCTION
The Eocene Baca Formation crops out in laterally discontinuous exposures along a belt aligned east-west in central Socorro and Catron Counties, New Mexico (Fig. 1).

This belt is approximately 120 miles long and 20 miles wide. The formation consists of a suite of terrestrial sediments composed of conglomerate, sandstone, siltstone, and mudstone averaging 700 feet in thickness. Maximum reported thickness is about 2,500 feet in a wildcat oil test drilled by Tenneco 8 miles south of Pietown.

Until recently, no fossil evidence has been found on the west side of the Rio Grande to substantiate an Eocene age which Gidley (Gardner, 1910) postulated for the Baca Formation on the east side of the Rio Grande in the vicinity of the Carthage coal field. The Eocene age assigned to the Baca in the Carthage area is based on a fossil mammalian tooth. Discovery and identification of additional mammal teeth approximately 15 miles north of Datil (Fig. 2) confirm that the Baca Formation west of the Rio Grande is also of Eocene age.

HISTORICAL BACKGROUND
During a reconnaissance geologic survey of the Carthage coal field, southeast of Socorro, Gardner (1910) discovered a fossil mammal tooth which was later identified by J. W. Gidley as Palaeosyops, a rhinoceros-type animal about the size of a tapir but without the typical nosehorn. Gidley concluded that the red beds and conglomeratic sandstone containing Palaeosyops are Bridger (middle Eocene) in age.

Ten years later approximately 2000 feet of volcanic tuff, rhyolite, sandstone, and conglomerate at the north end of the Bear Mountains were described and named the Datil Formation by Winchester (1920). Wilpolt and others (1946) proposed the name Baca Formation for a locality in Baca Canyon; secs. 4, 5, 8, and 9, '1 N., R. 4 W., Socorro County, for the lower 684 feet of Winchester's Datil Formation. Willard (1959) interestingly pointed out "365 of the 684 feet of the "section" at the measured section were named for a canyon outside the area covered by Winchester's map. . . . and the description given by Wilpolt was not of the material at the type locality, nor in Winchester's measured section, but of material mapped by Wilpolt in the Joyita Hills-Carthage area." Wilpolt and others (1946) correlated the sediments of the Carthage area with those in Baca Canyon and concluded on the basis of lithologic similarity and stratigraphic position that the Baca Formation could be extended to the Carthage area. Potter (1970) separated the Baca Formation, in the area of Baca Canyon, into three informal subunits, described the section, and recorded the thickness as 695 feet.

ADDITIONAL FOSSIL DISCOVERY
Personnel of Gulf Oil Corporation found 15 fragments of fossilized vertebrate remains in SE¼ SW¼ sec. 31, T. 2 N., R. 9 W. (Fig. 2). These remains were generously donated to the writer, who, in turn submitted them to the U.S. National Museum for identification. Included in the fossil fragments was a partial section of a lower (?) jaw bone containing three, and part of a fourth, well preserved molar teeth (Fig. 3). Dr. C. L. Gazin of the U.S. National Museum identified the teeth as cf. Protoreodon pumilus of late Eocene age. This animal is the ancestor of the modern-day sheep. Dr. Gazin noted that the other 14 fragments
were indeterminate; several of the specimens are probably pieces or sections of rib bones (Fig. 4) (Northrop, 1970, personal commun.)

These specimens were found 123 feet stratigraphically above the base of the Baca Formation protruding from loose sandy material covering scattered outcrops of grayish-pink siltstone, red mudstone, and gray, poorly-sorted, coarse-grained sandstone. The question arises as to whether or not the fossils were in place or had been reworked from somewhere higher in the section. There is no direct line of evidence to cite for either condition. The fossil locality is at the north end of a linear north-trending ridge which is about 600 feet topographically lower than the southern end; however, the loose sandy cover material is a residuum of weathered Baca and if the specimens were redeposited it is almost certain that the source area may have been somewhere higher in the Baca Formation.

REFERENCES
Dane, C. H., and Bachman, G. 0., 1965, Geologic map of New Mexico; U.S. Geol. Survey.


FIGURE 3.
Photograph showing 3, and a part of the fourth well preserved teeth of cf. Protoreodon pumilus. This animal is the ancestor to the modern-day sheep. Dimensions are 1.5 inches long and .5 inches wide.

FIGURE 4.
Photograph of two rib bones (?) found a few feet from the jaw-bone and teeth shown in Fig. 3. Dimensions of the larger bone are 1 inch wide and 3.5 inches long; and the smaller bone 1 inch wide and 1.5 inches long.
State Highway 61 along Mimbres Valley. Cooks Peak in background.