# The Gabaldon badlands

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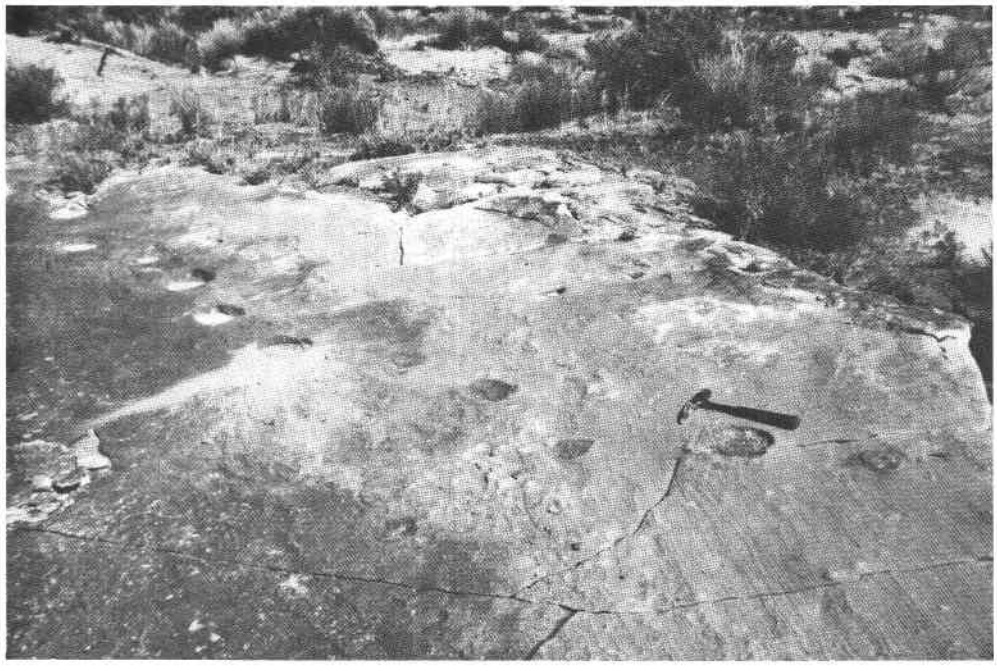
Located in a remote area of the Albuquerque Basin, about 35 mi southwest of Albuquerque, are the Gabaldon badlands (Fig. 1). This area features some interesting and picturesque landforms, but, more importantly, it contains the thickest exposed section of Santa Fe Group deposits within the Albuquerque Basin. The Santa Fe Group of latest Oligocene to middle Pleistocene age is the predominant basin-fill unit in the Rio Grande rift. Thus, the Gabaldon badlands are one of the critical areas for investigating the depositional history of the Albuquerque Basin. However, access to the Gabaldon area is restricted because the area is primarily on private land.

The exposed Santa Fe section is composed of more than 3,000 ft of interbedded mudstone, siltstone, sandstone, and conglomeratic sandstone. Throughout most of the section, beds generally dip 10–20° westward, but dips lessen to about 3° near the top of the section. The deposits are mostly weakly consolidated and range in color from red to brown to grayish-white. Three ash-fall beds, which are less than 6 inches thick, occur within the middle part of the section. Unfortunately, post-depositional alteration has made these horizons unacceptable for isotopic dating.

The Gabaldon section can be divided into four mappable units (from bottom to top): 1)

FIGURE 1—Aerial view, looking west, of the Gabaldon badlands in the foreground and the basalt-capped Lucero uplift in the distance. The flat area at the middle left is a remnant erosional surface that caps the Gabaldon section. The southwest-plunging nose of an anticline is visible in the lower part of the section. The airplane was piloted by Chris Condit.



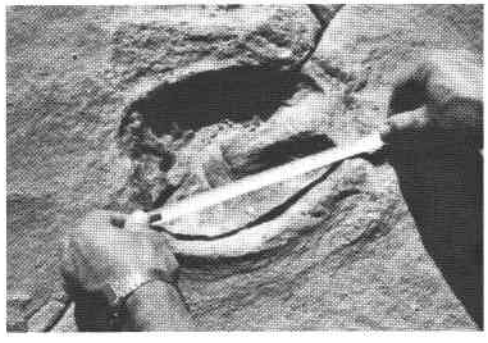


FIGURE 2—*Alforjas* trackway occurring in tilted, lenticular sandstone of unit 3 (hammer for scale). Eleven prints are visible in the photo. The prints measure 7 inches long by 6 inches wide (see detail photo to the right; scale in cm) with a 2.8 ft stride length. The sandstone bed also contains a few prints of smaller size. Fossil bones from this animal have been found in nearby strata.

a poorly indurated, locally gypsiferous mudstone, which grades upward to intercalated mudstone and fine-grained sandstone; 2) a better indurated, generally poorly sorted, locally conglomeratic sandstone with interbeds of siltstone and mudstone; 3) a weakly indurated mudstone with fine-grained sandstone; and 4) a dominantly well sorted, crossbedded sandstone with interbeds of siltstone and mudstone. Clasts from the conglomeratic beds in unit 2 are 80–90% Oligocene-age ash-flow tuffs. Because of differing degrees of induration, each unit has a distinct erosion pattern that aids in mapping. Several faults and folds complicate this relatively undeformed section.

Facies types indicate that most of the sediments of the Gabaldon badlands were deposited in a playa basin (units 1 and 3) and along the distal ends of prograding alluvial fans (unit 2). Sediments at the top of the section (unit 4) were deposited by a large fluvial system originating from the northwest and are representative of a significant change in the depositional pattern. This change probably reflects the transition from closed-basin drainage to through-flowing drainage.

A significant number of mammalian fossils have been recovered from units 1, 2, and 3 of the Gabaldon section. They include the dog, *Epicyon* cf. *E. haydeni*, the camel, *Michenia* cf. *yavapaiensis*, and antilocaprine pronghorns, which suggest an age of 7–9 Ma for the middle part of the section (fossils identified and age determined by Richard H. Tedford, pers. comm. 1985). These age dates show the Gabaldon badlands to be one of two areas in the Southwest (the other is in the Española area) that contain mammalian fossils from this time horizon. One of the most exciting discoveries has been a trackway containing 14 individual prints from *Alforjas*, a giant llama (Fig. 2).

The Gabaldon badlands are an excellent example of badland topography with its intricate network of rilles and arroyos cut into the multi-colored and easily erodable strata. This drainage system is further complicated by extensive piping (Fig. 3). Small drainages that disappear into sinks on dipping slopes reappear through openings at the base of slopes. This has resulted in a complex subterranean drainage network that is undergoing small-scale shifts due to stream piracy and capture.

The current study of the Gabaldon badlands is part of a larger petrographic study of the Santa Fe Group in the Albuquerque Basin. More information on the geology and depositional history of the Gabaldon area can be found in Wright (1946), Kelley (1977), Love and Young (1983), and the future Ph.D dissertation by the author.

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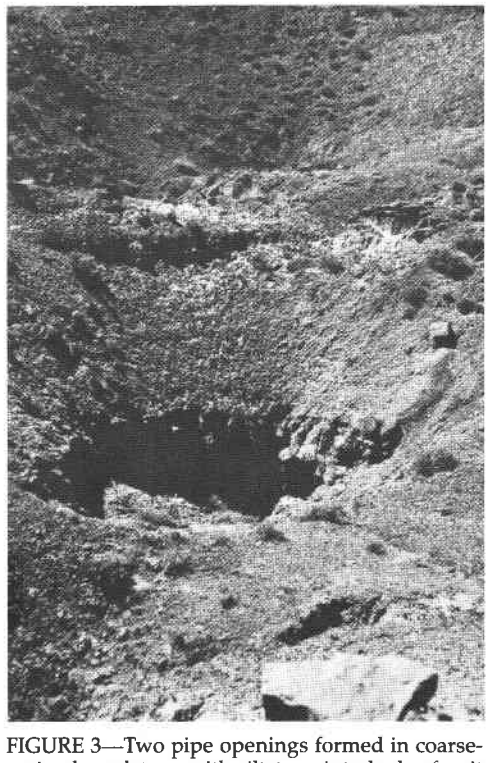

FIGURE 3—Two pipe openings formed in coarse-grained sandstone with siltstone interbeds of unit 2. Pipe in foreground is approximately 10 ft in diameter. Most pipes observed were in units 1 and 2.