

# PLIOCENE MAMMALIAN BIOSTRATIGRAPHY AND BIOCHRONOLOGY AT ARROYO DE LA PARIDA, SOCORRO COUNTY, NEW MEXICO

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In 1935, vertebrate fossils were first found in Arroyo de la Parida, about 6 km northeast of Socorro, Socorro County. Needham (1936) reported a complete pair of lower jaws of the gomphotheriid proboscidean *Rhynchotherium* and a lower molar of the horse *Plesippus* (now considered a subgenus of *Equus*) from an exposure of sands and gravels of the Santa Fe Group on the southern side of Arroyo de la Parida, about 2 km east of its confluence with the Rio Grande. Additional vertebrate fossils were collected from this same exposure by students from the New Mexico Institute of Mining and Technology (DeBrine et al., 1963).

Curt Teichert, a well known expatriate German invertebrate paleontologist, collected a sample of vertebrate fossils from the vicinity of Arroyo de la Parida in 1953, and donated these fossils to the American Museum of Natural History. The only locality information associated with Teichert's sample was that the fossils were collected "about four miles north of Socorro, New Mexico." Based on the general locality, preservation of the fossils, and the composition of the fauna, there is little doubt that Teichert's fossils are from the area that yields the Arroyo de la Parida local fauna (LF). The fossils collected by Teichert were summarized by Tedford (1981), and include three species of horses, *Equus simplicidens*, *E. cf. E. cumminsii*, and *E. cf. E. scotti*, the small antilocaprid *Capromeryx*, and the gomphothere *Stegomastodon*.

Lucas and Morgan (1996) described and illustrated the mandibles of *Rhynchotherium* first mentioned by Needham (1936), and referred them to the species *R. falconeri*, originally described from the Pliocene Blanco LF in Texas. Lucas and Morgan (1996) also summarized the biostratigraphy of the Arroyo de la Parida LF, including fossils collected in 1996 by two students from New Mexico Tech, Ed Frye and Mike O'Keeffe. We visited the Arroyo de la Parida area several times during 2000 and collected numerous additional fossils from 15 different sites (Morgan et al., 2000).

The Arroyo de la Parida LF is derived from a 70-m-thick sequence of sands and gravels that constitute the axial river (ancestral Rio Grande) facies of the Palomas Formation. Sandstone and conglomerate derived from the eastern basin margin interfinger with, and overlie these fluvial sediments. The strata in the vicinity of Arroyo de la Parida are located at the northern end of the Socorro basin, representing one of the northernmost occurrences of the Palomas

Formation, which has its type area about 100 km farther south in Palomas Creek near Truth or Consequences in Sierra County (Lozinsky, 1986). The Arroyo de la Parida LF is composed of ten species of vertebrates: the land tortoise *Hesperotestudo*; the ground sloth *Megalonyx* cf. *M. leptostomus*; three species of horses, *Equus* cf. *E. cumminsii*, *E. scotti*, and *E. simplicidens*; two camelids, a large species of *Camelops* and a small species of *Hemiauchenia*; the small antilocaprid *Capromeryx*; and two proboscideans, *Rhynchotherium falconeri* and *Stegomastodon* sp. This is a fairly typical faunal assemblage found in New Mexico Blancan sites, mostly consisting of large grazing ungulates and dominated by horses of the genus *Equus*.

Five mammals from the Arroyo de la Parida LF are restricted to the Blancan, including *Megalonyx leptostomus*, *Equus cumminsii*, *E. simplicidens*, the large *Camelops*, and *Rhynchotherium falconeri*. The most age-diagnostic of these taxa is *Rhynchotherium*, a gomphothere that became extinct in the late Pliocene at about 2.2 Ma together with several other characteristic genera of Blancan mammals. The lower jaws of *R. falconeri* from Arroyo de la Parida were collected near the top of the local section of the Palomas Formation, suggesting that the entire fauna, most of which occurs some 40 m lower in the section, is older than 2.2 Ma. An early Blancan age for the Arroyo de la Parida LF can be ruled out by the presence of *E. scotti* and *Camelops*, both of which first appear in New Mexico faunas during the medial Blancan. The absence of South American immigrants suggests an age greater than 2.7 Ma. *Megalonyx* is the only Blancan mammal of South American origin that was not a participant in the Great American Interchange. *Megalonyx* or its progenitor arrived from South America in the late Miocene about 9 Ma. *M. leptostomus* is fairly widespread in early through late Blancan faunas. The Arroyo de la Parida LF is thus interpreted to be medial Blancan in age (3.6-2.7 Ma), and is similar to the Cuchillo Negro Creek LF from the Palomas Formation in the Engle basin near Truth or Consequences.

A Blancan fauna is known from the extreme southern end of the Albuquerque basin near San Acacia in northern Socorro County (Denny, 1940). This site is located just north of the Rio Salado on the western side of the Rio Grande, presumably from the Sierra Ladrones Formation, as this site is near the type area of the Sierra Ladrones Formation of

Machette (1978). The fauna reported by Denny (1940, p. 93) from the San Acacia site consists of the gomphothere *Stegomastodon mirificus* and an undetermined species of *Equus*. We have not examined these fossils, so the identifications are taken from Denny's paper and must be considered tentative. The San Acacia site is similar to the middle to late Blancan Arroyo de la Parida local fauna, derived from the Palomas Formation about 15 km farther south in the northern part of the Socorro basin (Tedford, 1981; Lucas and Morgan, 1996).

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