Gallery of Geology - Bosque del Apache oreodont

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Paleontological and archaeological discoveries add valuable new insights to our understanding of regional geologic, environmental, and cultural history. It is important to realize that many scientific clues are lost when fossilized bones or artifacts are taken from the place of discovery without recording their location, photographing their stratigraphic context, and contacting the appropriate legal authority, whether the remains be on private, state, or federal land. Collecting vertebrate fossils on federal land is prohibited without a permit.

On February 21, 2008, when geologists from the New Mexico Bureau of Geology and Mineral Resources and New Mexico Institute of Mining and Technology discovered the exposed jaws, teeth, and parts of a skeleton, they realized that the fossilized remains could be important and sent photographs of the site to New Mexico Museum of Natural History and Science paleontologist Gary Morgan. Gary agreed that the fossilized remains could be important, and the geologists contacted the manager of the Bosque del Apache National Wildlife Refuge and started the process of obtaining a permit to collect the skeleton.

Gary Morgan visited the site and identified the skeletal remains as being from an oreodont, a group of extinct herbivores that roamed the West between about 35 and 7 million years ago. The Bosque del Apache animal belongs to a species of large oreodont that lived near the end of that period. The name "oreodont" was first used in 1851 and is derived from the Greek words *oreo* (mountain) and *dont* (tooth). We imagine that the sharp, jagged ridges of the fossilized teeth looked like mountains to 19th century paleontologists.

The collecting permit required an examination of the site by an archaeologist from the U.S. Fish and Wildlife Service's Albuquerque office. When the permit was approved, the three organizations (refuge, museum, and New Mexico Tech) coordinated in writing a press release on the discovery and imminent recovery of the fossil oreodont. On March 4, 2008, personnel from the refuge, Fish and Wildlife Service, New Mexico Tech, the museum, and the media and others interested in the recovery process gathered at the site.

Photo 2—Remains of the fossil oreodont are on both sides of this northwest-striking fault. The well-preserved nearly complete skull and still-attached lower jaws are visible on the right side of the fault. Most of the articulated postcranial skeleton was found on the left side of the fault and approximately one meter higher than the skull; however, parts of the skeleton just below the skull were affected by movement along the fault and poorly preserved. Colin Cikoski photo.

Photo 1—Geologist Richard Chamberlin takes a closer look at the oreodont skull where it was discovered in Miocene Popotosa Formation sandstone. Colin Cikoski photo.

Photo 3—Paleontologist Gary Morgan sprays the fossil bones with a glue-like preservative to hold them in place while he chisels away the rock around them. Photo courtesy of Aaron Drew.

Photo 4—When most of the surrounding sandstone has been chiseled away the block containing the skull bones is covered with plaster-coated strips of burlap to make a hard jacket that will protect and support the fossil. Photo courtesy of Sheri Melanson.

Photo 7—Gary Morgan and long-time museum volunteer Warren Slade wrap the block with more plaster and burlap. Photo courtesy of Sheri Melanson.

Photo 5—When the plaster-burlap jacket is hard the remaining sandstone connecting the block to the outcrop is chiseled away. Photo courtesy of Aaron Drew.

Photo 8—Gary and Warren determine that the postcranial part of the skeleton on the left side of the fault can be recovered as a single block. They spray it with preservative, chisel away the surrounding sandstone, and encase it in a plaster and burlap jacket. Photo courtesy of Sheri Melanson.

Photo 6—The encased fossil block weighing from 60 to 70 pounds is lowered to the ground. The back of the block and the outcrop are examined for other exposed bones. Photo courtesy of Sheri Melanson.

Photo 9—This block is too heavy to lower to the ground by hand, so it is tied off with a rope. Photo courtesy of Sheri Melanson.

Photo 10—While the heavy block is held in place by volunteers above the arroyo, the paleontologists chisel away the remaining sandstone, separate the block from the cliff, and lower it to the ground. Photos courtesy of Sheri Melanson.

Photo 11—The block containing the skull is loaded on the front of an ATV, and the heavier block containing the postcranial skeleton is loaded onto the back. They are driven back to refuge headquarters and a museum vehicle for the trip to Albuquerque. Volunteers return to the site and sieve loose dirt at the base of the arroyo, and they recover several more bone fragments. Photo courtesy of Sheri Melanson.

Photo 12—Museum volunteer Dr. J. B. Norton, a retired pediatric surgeon, spent many months carefully removing sandstone from around the skull. In the process he discovered the hyoid bones, which are at the base of the tongue, and the larynx (voice box). These two parts of the anatomy are very rarely preserved as fossils. Photo courtesy of Pat Hester.

Photo 13—Dr. Norton spent many additional months exposing the bones in the larger sandstone block. The skeletal remains were not complete enough to reconstruct the whole animal, so the paleontologists will leave the bones within the sandstone. The oreodont will be on display at the New Mexico Museum of Natural History and Science, and reproductions of the skull and some of the other bones will be returned to the Bosque del Apache National Wildlife Refuge. Gary Morgan photo.

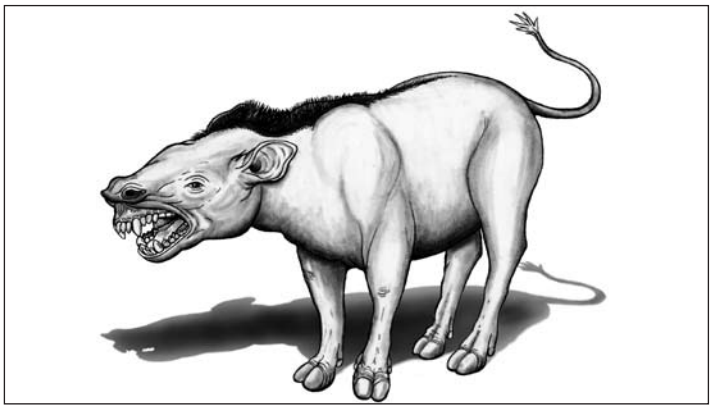

Photo 14—Paleontologist will be allowed to study and measure the bones and teeth to make comparisons with other oreodont specimens and to determine changes in the species and ecological changes through time. Artists can use the bones to reconstruct the appearance of this animal. Drawing by Leo Gabaldon.

Acknowledgments

The successful recovery of the fossil oreodont from the Bosque del Apache National Wildlife Refuge relied on a nearly unprecedented level of cooperation and participation from many federal and state government employees and interested private citizens.

New Mexico Geology thanks Colin Cikoski, Aaron Drew, Shawn Gillette, Pat Hester, Sheri Melanson, Gary Morgan, and John Vradenburg for generously sharing with us their help and photographs from March 4, 2008.