

pre-Dakota erosion surface.

The relation of the Burro Canyon(?) to the underlying Morrison Formation is less clear and has been the subject of controversy; the Burro Canyon(?) has at times been equated with the Jackpile-type sandstone at the top of the Brushy Basin Member in the San Ysidro area and along the east side of the San Juan basin. However, several lines of evidence, including facies relations, differing styles of sedimentation and sedimentary structures, and differences in composition of sandstone and mudstone of the upper part of the Brushy Basin Member and of the Burro Canyon(?) Formation in the San Juan and Chama basins, indicate that the Burro Canyon(?) Formation occurs stratigraphically above similar-appearing sandstones at the top of the Brushy Basin along the east side of the San Juan basin.

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Stratigraphy and Paleobotany of Lower Kirtland (Upper Cretaceous) Leaf Locality near Bisti, San Juan Basin, New Mexico

During a detailed stratigraphic study in the area of Hunter Wash, near Bisti, a new leaf locality was discovered in a sequence of mudstones, carbonaceous shales, siltstones, and sandstones. In the Bisti area, the boundary between the Fruitland and Kirtland formations is taken at the top of the highest carbonaceous shale above the highest Fruitland coal and below the prominent brown sandstone. The leaf locality lies within a 59-ft (18 m) measured section, about 14 ft (4.5 m) above the highest carbonaceous shale, within a gray-green shaly siltstone protected by an overlying sideritic concretion. Poorly preserved bivalves and gastropods are present in the deposit, but leaves predominate.

Leaf collections contain the remains of ferns, conifers, and angiosperms; angiosperms dominate the assemblage. The most common angiospermous genera include *Cercidiphyllum*, *Cissus*, *Ficus*, *Laurophyllum*, *Myrtophyllum*, *Platanus*, *Salix*, and *Rhamnus*. Preliminary analysis of the collection has revealed that most of the angiospermous leaves are of medium size with entire, or nearly entire margins and drip points. These features indicate that during early Kirtland time, the climate of the area was warm-temperature to subtropical.

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Migration Study Using Horizontal Core from Beneath Solid Radioactive Waste-Disposal Pit at Los Alamos, New Mexico

Solid radioactive wastes are disposed of by burial in pits excavated in rhyolite tuff at the Los Alamos Scientific Laboratory. Contaminants known to be in the waste include fission products, uranium, and transuranic elements. Horizontal holes were cored during air as a cuttings carrier beneath a pit which was in use from 1963 to 1966. During drilling operations the air and cuttings from the holes were monitored for radioactive contamination as was the ambient air. No contamination was detected. Samples of the core were analyzed for gross alpha, gross beta, total uranium,  $^{90}\text{Sr}$ ,  $^{137}\text{Cs}$ ,  $^{238}\text{Pu}$ ,  $^{239,240}\text{Pu}$ , and  $^{241}\text{Am}$ . None of the man-made elements were present in the samples at levels above the minimum detection limits. Gross alpha, gross beta, and

uranium activity was detected in the samples. Statistical comparisons were made to identify any significant variations from natural background concentrations. The comparisons demonstrated that none of the radioactivity detected in the samples can be attributed to migration from the disposal pit.

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Vertebrate Paleontology of Lower Tertiary Baca Formation of Western New Mexico

A paleontologic survey of the western outcrops of the terrestrial Baca Formation has yielded the first Oligocene fossils from New Mexico. Three sites of Chadronian (early Oligocene) age are known, and their fauna included the small oreodont *Leptomeryx*, the cameloid *?Eotylopus*, the carnivore *Hyaenodon*, the entelodont *Brachyhyops*, and a large-horned titanothere *Menodus*. All these genera are also found in the Porvenir local fauna, Chadronian of Trans-Pecos Texas.

Vertebrate finds indicate far less contemporaneity of the formation's isolated outcrops than previous workers had accepted. The formation had been considered Eocene, partly on the strength of the discovery of a specimen of *Protoreodon pumilis*, a late Eocene-early Oligocene oreodont, in alluvial-fan deposits north of Datil. The Chadronian sites lie in fluvial deposits north of Quemado, approximately 60 km west. Most Baca vertebrates have been recovered from channel deposits or from float. No site with a concentration of small fossils suitable for screening has yet been discovered. Future goals for Baca Formation paleontologic work include location of fossils in the still unfossiliferous outcrop areas and location of screening sites.

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Provenance and Depositional Environments of Eocene-Oligocene Baca Formation, Catron County, New Mexico

The Baca Formation, which crops out discontinuously in east-west-trending exposures from Socorro, New Mexico, to the New Mexico-Arizona border, is composed of fluvial, alluvial-fan, and lacustrine deposits. It was deposited in a basin which formed during the Laramide orogeny in New Mexico and Arizona. Uplifts bordering the basin include the Defiance, Zuni, Lucero, and Sierra-Sandia, and the Mogollon highland. In the late Eocene, volcanism began in the Datil-Mogollon volcanic field in southwestern New Mexico and adjacent Arizona, south of the study area. Sediments were derived from adjacent uplifts and from the volcanic rocks. The Mogollon highland and the Zuni uplift supplied metamorphic, sedimentary, and plutonic detritus to the Baca Formation.

There is a westward increase in volcanic detritus in the Baca Formation, and faunal evidence shows an early Oligocene, Chadronian, age for western Baca outcrops north of Quemado, younger than outcrops further east which are Eocene in age. With the beginning of Eocene volcanism, volcanic detritus was supplied to the Oligocene Baca sediments which were deposited in a coarse-grained meander belt. Other depositional environments identified include fine-grained meander belt, alluvial fan, and distal, braided alluvial plain. Flow direction was dominantly eastward.