



Cretaceous stratigraphy in the Jornada del Muerto region, including the geology of the Mescal Creek area, Sierra County, New Mexico

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CRETACEOUS STRATIGRAPHY IN THE JORNADA DEL MUERTO REGION, INCLUDING THE GEOLOGY OF THE MESCAL CREEK AREA, SIERRA COUNTY, NEW MEXICO

JAMES W. MELVIN

The Jornada del Muerto is a north-trending synclinal depression enclosing Cretaceous sedimentary rocks which in most places are covered by a veneer of alluvial sand and pediment gravel. At the Mescal Creek area in the west-central part of the region, however, the Cretaceous rocks are exposed.

In the Mescal Creek area Paleozoic rocks are capped by the San Andres Formation (Permian) and local thin remnants of siltstone and arenaceous claystone which are herein designated as undifferentiated Artesia(?) Group. Overlying these beds is a 3,822 foot sequence of Cretaceous sedimentary rocks. The Dakota Formation at the base of the Cretaceous section consists of sandstone and shale. The superjacent Mancos Formation is composed of siltstone, limestone, shale, and sandstone. Overlying strata which are assigned to the Mesaverde Group include, from base to top: Cuesta Pelado Formation (new name), composed of intricately interlensed sandstone, siltstone, shale, claystone, and coal; and Mescal Creek Formation (new name), composed of thick-to massive-bedded sandstone which is termed the Durham Ranch Member (new name) and overlying conglomerate bed (Ash Canyon Member). Above the unconformity at the top of the Ash Canyon Member are sandstone, conglomerate, and breccia of the McRae Formation of Cretaceous and Tertiary(?) age. Cenozoic rocks include Santa Fe Group and Jornada pediment gravel. Igneous rocks of Cenozoic age are basalt dikes and extrusive basalt.

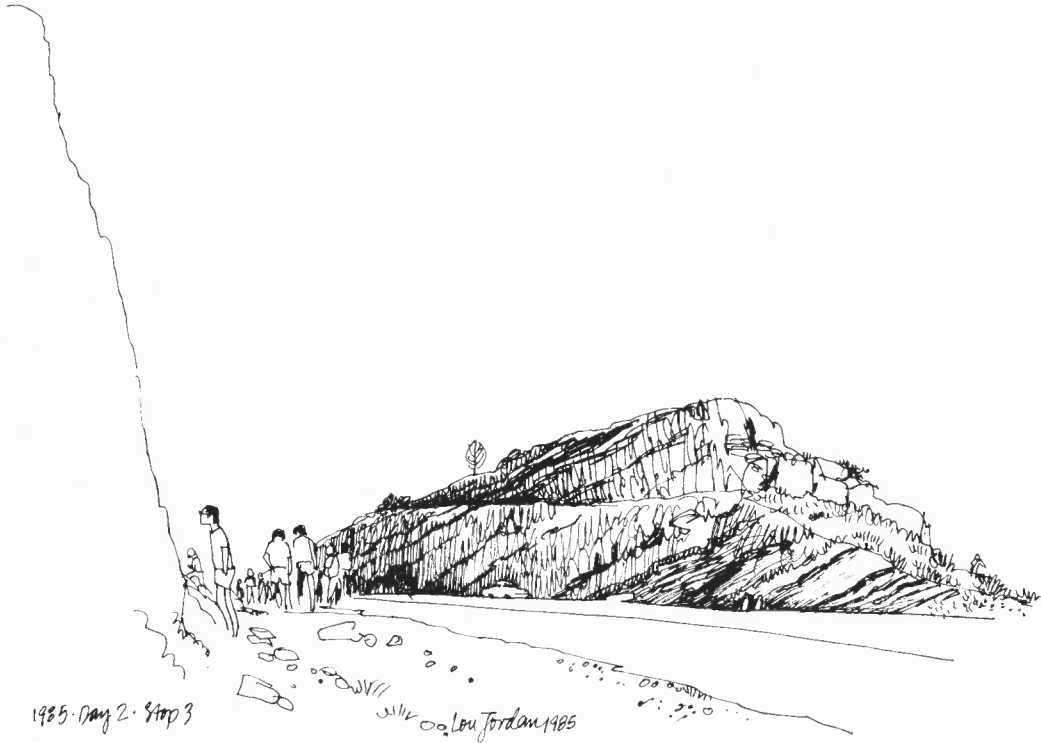
Structures in the Mescal Creek area include high-angle faults, on

which normal dip-slip displacement is usual, and gentle, open folds. The structures are assigned to the "Cascade" orogeny, with successive principal stresses interpreted as having consisted of: east-northeast and west-southwest tangential compression; north-northwest and south-southeast tangential compression; and northeast-southwest effective and relative tension.

Other Cretaceous outcrops in or near the Jornada del Muerto region are summarized, and the Cretaceous intervals from the oil tests in the region which were studied are described. Utilizing these data and the section present at Mescal Creek, some regional correlations are made. The "Sarten" Formation present in the southern part of the region is assigned to late Washita time. The Dakota Formation in the region may be slightly younger than in west-central New Mexico, but it is probably of Belle Fourche to early Greenhorn age. The Mancos Formation may include representatives of Greenhorn and Carlile time. The fluvial and transitional Cuesta Pelado Formation is considered correlative with parts of the Crevasse Canyon Formation and the Menefee Formation of west-central New Mexico and may be of mid-Carlile to Montana age. The continental Mescal Creek Formation may be correlative with part of the Menefee Formation and is perhaps of Pierre age. The continental McRae Formation is at least largely Cretaceous, although uppermost beds may be Tertiary. It is probably correlative in part with the Cub Mountain Formation of the Capitan area.

The preceding is the abstract of an M.S. thesis (1963) by James W. Melvin (deceased), who was a student of Dr. Vincent C. Kelley at the University of New Mexico. It is reprinted here in memory of Jim and also because he was one of the first to attempt a detailed correlation of Upper Cretaceous rocks between the Jornada del Muerto region and west-central New Mexico. The formation names erected by him remain informal because the thesis has never been published. More recently, Hook & Cobban (1981: Annual Report of New Mexico Bureau of Mines & Mineral Resources for fiscal year 1979/1980) recognized the D-Cross Tongue of the Mancos Shale in the Mescal Creek section. The D-Cross Tongue overlies a Tres Hermanos Formation section and underlies the Gallup Sandstone; all these units lie within Jim Melvin's Cuesta Pelado formation. Among Jim's publications is a contributed article to *Tectonics and mineral resources of southwestern New Mexico* (New Mexico Geological Society, Special Publication 6, 1976).

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