most Fruitland strata are exposed. These contain at least two, and possibly three, levels of in-situ tree stumps, fallen logs up to 20 m long, and several leaf localities. Preliminary analysis indicates the presence of *Taxodium, Sequoia,* and palm. Pollen analysis will be conducted.

Fossil mammals, including multituberculates, marsupials, and insectivores, have been found at two sites in clay-pebble conglomerates, associated with freshwater fish, some sharks, amphibians, turtles, lizards, and dinosaurs. The mammals are represented by isolated teeth, jaw fragments, and the first reported postcranial elements from the San Juan basin.

Elsewhere in the area, channel sands and mudstones have produced a large assemblage of turtles, lizards, crocodiles, and dinosaurs. We have identified ankylosaurs, hadrosaurs, ceratopsians, and carnosaurs.

There are at least three stratigraphic levels of mollusk-rich beds containing bivalves, gastropods, and numerous gastropod opercula.

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Geology and Stratigraphy of Late Cretaceous "Fossil Forest" near Split Lip Flats, San Juan Basin, New Mexico

A paleontologic inventory contracted by the U.S. Bureau of Land Management (BLM) reported an interesting "fossil forest" in the region of Split Lip Flats, south of Farmington, New Mexico. The potential for coal development has led to a joint geologic investigation by the New Mexico Bureau of Mines and Mineral Resources and the BLM.

Numerous measured sections were made in the fossil forest study area. The exposed sequences consist of interbedded shales, siltstones, channel sandstones, carbonaceous shales, and coal; coal crops out only at the base of the sections. Virtually all the beds are laterally discontinuous except over short distances. The coal and carbonaceous shales have greater lateral extent; two continuous but slightly undulatory carbonaceous shales were identified and used as stratigraphic marker beds. Approximately 26 m of sediments is exposed, most of which are in the Fruitland Formation. In some sections, the uppermost 5 m is probably part of the lower shale member of the Kirtland Formation. Correlations of these sequences with those near Hunter Wash, 10 mi (16 km) west-northwest, is attempted.

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Overthrust and Disturbed Belt of West-Central Montana—Implications for Hydrocarbon Exploration

The Overthrust Belt of west-central Montana consists of a zone of Laramide (Late Cretaceous–early Tertiary) convex-eastward thrusts and folds that include the major Eldorado-Lombard overthrust that has brought Precambrian Belt rocks eastward over Paleozoic and Mesozoic strata. East of and structurally below the Eldorado-Lombard overthrust is the Disturbed Belt with deformed rocks ranging in age from middle Precambrian (Proterozoic or Y) to early Tertiary.

The Disturbed Belt here forms a salient that extends eastward into the foreland and is bounded on the north by thrusts having a left-lateral component of movement and on the south by folds characterized by right-lateral shift. Deformation is most intense in the western part of the Disturbed Belt and dies out eastward where gentle folds merge with structures of the Rocky Mountain foreland. This salient appears to be underlain by an eastward-yielding decollement fault that merges with tear thrusts on the north and dies out in the subsurface beneath the folds marking the eastern and southern margins of the Disturbed Belt. Deformation resulted from piling up of imbricate thrusts and folds where the major Eldorado-Lombard overthrust sheet of the Cordilleran orogen moved upward and onto the foreland margin. Thus, the strata of the Disturbed Belt have been crumpled and deformed independently of the basement rocks, with crustal shortening above the decollement.

Hydrocarbon exploration in this area should be guided by the tectonic features. Thrusts in the western part of the Disturbed Belt have displacements of several miles and may conceal structures beneath the thrusts, but in the eastern part of the area have smaller displacements and probably do not conceal major structures below. Some anticlines are broken by subsidiary thrusts, resulting in offset axial surfaces at depth. Also, many folds have inclined axial surfaces and the fold aces therefore will migrate with depth.

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Mobility of Uraniun and Other Elements During Alteration of Air-Fall Ash to Montmorillonite: Case Study

An unusual occurrence of juxtaposed glassy and clay-altered ash was sampled to determine the extent of element mobility during glass diagenesis. The results are particularly interesting in that major mobilization of uranium is indicated. Closely spaced samples of glassy and clay-altered ash were collected from the same 20 to 50-cm-thick stratum in the Troublesome Formation (Miocene) of northwestern Colorado. Sharp contacts present between glassy ash and underlying pink montmorillonite may indicate water-saturated conditions restricted to basal ash layers or deposition in a body of water that dried up during the course of the eruption. Formation of montmorillonite instead of zeolites indicates that the water was not highly alkaline or saline. Multielement analysis of glassy and clay-altered samples indicates three things. (1) Montmorillonite has 85 to 90% less uranium than the coexisting glass; similarly depleted elements include Cs, Rb, Na, and K; much smaller depletions of these elements in some glassy samples serve as particularly sensitive indicators of incipient alteration of this type. (2) The abundances of relatively insoluble elements such as Th or Ta are slightly higher (5 to 40%) in clay-altered ash and serve as indicators of the maximum levels of element enrichment in residual material; greater enrichment of elements such as Sc, Sr, and Co indicate adsorptive uptake by clay or by secondary oxides of iron and manganese. (3) The rare earth element (REE) patterns and abundances in glass are sufficiently mimicked by detritus-free montmorillonite to document the original compositional equivalency of the two.

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