

correlation at the substage level with Midwestern chronology cannot be satisfactory. Present attempts fail because of insufficient field work, lack of stratigraphic information, and scarcity of radio-carbon dates.

FAULTING IN NORTHEASTERN SONORA, MEXICO, IN 1887

Vincent P. Gianella

University of Nevada, Reno, Nev.

Faulting associated with the Sonora, Mexico, earthquake of May 3, 1887, extends farther than previous mapping indicates, particularly south of the Bavispe River. This earthquake rates among the strongest experienced in the western United States.

The fault extends southerly from a few miles south of the Mexico-United States boundary for about 50 miles.

Right-lateral movement of up to 20 feet displaces andesites and leaves scarps up to 20 feet high. Near this place, a few miles north of where the fault crosses the Bavispe River, are several sharp bends, approaching right angles, with intervening, nearly straight segments several thousand feet in length. These bends have a short radius of curvature. Twenty miles to the north scarps up to 21 feet were measured.

Displacement is negligible where the fault crosses the Bavispe River, but the scarp increases to a height of many feet farther south. South of the river the recent scarp appears to follow an ancient line of faulting along the western slope of the Teras Range (Sierra de la Madera) and has been traced for 12 miles south of the Bavispe through the Cinco de Mayo mining district and beyond.

MARINE PERMIAN AT BLACK ROCK, NEVADA

Vincent P. Gianella and E. R. Larson

University of Nevada, Reno, Nev.

Black Rock, a prominent topographic feature of the Black Rock Desert in northwest Nevada, was first reported by John C. Fremont who, in 1844, noted the abundance of black fragments, like the cinders from a blacksmith's forge, at the base of this sharply conical hill.

The rock, generally thought to be a mass of volcanic-flow rock, received only cursory attention over the years. Recent detailed examination has shown the cone to be composed of very steeply dipping, fossiliferous, volcanic sediments and limestones. The fossiliferous beds contain well-preserved upper (?) Permian brachiopods. This is the westernmost exposure of fossiliferous Permian strata known in the State.

The Black Rock Permian consists of more than 1800 feet of volcanic sediments with variable amounts of limestone and includes a 100-foot unit of well-bedded limestone. The major portion of the sequence is 1- to 2-foot beds of andesite clasts which average about half an inch in diameter but range from a small fraction of an inch to 6 inches. The volcanic rocks consist principally of augite andesite breccia.

The volcanic sediments at Black Rock are typical of accumulations in eugeosynclines. In these belts local volcanic sources may supply volcanic detritus to adjacent areas of limestone deposition. In some fortuitous circumstances, as at Black Rock, organic remains are preserved in the more limey beds and in the dominantly volcanic detritus.

TERTIARY POLLEN FLORA FROM THE BASIN AND RANGE PROVINCE, ARIZONA

Jane Gray

Geochronology Laboratories, University of Arizona, Tucson, Ariz.

A newly discovered microflora provides the most detailed record of Arizona Tertiary vegetation. The fossils come from tuffs near 5600 feet in the mountains 4 miles northwest of Prescott. The tuffs are tentatively referred to the Clarendonian on the basis of the regional geology and paleontology.