INTRODUCTION

Geographic and structural setting.—The focus of this paper is the Wyoming structural province of the Cordilleran foreland and includes much of the United States Rocky Mountain area. (fig. 1). The Wyoming foreland is similar to, and an extension of, the Mid-Continent craton but has been much more severely deformed and is intermediate between the geosyncline and the craton. The foreland is part of an integrated mechanical system that includes at least the eastern Pacific, the entire Cordillera from the Arctic to the Antarctic, and possibly much of the continental crust for at least 1,000 miles east of the Rocky Mountain front.

In contrast, tectonics of the Cordilleran geosyncline display an entirely different aspect. With the exception of the fused crust in the batholithic blocks, the geosynclinal sediments have deformed much more plastically than the foreland blocks. The basement seldom is brought to the surface by the geosynclinal thrusts, and the sediments have been peeled from it and forced eastward on a regional glide surface or surfaces above the basement (Misch, 1960, Armstrong and Oriel, 1965, Bally et al, 1966).

THE DRIVING FORCE

Significantly, in the Western Hemisphere, the Cordillera lies along and seems related to the Pacific margin of the continent, but the stable shield areas are located nearer the eastern margins of North and South America.

South American model.—To understand the tectonics of the Wyoming foreland, it is instructive to look at the South American Cordillera which is in a more primitive stage than the North American Cordillera. The South American mountains are narrow, high, and are concentrated close by and parallel to the Pacific margin of the continent. Deep ocean trenches lie at the base of the steep continental slope. The volcanoes are concentrated along the continental margin (fig. 2). Each successively deeper sequence of earthquake foci is located farther inland along a plane which intersects the surface at the trenches and dips eastward under the continent (Benioff, 1954).