JACKSON, WILLIAM D., Chevron, U.S.A., Denver, CO

A Point Source Depositional Model for Muleshoe Mound, a Mississippian (Osagean) Spar-Cemented Carbonate Buildup, Sacramento Mountains, New Mexico

Three sections were measured, and oriented samples at 5-ft intervals were taken from the northwest cliff of Muleshoe Mound. Six microfacies were separated using hand samples and thin sections. These are: (1) crinozoan-bryozoan wackestones/packstones; (2) crinozoan-bryozoan wackestones/packstones with sheltered voids; (3) crinozoan-bryozoan packstones/grainstones with sheltered voids; (4) marine cemented bryozoan grainstones; (5) crinozoan wackestones/packstones; and (6) crinozoan packstones/grainstones.

A sediment point source model, with gradational stages, was developed to interpret the vertical distribution of the microfacies in the measured sections. These stages are: (A) the basal wackestones/packstones sediment baffling stage; (B) the spar-rich substrate modification stage; (C) the crinozoan-bryozoan diagenetic framestone stage; and (D) the clean, highly cemented, bryozoan diagenetic framestone stage.

The bryozoan-radiaxial spar point sources developed from the quiet water stage (A) to the turbulent water stage (D). Grainstones and packstones on the flanks of adjacent point sources prograded laterally and eventually coalesced. This resulted in a complex carbonate buildup of spar-cemented crinoidal debris and localized bryozoan mounding facies.

The progression from a quiet water to a turbulent water environment can be followed in three and possibly four cycles within the upper reef core of Muleshoe Mound. This indicates repeated, prolonged exposure to a turbulent environment throughout the history of the buildup.

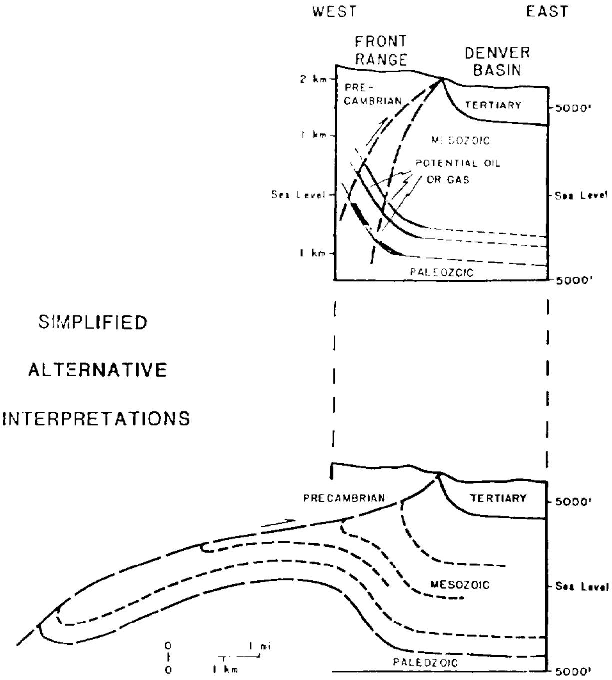
Confirmative studies are now underway at Little Suparloaf Mound, the southern sister buildup of Muleshoe Mound.

JACOB, ARTHUR F., McMahon-Bullington, Englewood, CO

Undrilled Shallow Giant Trap in Denver Basin, Colorado: Mountain-Front Thrust

Along the southwestern margin of the Denver basin, Precambrian rocks have been upthrusted at least 15,000 ft (4,600 m) in the Front Range and 8,000 to 10,000 ft (2,400 to 3,000 m) or more in the Wet Mountains. Strongest deformation apparently was during latest Cretaceous, Paleocene, and possibly earliest Eocene. The sedimentary strata of the basin were folded upward and were overridden by the Precambrian to create the steep west flank of the basin. Below the Precambrian, the precise configuration of the strata and the faults is unknown because there are no available seismic or drilling data, but reasonable interpretations can be made by analogy with other similar areas.

Important reservoirs in the basin are the Permian Lyons Sandstone, the Lower Cretaceous "J" and "D" sandstones, and the Upper Cretaceous Codell Sandstone, Niobrara Formation, and Pierre Shale. The Lyons Sandstone, largely eolian, is about 700 ft (210 m) thick on outcrop at Colorado Springs in front of the upthrust. The "J" sandstone is thicker in drill holes directly in front of the upthrust than almost anywhere else in the basin. Distributary complexes in the "J" form clastic wedges almost 200 ft (60 m) thick that extend eastward from the mountains. The wedges provide migration paths that can funnel hydrocarbons from the basin upward into traps in the wedges themselves below the Precambrian. Deposits of southwest-oriented barrier islands and lagoons in the 40-ft (12 m) thick Codell Sandstone trend under the upthrust of the Wet Mountains.



Directly overlying the "J" are the major hydrocarbon-source rocks in the basin (in ascending order: the Graneros Shale, Greenhorn Limestone, Carlile Shale, and Niobrara Formation). Black shale is interstratified with the Lyons Sandstone in at least one drill hole in front of the upthrust. All source rocks probably reached maturity in late Cretaceous time and still are generating today. Oil and gas fields are present in front of the Front Range and Wet Mountains, and oil seeps are present at each end of the Front Range mountain-front thrust system.

Below the Precambrian, simple upfolding permits an oil column as much as 5,000 ft (1,500 m) high, or more, in the "J," and as much as 4,000 ft (1,200 m) high, or more, in the Lyons, assuming a fault dip of 70° at depth; lower fault dips permit higher oil columns. Clayey fault gouge, breccia, and minute faulting, in a zone that is in many places hundreds of feet wide at the fault, should be a good hydrocarbon seal, like a cork in a tilted 5,000-ft (1,500 m) high bottle. If the strata "roll over" to the west to form a large anticline below the Precambrian, a different kind of trap of very large dimensions would be present. Any kind of trap can extend a combined north-south distance of nearly 65 mi (105 km). Even if roll over is absent and the fault dips steeply, drilling depths to most traps are likely to be only several thousand feet.

JACOBS, ELLIOTT B., Univ. Georgia, Athens, GA (present address: Amoco Production Co., New Orleans, LA)

Shape Parameters and Distribution of Macroborings: St. Croix, U.S. Virgin Islands

Many marine invertebrates that inhabit coral reefs excavate the coral substrate in order to create protective domiciles. In turn, the organisms comprising the coral-reef community display a pronounced biotic zonation that can be closely correlated to bathymetry. This study considers the distribution of these endolithic organisms covering a variety of reef habitats. Vast differences in the major environmental parameters have a profound effect upon the distribution patterns of macroboring organisms and govern the boring morphologies. Of these parameters,