from engineering feats to economics of world petroleum.

DOW, WALLACE G., Pan American Research Lab., Tulsa, Okla.

THEORY OF RED RIVER RESERVOIR DEVELOPMENT IN WILLISTON BASIN

Dolomitization of Ordovician Red River carbonates has produced 3 types of dolomite. Mottled dolomite and bedded dolomite developed during early diagenesis, and saccharoidal dolomite is a product of late diagenesis of limestone. Effective porosity is limited to the late diagenetic dolomite.

The mottled dolomite in the section is present as patches in carbonate mudstone and resulted from selective dolomitization of burrows in a shallow marine environment. Anaerobic bacteria, acting on buried organic material produced a chemical environment favorable for dolomite genesis. The concentration of this finely to coarsely crystalline mottled dolomite is proportional to the degree of burrowing and hence to the rate of sedimentation.

The bedded dolomite consists of thin beds of argillaceous, microcrystalline dolomite closely associated with laminated and nodular anhydrite. The dolomite was formed by replacement of carbonate mud under hypersaline conditions in a supratidal environment.

The saccharoidal dolomite ranges greatly in thickness and was produced by subsurface replacement of carbonate mudstone. Fractures permitted entry and circulation of dolomitizing solutions in nonporous limestone resulting in fine-grained porous dolomite. Distribution of the saccharoidal dolomite can be predicted by mapping fracture zones which are commonly related to local structure.

EARDLEY, A. J., Dept. Geol., Univ. of Utah, Salt Lake City, Utah.

UNMEASURED RESOURCES OF ROCKIES

(No abstract submitted)

ECKER, GEORGE D., Pan American Petroleum Corp., Denver, Colo.

PEORIA FIELD, ARAPAHOE COUNTY, COLORADO

(No abstract submitted)

FASSETT, JAMES E., U. S. Geol. Survey, Farmington, N. Mex.

STRATIGRAPHIC RELATIONS BETWEEN CLIFF HOUSE AND LA VENTANA SANDSTONES, SAN JUAN BASIN, NEW MEXICO AND COLORADO

The Cliff House Sandstone, the upper sandstone unit of the Mesaverde Group, was named for outcrops in the northwestern part of the San Juan basin near Mesaverde National Park, Colorado. Maps of the southeastern part of the basin reveal that the Cliff House fingers eastward into the marine Lewis Shale. There, a stratigraphically lower sandstone was named the La Ventana Sandstone Member of the Mesaverde Formation. The La Ventana was traced north to near the Colorado border where it merges with the underlying Point Lookout Sandstone. The nomenclature was revised to elevate the Mesaverde Formation to Mesaverde Group and the 3 members to formations. The La Ventana Member of the Mesaverde Formation was changed to the La Ventana Tongue of the Cliff House Sandstone. This change of the La Ventana from a member of the Mesaverde to a tongue of the Cliff House was based on the supposition that even though the sandstones did not merge on the outcrop, they would be found to merge in the subsurface. Preliminary subsurface studies suggest that the La Ventana Tongue and the Cliff House Sandstone do not merge.

GARVIN, ROBERT F., Phillips Petroleum Co., Denver, Colo.

STRATIGRAPHY OF PHOSPHORIA FORMATION, NO WATER CREEK FIELD, WASHAKIE COUNTY, WYOMING

(No abstract submitted)

GREENWOOD, EUGENE, Independent, Midland, Tex.

OIL AND GAS POSSIBILITIES IN PEDREGOSA BASIN

Oil and gas have been found in the Pedregosa basin area, but it is not known if they are in commercial quantities. Geologists such as Kottlowski, Wengerd, Foster, and Zeller have suggested the oil potential of various zones. Analogies have been drawn between environmental and structural similarities of the Pedregosa basin and nearby oil-producing basins. Shows of oil have been reported from shallow water wells in southwestern New Mexico, southeastern Arizona, and the northern part of the state of Chihuahua. Zeller reported oil shows in the Big Hatchet Mountains in the Cretaceous strata and good petroliferous odor from Paleozoic rocks. The Hachita Dome well drilled in 1953 near the town of Hachita reported shows of oil from lower Paleozoic limestones. Humble Oil and Refining Company's B. A. State, drilled south of the Big Hatchet Mountains, recovered gas on a drill-stem test from Permian rocks. The Humble well was reentered a few years ago by a group of independent oil men in an attempt to make a commercial gas well. They reported gas flow at the rate of 0.5 MMcf/d, but lost the hole when attempting to acid frac the gas zone. Oil shows were reported in the Cockrell well drilled north of Coyote Hills. Sample shows have been reported in the Pemex well drilled at Los Chinos in northern Chihuahua, Mexico. Oil shows in the surface exposure of the Mississippian near Bavispe, Chihuahua, were noted by Pemex surface geologists.

Porosity in the middle sandstone member of the Cambrian Bliss Sandstone is present in the exposures at Big Hatchet Mountains. Cambrian sandstones produce on anticlines on the Eastern shelf of the Midland basin of West Texas.

The 800 ft of porous Silurian Fusselman Dolomite, present in the Franklin Mountains, was eroded after Middle Devonian uplift in the Big Hatchet Mountains area. The eroded scarp is covered by sapropelic shale and dark chert of the Upper Devonian. Similar conditions on the Eastern shelf and Central Basin platform of the Permian basin of West Texas and southeastern New Mexico produce oil from structural and stratigraphic traps.

Ordovician El Paso-Ellenburger dolomite is present and should be covered by the Devonian shale west of the Fusselman subcrop. The Ellenburger is an excellent producer on structure in the Permian basin of West Texas and southern New Mexico.

Bioherms of Mississippian crinoids are present in the Sacramento and San Andres Mountains and very mas-