ferent situations of fault entrapment of hydrocarbons in Tertiary sediments of the Gulf Coast salt basin, and (2) the role of juxtaposed sediments in a sandstone-shale sequence in creating sealing and nonsealing faults.

Fault-controlled accumulations in the hydropressured Tertiary section were studied in 10 Gulf Coast fields located on low relief structures. Investigations were limited to traps associated with faults which restrict vertical migration of hydrocarbons, that is, where an accumulation is in contact with the fault. The relations observed among fault, lithology, and accumulation are (1) fault sealing, with hydrocarbon-bearing sandstone in lateral juxtaposition with shale; (2) fault nonsealing to lateral migration, with parts of the same sandstone body juxtaposed within the hydrocarbon column; (3) fault nonsealing to lateral migration, with sandstone bodies of different ages juxtaposed within the hydrocarbon column; and (4) fault sealing, with sandstone bodies of different ages juxtaposed within the hydrocarbon column. In some places these four relations are present at different levels along the same fault.

In the examples studied, faults nonsealing to lateral migration were observed only where parts of the same sandstone body are juxtaposed across a fault. With sandstone bodies of different ages juxtaposed, some faults are sealing and others are nonsealing to lateral migration, but sealing faults are the most common. The fault seal apparently results from the presence of boundary fault-zone material emplaced along the fault by mechanical or chemical processes related directly or indirectly to faulting.

SMITH, G. W., Chevron U.S.A. Inc., New Orleans, La.

Ellenburger Group, Delaware Basin, West Texas

The Ellenburger Group in central and west Texas is part of a vast sheet of Lower Ordovician carbonate sediments deposited on the southern edge of the North American craton. In the west Texas area the Ellenburger, a 1,000 to 2,000-ft (300 to 600 m) section of dolomite, is extremely important as an oil and gas reservoir. Since the first discovery in 1928, the Ellenburger has produced more than 500 million bbl of oil in the Permian basin and, more recently, huge gas reserves have been established in the deep Delaware basin.

During deposition of the Ellenburger carbonate sequence, the predominant environment was probably similar to the area of carbonate mud and pelletal carbonate mud deposition on the Great Bahama Bank. Today the Delaware basin section is largely microcrystalline to coarsely crystalline dolomite with many sedimentary structures indicative of shallow-water to supratidal deposition. On the basis of textures, fabrics, and insoluble residues, the Ellenburger Group in the Delaware basin may be divided into three units. Generally, porosity is confined to the middle and lower units and is related to subaerial solution and associated brecciation. Tectonic fracturing, related to late Paleozoic deformation, apparently is responsible for greatly increasing permeability.

Several Ellenburger fields produce up to 50% carbon dioxide with methane. The carbon dioxide content increases in the west and south toward low-salinity formation water.

Ellenburger hydrocarbons probably were derived from the overlying Simpson (Middle Ordovician) shale.

SMOOT, JOSEPH P., State Univ. New York-Stony Brook, Stony Brook, N.Y.

Sedimentary Subenvironments of Wilkins Peak Member of Green River Formation (Eocene), Wyoming

The Wilkins Peak Member of the Green River Formation is a nonmarine, closed-basin, dolomitic carbonate deposit that intertongues with siliciclastic deposits at the basin edges. A transect from the basin margin to the basin center reveals six major subfacies. (1) The alluvial-fan subfacies is poorly sorted boulder conglomerates, cross-bedded gravels, and horizontally laminated grits and sands. These are interpreted, respectively, as fan-apex incised channels; mid-fan channel-bar deposits; and fan-toe, shallow, braided channels. (2) Sand-flat subfacies consists of wedge-shaped sheets of dolomitic sands extending tens of kilometers into the basin center and changing from "Bouma-like" graded units (20 to 30 cm thick) near the basin edge to horizontally laminated or coarse graded beds (1 to 10 cm thick) toward the basin center. These are interpreted as having been deposited by decelerating sheetfloods. (3) Dry-mud-flat subfacies includes densely mud-cracked and graded dolomitic mudstone laminites and thin beds. These are interpreted as subaerial mud flats in which sheetflooding and in-basin, shallow debris flows were the important depositing mechanisms. (4) Nonsaline-ephemeral-lake subfacies is dolomitic mudstones with laminations composed of pinch-and-swell sand, a thick mud cap, and sparse deep mud cracks. These are interpreted as sporadically exposed, shallow-lake margins or isolated shallow ponds. (5) Perennial-lake subfacies is oil shales or finely laminated dolomitic mudstones that are rarely cracked. These are interpreted as having been deposited in a shallow but persistent lake. (6) Saline-ephemeral-lake subfacies consists of either dolomitic mudstones and oil shales disrupted by intrasediment salt-crystal molds, or massive trona and/or halite beds containing mud partings. These are interpreted as brine-soaked lake and mud-flat deposits, or deposits in very shallow brine pools.

These subfacies occur as asymmetric cyclic sequences 3 to 4 m thick that are interpreted as random sheetflood deposits superimposed on transgressive and regressive beds laid down in a shallow central lake which occasionally dried up. The small-scale lacustrine cyclic sequences probably provide delicate indications of minor climatic changes. These sequences not only provide a facies model for other deposits but also a possible criterion for predicting the large-scale geometry of less well-exposed basins.

SMOSNA, RICHARD, West Virginia Univ., Morgantown, W. Va.

Compaction Effects in Fusulinid Limestone

Of 14 fusulinid genera in the Upper Pennsylvanian–Lower Permian Bird Spring Formation, only *Pseudoschwagerina?* shows evidence of deformation caused by compaction. Most deformation occurred in the outermost whorl; the wall and septa were jumbled, and the