to the existence of three factors: large structures, favorably located pinchouts of most Frio sandstones, and a very large structurally uninterrupted drainage area extending basinward to the hydrocarbon source.

Entrapment is the result of anticlinal folding on a typical "rollover" feature common to the downthrown side of the Vicksburg flexure. Structural growth probably had its origin in large-scale gravity slumping of the clays of the early Oligocene Vicksburg Formation, either on the continental slope or near the continental shelf margin. A series of structure maps and cross sections show trap configuration at various horizons.

The excellent quality of the reservoir sandstones is discussed in relation to depositional environment. Reservoir and fluid characteristics are given by formation.

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GIANT OIL FIELDS OF NORTH AMERICA

A group of 45 oil fields in North America, each with reserves in excess of 500 million bbl, have been analyzed to determine their characteristics as an entity. The fields include 18 in the continental interior, 11 in California, 11 in the Gulf Coast area, 3 in Canada, and 2 in Mexico. They contain a total of 46 billion bbl of ultimate reserves, which is about 35 percent of the present total for the continent. The historical implications and future potential are discussed.

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PETROLOGY AND SEDIMENTATION OF JACKFORK SANDSTONES, ARKANSAS

A detailed field investigation along the intricately folded and faulted Frontal Ouachitas for the first time permits accurate sampling of sandstones encompassing the entire Jackfork section. The resulting petrographic information supplements paleocurrent studies and sedimentary structures in postulating a provenance and dispersal system. Rocks of the Frontal Ouachitas consist approximately 30 percent of sandstone deposited by mass flow or turbidity currents and 70 percent of shale, mostly contorted by downslope movement after deposition. Exposures along a southern belt consist of 75 percent of sandstone; only negligible amounts of gravity-deformed, argillaceous rocks are present in this southern belt.

Approximately 200 thin sections were analyzed from measured sections and isolated areas. Along the Frontal Ouachitas, the sandstone is predominantly fine-grained quartz arenite and wacke (range 0.07 to 0.31 mm; average 0.14 mm), high in polycrystalline quartz, and having less than 1 percent feldspar, 2.5 percent unstable rock fragments, a stable heavy-mineral suite, and varying amounts of matrix. These rocks are moderately sorted to moderately well sorted although pressure solution has masked and altered the original texture. Stylolites along bedding planes and sutured, interlocking grain contacts indicate considerable removal of silica by post-depositional means, a small amount remaining as quartz overgrowths. More argillaceous wacke shows highly corroded quartz grains due to local increases in pH but with little grain interpenetration. Dominantly friable sandstone along the southern belt has comparable grain sizes but a marked increase in matrix and decreased post-depositional changes. The matrix probably reduced the flow of silica-removing waters, also forming a cushion that would reduce number of point contacts. Feldspar content may approach 10 percent but remains lower than that of the Stanley sandstone.

Basinal filling was mainly from the end (east), aided by sediment bypassing through the Illinois basin. A volcanic archipelago (Llanoria) probably contributed the feldspar. Rocks throughout the Frontal Ouachitas apparently were deposited along a steep, south-dipping, unstable slope. West-flowing, bottom-hugging turbidity currents concentrated the sand in the deepest part of the east-west trending Ouachita trough which today is exposed as the rocks of the southern belt. Care must be taken when interpreting sandstone-shale ratios in flysch basins where the greatest sand content is along the basin axis.

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STRATIGRAPHIC DISTRIBUTION, PENNSYLVANIAN FUSULINIDS, MANZANO MOUNTAINS, NEW MEXICO

The Manzano Mountains, on the east edge of the Rio Grande Valley, are between Albuquerque and Abo Canyon, 40 mi south. Paleozoic rocks exposed in the range are chiefly of Pennsylvanian age. Rocks of Permian age crop out on the east flank of the mountains at the south end of the range.

Pennsylvanian and lower Permian rocks have been subdivided into three major lithic types—one constituting the Sandia Formation and two constituting the Madera Limestone. The Sandia Formation contains a basal sandstone and conglomerate, and upper beds of sandstone and dark-colored shale with a few thin beds of fusulinid-bearing limestone. The Madera Limestone overlies the Sandia Formation with apparent conformity. The lower part of the Madera is dominantly limestone (commonly cliff-forming) and a few thin beds of shale and minor amounts of sandstone. The upper part, which overlies the lower part with no more than minor disconformity, consists of rhythmically alternating sandstone and conglomerate, shale, and marine limestone. This upper part has been subdivided for convenience into units B, C, and D.

Fusulinids from the Sandia Formation indicate that these rocks were deposited during Atoka time. Fusulinids from the lower part of the Madera Limestone indicate deposition during Des Moines time. The upper part of the Madera is within the faunal zone of *Triticites*. The fusulinid fauna from unit B suggests deposition during Missouri time; that from unit C suggests deposition during early Virgil time; and that from unit D suggests deposition during late Virgil and early Wolfcamp times.

Studies of insoluble residues from 52 samples of fusulinid-bearing limestones from 5 measured sections suggest that there is correlation between the amount of terrigenous material in the limestone and the relative abundance of the fusulinids. If the amount of terrigenous material is taken to be an index of water turbidity, tentative conclusions may be drawn concerning clarity of the water in which the fusulinids lived.