beds and salt, representing lower to upper sabkha progradational couplets, reflect dominance of sabkha sedimentation during upper San Andres deposition. The overall genetic aspect of the stratigraphy is a general southerly facies shift through time.

Porosity is best developed in subtidal dolomite facies. Facies mapping delineates areas of potential porosity preservation and is important to explorationists predicting updip San Andres porosity trends and pinchouts.

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Design and Function of Oil and Gas Traps

Oil and gas are found in traps. If we can understand what is going on in traps, we should be able to look back along the migration trail with special insight as to what has happened. That insight could even extend all the way back to the "source."

Traps are the most logical places for hydrocarbon mixtures to be put together as distinct oil and gas fluids. It follows that traps are not just passive receivers or containers of hydrocarbon mixtures put together elsewhere. Effective oil and gas traps of different well-known styles have a very important feature in common: structurally and stratigraphically, they are designed to discharge waters from depth. Thus they function as active focal mechanisms to gather and process feedstock waters carrying hydrocarbons and other organic materials. It is a forced-draft system. The concept adds an exciting new dimension to the anticlinal theory. It honors all factual observations around oil and gas deposits.

Very simply, the most important function of a trap is to leak water while retaining hydrocarbons. The water can leak because the enclosing membranes and cover are water-soaked, like a wick. The hydrocarbons and other organic materials are separated from the waters as they pass through the trap. The separation is caused by abrupt changes in pressure, temperature, and possibly salinity—those changes being related to the basic change in direction of feedstock (water) movement from lateral to upward. Coalescence of hydrocarbons makes bubbles or globules which cannot move so easily as water. The ultimate composition of a trapped hydrocarbon mixture depends on the respective residence times of the various components of that mixture which in turn depend on (1) what the water carries to the trap, (2) what the trap retains, and (3) the pore-volume exchange rate.

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Waveland Field, Unique Structural and Stratigraphic Trap

Waveland field, located in Hancock County, Mississippi, and currently being developed, was discovered in 1965 by Humble Oil and Refining Co. Gas Unit 1, Sec. 22, T8S, R15W. One additional field well was drilled, a northwest diagonal in Sec. 16, T8S, R15W. After these two field wells were completed and put on production, there was no additional development until 1975, when lease blocks were assembled by Phillips Petroleum Co., Saga Petroleum, Marshall R. Young Oil Co., and others.

There is no massive deposition of Ferry Lake Anhydrite in the area. Because of the lack of massive anhydrite, actual definition of the formations of the Trinity Group (Lower Cretaceous) is difficult to impossible. However, it is interpreted that the primary reservoir of Waveland, a porous limestone, is the Mooringsport Formation.

The depositional environment of the Mooringsport limestone reservoir is extremely complex because of the influence of the large regional carbonate banks on the south. For convenience, the Mooringsport porosity zones are lettered A through G. To date, the A and B zones are the primary contributors to production. The B zone may be subdivided within the field proper.

The reservoir rock is best described as a two-porosity system—matrix porosity (range 6 to 12%) and vugular porosity (range 7 to 16%) directly related to the mineralogy, lithology, and diagenetic history. Matrix permeability is generally low, not exceeding 2 md and usually less than 1 md. Fractures are essential for good productivity and intense fracturing is present in all the higher crestal positions.

The Waveland field comprises the crestal 19,000 productive acres (7,600 ha.) of a north-to-south-elongated nose having no apparent structural closure, fault closure, or north dip at the Mooringsport limestone level. Structural elevation at the Mooringsport level is a major factor in determining hydrocarbon saturation, but no direct relation has been found among pore-throat size, rock type, porosity, structural elevation, and hydrocarbon saturation. The Waveland field is a complex combined structural and stratigraphic trap.

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Evidence for Wrench Faulting, Southern Val Verde Basin, Southwest Texas

A structural analysis in the southwest Edwards Plateau area included four 15-minute quadrangles in Edwards, Kinney, and Val Verde Counties, Texas. Seven rock units of the Cretaceous Comanche Series and two units of the Cretaceous Gulf Series crop out. Subsurface Paleozoic foreland facies rocks of the southern Val Verde basin are present in the northern study area; the Devils River uplift, partly blanketed by allochthonous upper Paleozoic metamorphic rocks, underlies the southern part. A pronounced east-west-trending fault zone which cuts through the center of the study area is at least 55 mi (88 km) long and 1 to 2 mi (1.6 to 3.2 km) wide. This trend, named the Carta Valley fault zone, is characterized by a complex series of en echelon, northeast-oriented faults which are cross-cut by a lesser number of northwest-trending faults. These faults bound a series of grabens, downthrown by 200 to 300 ft (60 to 91 m), which are as large as 3 sq mi (7.7 sq km). Nine gently dipping, northwest-plunging, en echelon anticlines parallel the south side of the fault zone. The con-