Taylor Hill. All three fields had previously produced oil from the O'Hara Limestone Member of the Ste. Genevieve formation. New production has been established in the three fields from the deeper Salem and Warsaw limestone section. Oil in all three fields is found in a combination of structural and stratigraphic traps. New reserves in Ewing East and Taylor Hill total about 400,000 bbl of oil. The Bessie field is currently in the development stage but preliminary indications show the reserves should greatly exceed those of Taylor Hill and Ewing East.

Recent geophysical work in the Ewing area, employing a portable mini-hole seismic crew, indicates several more untested features which occur along the same Middle Mississippian depositional trend that created the producing facies in the above fields. The new portable mini-hole seismic operation has made it possible to survey areas previously unaccessible by deep hole or vibroseis crews.

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Buried Structures in Marine Exploration

Examples are presented of what most geologists call "buried structures." Improvements in reflection seismograph techniques and data processing have produced deeper penetration and better resolution of data which have led to the location of many "buried structures" in the Gulf of Mexico and other marine areas.

Some of these structures are buried diapirs—some are related to growth fault development. In either situation, local movement ceased and the structures were overridden by sediments prograding over a subsiding basin.

Recognition of these undrilled structures has sparked intense bidding competition in recent offshore lease sales in the Gulf of Mexico and the Atlantic offshore. Buried structures will be important targets in offshore exploration for years to come and will contribute substantially to the nation's reserves of oil and gas.

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Paleochannel Across Louden Anticline, Fayette County, Illinois: Its Relation to Cypress (Chesterian) Stratigraphic Entrapment of Petroleum

Structural mapping of the base of the Beech Creek (Barlow) Limestone across Louden oil field, Fayette County, Illinois, reveals a northwest-southeast trending saddle that is more than 1.5 km wide and 6 km long, and is perpendicular to the major axis of the Louden anticline. This depression coincides with the abrupt appearance of a thick, fine-grained, argillaceous limestone (so-called "false Barlow") subjacent to a regionally normal thickness of coarse-grained, bioclastic Beech Creek Limestone. Sandstone beds in the Cypress Sandstone, which generally underlie the Beech Creek, are thin or absent beneath this area of false Barlow.

This feature is believed to be a major tidal channel that breached deposits of shallow marine or eolian sands that had accumulated along the crest of the anticline. The trend of the channel, perpendicular to the anticlinal axis, and the restriction of the channel to the crestal area only, with no apparent extension off-structure, strongly suggest that the Louden anticline was topographically high during Cypress deposition. The channel was filled during latest Cypress deposition by marine shales and fine-grained limestone (false Barlow). During the main phase of sand deposition, the channel profoundly influenced local sandstone depositional patterns; two thick, offshore sand bars or barrier islands accumulated near its southeastern terminus along the flank of the anticline. These flanking sand bodies pinch out updip against lagoonal shales and are true stratigraphic traps that have since produced several million barrels of petroleum.

The recognition of large marine bar sand bodies in the Cypress Sandstone opens new prospects for oil exploration in the Illinois basin. Henceforth, Cypress sandstones should not be viewed as massive blanket sands or overlapping fluvial channel sands, but rather as complex sequences of shallow marine sandstone. Favorable areas to explore for stratigraphic traps in the Cypress include the flanks of major anticlines, areas of thick false Barlow, and near linear gaps in the areal distribution of Cypress production.

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Depositional Trends of Lower Silurian "Clinton" Sandstone, Northeastern Ohio

The Lower Silurian clastic rocks of the northeastern Ohio subsurface represent a deltaic sequence of complexly intertonguing sandstones and shales. These rock units overlie Ordovician shales throughout the area. The complexity of sandstone and shale facies resulted from migration of distributary channels during the constructive phase of deltaic progradation. At the close of delta growth, a transgressive pattern of lithofacies occurred, culminating in the deposition of a carbonate unit, the "Packer Shell" (Brassfield) which serves as an overlying distinct marker bed for correlation. The overall thickness of the interval between the base of the Packer Shell and the underlying Ordovician shales is nearly constant, allowing these shales to be used as a lower bounding surface for mapping the sedimentary package of "Clinton" sandstones and shales.

Depositional trend maps were constructed using conventional subsurface techniques and compiled using the SYMAP computer contouring program. The total sandstone lithosome of the Clinton and sandstone quality (based on gamma-ray log deflection) are shown on isopach maps of the Clinton. A total of more than 2,600 wells were used in the study of several counties in northeastern Ohio after conventional stratigraphic work was completed.

The trends show dominant sandstone depositional environments in the deltaic sequence which prograded westward on a low slope across eastern and central Ohio. Cross sections delineate the three-dimensional aspects of sand bodies and show the complexity of the facies changes between distributary and interdistributary deposits. The cross sections also show the effect of the interfingering nature of the Clinton reservoirs over small distances on petroleum production. In addition,