representing the intrusive mass. The surrounding beds dip away from the central depression, often very steeply, to form a series of cuestas. In contrast, the Iza diapir is a buried wall or ridge of plastic rock at least five kilometers (three miles) long by less than 1.5 kilometers (one mile) wide intruded into a sedimentary section over 4,410 meters (14,470 feet) thick. Only the uppermost tip is exposed at the surface in a belt of indistinct outcrops up to 30 meters (98 feet) wide. One of the wells drilled on the structure encountered an inverted block of Upper Cretaceous sandstone above Paleocene carbonates, apparently incorporated into the diapir.

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Salt Deposits and Structure of the Maritime Provinces of Canada

Aeromagnetic, gravity, and seismic surveys in the Maritime Provinces of Canada have provided extensive new information bearing on (1) the geometry of the depositional basins, (2) the distribution and shape of the major salt masses, and (3) the sub-salt structure.

The basins and uplifts exhibit a striking geometrical relationship of east- and northeast-trending elements that strongly suggest a shear pattern. This pattern was developed during the Acadian and possibly earlier orogenies. Large crustal blocks, bounded by faults, appear to have tilted and shifted, with rapid erosion and deposition during Mississippian and Pennsylvanian times creating large prisms of sediments which differ greatly in shape, size, and sedimentary facies.

Widespread deposits of rock salt, gypsum, and anhydrite exist in the Windsor Group (Upper Mississippian) in all the Maritime basins. The saline facies is interbedded and interfingered with thin limestones, red and grey shale, and coarse red clastics, and in a few places lies directly on the basement rocks. In the anticlines, notably those of northern Nova Scotia, western Cape Breton, and southern New Brunswick, the rock salt thickened greatly in the axial region of the folds and in places pushed through the overlying rocks to the surface. This sequence of thickening of the salt within the folds followed by diapirism is similar to that of the salt anticlines of the Paradox Basin and South Persia. Little is known about the original depositional thicknesses of the saline facies, but gravity data indicate wide differences in the amount of rock salt along the axes of the major anticlines. This may indicate the original pattern of salt deposition.

A thick section of sandstone and shale, plentiful oil shows, a basin-wide seal afforded by the evaporite section, and the large structural traps provided by the major anticlines combine to make the sub-salt Horton Group (Lower Mississippian) rocks a prime target for oil and gas exploration in these largely untested basins.

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Geosynclinal Filling: Some Stratigraphic-Structural Relationships

A geosyncline does not develop by mere crustal sag but rather by movement along faults. Contemporaneous faults are known to have been active during development of the large Ouachita and Gulf Coast geosynclines and development of the small but active Los Angeles, Hanna, and Ardmore basins, which are tectonically similar.

The sedimentary fill of tectonically similar geosynclines, however, may be quite different. The Los Angeles Basin along the continental margin received thick turbidite deposits before it was filled to shelf depths. During its rapid subsidence, the Hanna Basin within the landlocked western interior filled with alluvial deposits. The Ardmore Basin during the late Paleozoic received shallow marine and coastal (paralic) sediments. Disharmonic folds involving the thick, ductile Springer-Goddard Shale indicate the influence of rock type in forming local structural features.

While the Springer Shale was being deposited in the Ardmore Basin, turbidites were being deposited along the length of the Ouachita geosyncline. After water depths shoaled, shallow marine beds of the Atokan were deposited. The over-all regressive sequence of the Tertiary in the Gulf Coast geosyncline has resulted in paralic sediments overlying ductile, offshore, and "deep-water" shales. This relation may have been the cause of structures formed independently of salt tectonics. Such features are thought to be analogous to those failures recognized causing failures in foundation engineering and to the Recent mudlumps of the Mississippi River.

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Some Oil Occurrences in the Tar Springs (Mississippian) Delta, Illinois

The Tar Springs Sandstone along the southwestern flank of the Illinois basin is one of a series of Mississippian Chester clastic formations comprising a major deltaic complex. The Tar Springs was deposited in a slowly subsiding, intracratonic basin by a major river system, the Michigan River system of D. H. Swann.

The Tar Springs deltaic deposits are the principal reservoir in the 9-mile-long, 1–3-mile-wide producing trend formed by the Benton, Orient, and West Frankfort fields in south-central Franklin County. In this north-south oriented trend, the Tar Springs Sandstone is at an average depth of 2,050 feet and lies between two widespread, shallow marine, impermeable limestones. The reservoir is made up of very fine-grained to fine-grained sandstone laid down in overlapping and coalescing fan-shaped buildups and in lenticular bodies. Individual sand buildups are partially separated vertically and laterally from one another by impermeable siltstone and shale. The sandstone was probably deposited by shifting distributary channels. The siltstone and shale are probably quiet water, interdistributary deposits.

Oil accumulations in the Benton-Orient-West Frankfort trend are primarily structurally controlled; however, stratigraphic variations influence the over-all distribution of hydrocarbons. All the Tar Springs accumulations lie on a broad, north-south trending anticline of moderate closure. Local folding and warping of the anticline combined with lateral and vertical facies change from sandstone to shale determine the size, shape, and position of the oil pools.

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Distribution of Hydrocarbons in South Louisiana by Types of Traps

Hydrocarbons in Frio and younger sediments in South Louisiana, both onshore and offshore, are associated with six types of structural or combination structural-stratigraphic traps: salt domes; circular or elongate