davisi zone and above the Abbeville facies of the Anahuac Formation. The *Planulina* interval is present in the subsurface along a narrow band extending from Lake Verret in Assumption Parish westward through Cameron, Louisiana, into coastal Texas.

The first discovery of gas in *Planulina* sandstones was made in 1945 by Magnolia Petroleum Company in Mud Lake field, Cameron Parish, Louisiana. By 1963, after 18 years of exploratory effort, there were only 4 significant *Planulina* fields. Operations were hampered by elusive structures, erratic sands, extreme correlation problems, high pressures, high drilling costs, inadequate seismic resolution, and a general lack of understanding of the geologic setting. During the past 8 years a sharp increase in success has changed a "bad" trend into one with promise of substantial new gas reserves. Modern drilling technology and CDP seismic techniques were responsible for this success, and the additional control has resulted in a better understanding of the geology.

Planulina sands are believed to have been deposited along the outer edge of a narrow continental shelf. Marine transgression in "late *Planulina* time" shifted the axis of deposition northward. Consequently, the next younger cycle of deposition and associated growth faulting lies north of, and updip from the *Planulina* trend. Because of this shift in the axis of sedimentary loading, growth of many *Planulina* structures ceased in "late *Planulina* time" and were buried by transgressive shale.

Typical *Planulina* structures are anticlines and northward-plunging, faulted noses buried beneath south dipping sediments. Where younger beds are also productive their structural crest generally is well removed from the apex of the *Planulina* structure. *Planulina* structural crests are commonly, though not exclusively, north of the shallow structure or in the upthrown fault block. Some salt domes and high relief uplifts have *Planulina* sandstone pinchouts on the north flanks.

Within the *Planulina* trend stratigraphy plays a vital role in hydrocarbon entrapment and modified stratigraphic traps are common.

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Contribution of JOIDES to our Geologic Knowledge of Gulf of Mexico

The coring of deep-water sediments in the Gulf of Mexico during Legs I and X of the JOIDES program has contributed significantly to our knowledge of the Gulf's geologic history. The nature of Sigsbee scarp is still not known with certainty, but the results of drilling holes 1 and 92 suggest that both "contemporaneous normal faulting" (perhaps overbuilding and downslope movement) and salt tectonics may be involved.

Drilling results from holes 3, 85, 87, 90, and 91, indicate that formation of the present Sigsbee plain includes late Neogene subsidence and, prior to the Pliocene, a more westerly source for coarse terrigenous clastic debris than the Mississippi River. The discontinuous record of deep-water sedimentation since the end of Early Cretaceous time, found in holes 86, 94, 95, 96, and 97, suggests a complex structural history of block tilting and faulting for the banks and scarps. This may include a Late Cretaceous seaway, and its reemphasis as the present Yucatán Channel–Florida Strait as late as Pleistocene. Correlatibility of the discontinuities bounded above and below by deep-water sediments may require some more comprehensive explanation than slumping and submarine current removal of sediments.

Perhaps worthy of note, is the possibility that the overly publicized recovery of hydrocarbons from Challenger Knoll in the Campeche embayment salt-tectonic province (hole 2) affected the extenders of the JOIDES program, thus helping to make Leg X cruise possible. Drilling during this cruise, in turn, under the influence of changing political winds, contributed to the pollution-scare, thwarting the original Leg X goals. Many of our basic questions have not been answered adequately by JOIDES work, but we are, at least, aware of many more questions.

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Environmental Controls of Benthic Macrofaunal Patterns in Gulf of Mexico Adjacent to Mississippi Delta

Two communities of shelled benthic macrofauna are recognized south of the Mississippi delta by means of cluster analysis. The faunal pattern is correlated closely with water depth, pelecypod feeding type, and substrate texture. Correlation of faunal, lithologic, and environmental characteristics reflects joint sedimentation and biotic production in response to the present hydrologic regime.

East of the Mississippi delta, 8 communities of benthic shelled macrofauna are recognized by means of cluster analysis. Distribution patterns of these communities (biofacies) appear to reflect the primary environmental factors controlling the nature of the water mass: distance from the delta front; water depth on the shelf away from the influence of the delta; and subdivision of the shelf by the Chandeleur-Breton islands. Faunal and substrate patterns are poorly correlated; histograms of sediment texture for each of the biofacies are not significantly different from the histogram of sediment texture for the whole area. The poor correlation of fauna with substrate texture is the result of the formation of the substrate distribution pattern during deposition of the St. Bernard delta. Faunal distribution patterns are determined primarily by the environmental factors controlling present water-mass characteristics and only secondarily by the relict substrate texture pattern. If preserved in the geologic record, the co-occurring fauna and sediments would represent 2 different periods of deposition.

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Origin of Cabo Rojo Beach-Ridge Plain, Veracruz, Mexico

The Cabo Rojo beach-ridge plain was formed in a low-energy shadow behind the Blanquilla-Lobos coral-reef tract. The source of the sand comprising Cabo Rojo was offshore material of Wisconsin (?) age, most probably deposited by the Río Panuco during a lower sea-level stand. Islands within the Laguna de Tamiahua define a sandstone body similar in shape and orientation to that of Cabo Rojo, strongly suggesting either a 2-stage Holocene constructional history, or the remains of a pre-Wisconsin barrier.

The beach-ridge plain consists of low, hummocky ridges (relief less than 1 m, spacing of 100 m) oriented parallel with the present coast. This coast is undergoing erosion, and beach ridges are *not* forming. Cliffed, back-beach dune ridges are found on the northern and