

Shoal development on the north and south sides of estuarine entrances gives rise to 2 structurally different types of barrier islands. South-side shoals are triangular sand bodies attached to the shoreline. Through time these shoals prograde seaward and form arcuate beach ridges. Shoal and beach ridges are partly eroded during periods of high wave energy. The development of barrier islands (Type I) results when renewed shoal and beach ridge formation occurs seaward from these terminated ridges. Shoals on the north sides of entrances are detached from the shoreline and are segmented as a result of longshore spillover of channel water. Longshore trending shoals form seaward of "spillover channels." These shoals are the forerunners of recurring beach ridges which form barrier islands (Type II) on the north side of the channel. At the present time Type I and Type II barrier islands are developing on the Georgia coast.

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GOVERNMENT'S EXPECTATIONS AS TO NATIONAL MINING AND MINERALS POLICY

There is a need for Congress to have a continuing evaluation of the nation's mineral and fuel position, as described in the Mining and Minerals Policy Act of 1970. Steps are being taken by the Department of the Interior and the Bureau of Mines to provide this evaluation.

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COMPUTER MAPPING IN LOWER FRIO FORMATION (OLIGO-MIOCENE), SOUTHWESTERN LOUISIANA

The usefulness of a computer in mapping the complex structure and stratigraphy of the Oligo-Miocene of the Gulf Coast has been questioned. During a regional study of the lower Frio by Paine, Meyerhoff, and Furrer, the writer had an opportunity to computerize the data used for the study (hand-contoured maps), and to produce a set of computerized maps from the same data. Four sandstone isolith maps, 1 isopach map, and 1 structure map of 1 zone were constructed, as well as 4 isopach maps and 4 structure maps of other zones.

The computer's sandstone isolith map of the *Nodosaria* "A" sandstone showed a marked difference from the hand-contoured map, because the writer had introduced a major distributary system into the eastern half of the area. The computer plotted this distributary system as a series of east-west, elongate, barlike bodies parallel with (1) thinner sandstone bodies in the western part of the area and (2) the shoreline of massive continental sandstone bodies on the north. In the growth-fault area of the *Nodosaria* embayment, computer maps and handmade maps are very similar.

The structure maps show less similarity. Only the large regional faults and the large domes appear on the computer maps. Smaller faults and closures do not appear on the computer maps. The differences between shallow and deep structure are evident on both the computer and hand-contoured maps.

This study revealed that computer maps are useful in stratigraphic work—both on regional and local scales. For structural work, the computer maps are less useful, but do reveal major features. The great number of maps which the computer can produce in a short time is an obvious advantage. Clearly, the geologist's

prejudices are reflected in the computer output. The writer strongly recommends the use of computerized maps in studies of Gulf Coast geology.

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STRATIGRAPHY, SEDIMENTATION, AND PETROLOGY OF OLIGO-MIOCENE LOWER FRIO FORMATION, SOUTHWESTERN LOUISIANA

The Frio Formation, a major productive unit in South Louisiana, never has been described petrographically, although conventional cores and thousands of sidewall cores have been collected.

The lower Frio consists of about 1,000 ft of alternating sandstone and shale in the updip stable shelf area, but it thickens to an observed maximum of 7,000 ft in the downdip unstable shelf (*Nodosaria* embayment) area. The lower Frio is mainly a regressive sequence, and has been divided into 4 units (designated A, B, C, and D from top to bottom) on the basis of electric-log correlations and other characteristics.

Three lithologic sequences characterize each unit: a massive sandstone facies on the north (updip); an interbedded sandstone-shale (deltaic?) facies exhibiting considerable lateral variation; and a downdip sequence of alternating sandstone and shale in which the shale content increases markedly downdip. The sandstone bodies are thin and relatively persistent.

Unit D, at the base, marks the beginning of the regression, has the least amount of sandstone, and has smallest amount of production. Shoreline and deltaic sandstone bodies are poorly developed. Unit C shows an increase in sandstone content and production. The deltaic facies is well developed, and shows a marked increase in volume and areal extent. Most of the production is associated with this facies, although production does occur in marine sandstone facies. Unit B shows only limited southward regression, but exhibits considerable development of marine facies. Numerous fields produce from this unit. Significant production also comes from channel-like bodies with erosional lower contacts. These bodies may be bar fingers or distributary channel deposits. Unit A is the most regressive. It contains the largest amount of massive continental and deltaic plain sandstones, as well as a well-developed delta system. As a result, marine sandstones are limited in number and extent. The distributary sandstone bodies account for major production and several giant fields.

Independent stratigraphic, petrographic, and paleontologic studies demonstrate that the lower Frio contains strata deposited in continental, deltaic, and inner to middle neritic environments. Production, although primarily controlled by structure, is definitely affected by sedimentation and depositional patterns. Because structure in the Frio is now well known, future discoveries will be determined primarily by stratigraphic, petrographic, and paleontologic studies similar to this one.

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EXPANDING HUMAN HORIZONS IN GEOSCIENCES