

SHREVEPORT GEOLOGICAL SOCIETY STUDY GROUP, Shreveport, La.

BASIN FRONTIERS AND LIMITS OF EXPLORATION IN THE CRETACEOUS SYSTEM OF CENTRAL LOUISIANA

This paper is concerned with an area of 11,000 square miles in central Louisiana. Facies changes and thickening of the section make correlation with updip equivalents difficult. The estimated combined maximum thicknesses of Gulfian and Comanchean beds in southeastern Avoyelles Parish is more than 15,000 feet.

The most prominent structural features that affected deposition were the Sabine uplift and the LaSalle arch. The dip is steep on the south flanks of both. South of them, the dip ranges from 150 to 200 feet per mile toward the Gulf. The northern edge of the central Louisiana area is believed to have acted as a hinge line between a platform area on the north and a basin on the south.

A sandstone-limestone percentage map of Hosston sediments indicates that potential Hosston sandstone reservoirs may be present in Caldwell, Richland, and Franklin Parishes. There may be a reef of Hosston age across southern Vernon, Rapides, and Avoyelles Parishes.

Potential reef and stratigraphic traps are expected to be present in the Glen Rose of central Louisiana. Although shallow-water platform limestones of Washita-Fredericksburg age may have culminated southward in a structurally higher reef complex along the outer edge of the southern platform, post-Comanchean uplift and erosion probably removed this objective section.

The zero line of porous sand in the Tuscaloosa runs diagonally across Louisiana from northeast DeSoto to northern Avoyelles Parishes. South and west of this line, little porous sand can be expected to be present in the Tuscaloosa section. The best potentials for Austin and Taylor production are in the form of faulted chalks. Sediments of Navarro age are absent in this area.

The calculated volume of ultimate recoverable Cretaceous oil in North Louisiana is 1,760 MM barrels, or approximately 117,000 barrels per cubic mile. Based on this figure, a total of 819 MM barrels of ultimate recoverable Cretaceous oil are expected to be present in central Louisiana.

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CENTRAL TEXAS LOWER CRETACEOUS STRATIGRAPHY

The Trinity Group is divided into a lower unit consisting of the terrigenous Hosston Formation overlain by the carbonate Sligo; a middle unit called the Pearsall, made up of the Hammett shale, Cow Creek limestone, and Bexar shale; and an upper unit which includes the Hensel sand, overlain by the Glen Rose limestone.

Limestone, dolomite, and marl of the section between the base of the Upper Trinity and the top of the Edwards were deposited in shallow water behind the Stuart City coral-rudistid barrier reef. Lower Glen Rose reefs and the Stuart City reef formed the southwestern, southern, and eastern barriers of the Ferry Lake anhydrite evaporation pan.

The Fredericksburg Group includes the strata between the base of the Bee Cave limestone and the base of the Kiamichi.

The Washita Group includes the Kiamichi, middle (Kiamichi) Edwards, upper Edwards, Georgetown, Del Rio, and Buda formations. The upper, or the lower Edwards should be renamed.

Structural elements which affected Lower Cretaceous deposition include the spasmodically positive Belton

high (new term), the Round Rock syncline (new term), two synclinal troughs behind the Stuart City reef, and the Sample fault system (new term). Up-to-the-coast faults are dominant southeast of the axes of the synclinal troughs, and down-to-the-coast faults are dominant northwest.

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APPLICATION OF MARINE ECOLOGY IN THE GULF COAST TERTIARY

Recent studies of sediments and faunas on the present continental shelves and slopes of the world have afforded paleoecologists many valuable data for interpreting the depositional history of older rocks. The thick subsurface wedges of marine and shore-line sediments in the Gulf Coast Tertiary, and their contained faunas, lend themselves ideally to paleoecologic interpretations using principles developed from studies of modern distributions.

Characteristics of modern faunas, principally the Foraminifera, have been most useful in Tertiary sediments. Specific and generic distributions where applicable are most diagnostic. Non-specific characteristics such as gross population characteristics, generic dominance, faunal diversity, and morphology become more useful in older Tertiary rocks.

The application of these characteristics in the Texas Gulf Coast Oligocene allows the construction of essentially time-stratigraphic paleogeographic maps and interpretation of the depositional history of Oligocene sediments. Such interpretations are essential to a valid understanding of subsurface stratigraphy.

S.E.P.M. ABSTRACTS

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DISTRIBUTION OF FORAMINIFERA AND OSTRACODA OFF THE GULF COAST OF THE CAPE ROMANO AREA, FLORIDA

Four benthonic foraminiferal and ostracod assemblages are recognized in the Cape Romano area, corresponding with four vaguely defined environments. They include the following: (1) a marsh river assemblage; (2) a lagoonal assemblage; (3) a mangrove island assemblage; and (4) an open-gulf assemblage.

Distribution patterns of both faunal elements are similar. Patterns of distribution appear to be the function of a combination of ecologic factors rather than a single factor, with correlation observed with organic carbon content of bottom sediments, mean grain size of bottom sediments, salinity-temperature of bottom water, and submarine topography.

There is evidence that an acid environment exists in the highly organic, fetid, gelatinous oozes which cover the bottoms of large tracts within the marsh river, lagoonal, and mangrove island regions. This condition could conceivably result in the total destruction of both faunal elements after burial.

The foraminiferal fauna consists of 47 genera and 118 species, of which 98 are referred to known forms. The ostracod fauna consists of 38 genera and 88 species. Sixty-six of these are identified specifically.

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Bigenerina humblei AND THE HUMBLE H. L. ELLENDER

NO. 1, LIRETTE FIELD, TERREBONNE PARISH,
LOUISIANA

The Humble Oil and Refining Company, H. J. Ellender No. 1, sec. 32, T. 19 S., R. 19 E., Lirette field, Terrebonne Parish, Louisiana, is the type locality for *Bigenenerina nodosaria directa*, *Cibicides carstensi*, *Uvigerina liretensis*, *Globorotalia fohsi fohsi*, and *Globorotalia mayeri*, stratigraphically important Miocene marker species described by Cushman and Ellisor (1939). *Globorotalia fohsi fohsi*, ranging from the *Cibicides carstensi opima* zone upward through the *Bigenenerina humblei* zone, has been used extensively for intercontinental correlation of Miocene deposits.

Ellisor (1940) reported *Bigenenerina humblei*, *Uvigerina liretensis*, and *Globorotalia fohsi fohsi* at 9,612 feet, the sample depth from which she and Cushman had earlier described *Globorotalia fohsi fohsi* and *Globorotalia mayeri*. Additional deeper drilling and later work has proved that the Humble Ellender No. 1 well penetrated sediments no older than *Bigenenerina nodosaria directa-Cibicides carstensi* and that the deepest well in Lirette field, the Humble H. J. Ellender No. 6 (also located in sec. 32), drilled to 13,500 feet, did not encounter the *Textularia stapperi* zone which overlies the *Bigenenerina humblei* zone.

In order to establish that *Bigenenerina humblei* could not have occurred at 9,612 feet in Lirette field, and that the Humble Ellender No. 1 well should not be considered a valid type locality for *Globorotalia fohsi fohsi* and *Globorotalia mayeri*, two cross sections have been constructed; A-A' from Raceland field, Lafourche Parish, to Bay Baptiste field, Terrebonne Parish, and B-B' from Patterson field, St. Mary Parish, to Lirette field. The two sections depict the general downdip (coastward) thickening of the Miocene section and the tremendous sedimentary accumulations encountered on the downthrown sides of the large "growth" or depositional faults typical of the area.

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Robulus "43" AND *Discorbis* "4"—TWO USEFUL MIOCENE FORAMINIFERA IN LOUISIANA

For a number of years a foraminiferal species, commonly designated *Robulus* "43" by economic paleontologists, has been used to mark a biostratigraphic zone in the Miocene post-Anahuac sedimentary sequence of south Louisiana. In the petroleum industry this species has also been known as *Robulus* "L," *Robulus* "4," and *Cristellaria* "angular." A paper describing and naming this species and its associate *Discorbis* "4" has been submitted to the Journal of Paleontology for publication (Butler, in press).

Regionally, the *Robulus* "43" zone lies stratigraphically below the *Cibicides carstensi opima* and *Amphistegina* "B" zones and above the *Operculinoides* sp. zone. The *Amphistegina* "B" fauna generally occurs 100 to 200 feet above the *Robulus* "43" zone, but tends to climb stratigraphically in the section along strike and to the southwest. Since *Robulus* "43" shows less stratigraphic variation than the *Amphistegina* "B" fauna, it is considered a more reliable regional marker on which to base correlations.

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FORAMINIFERAL POPULATIONS AND FAUNAS IN THE BARRIER REEF AND LAGOON OF BRITISH HONDURAS

Eighty-nine sediment and 41 bottom-water samples were collected from the barrier reef and lagoon of British

Honduras. The sediment samples were obtained with a gravity coring tube and a Van Veen grab sampler. The top 1 cm. or 10 ml. of wet sediment of each core or grab sample was used to study the contained Foraminifera. The temperature and salinity of each bottom-water sample were measured.

Living and total (living and dead) foraminiferal populations were determined in each sediment sample. The largest populations on the barrier reef occur on the leeward side of mangrove and coral sand cays.

The Barrier Reef fauna was typified by the restricted occurrence of some species of the families Alveolinellidae, Amphisteginidae, Cymbaloporidae, Peneroplidae, and Rotaliidae, and abundant and diversified Miliolidae.

The Lagoon fauna was characterized by the abundant occurrence of species of *Elphidium* and *Nonian*, and the relatively common occurrence of variants of *Streblus beccarii*.

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PALEOECOLOGY OF THE CHOCTAWHATCHEE DEPOSITS AT JACKSON BLUFF, FLORIDA

The Choctawhatchee (late Miocene) deposits exposed at Jackson Bluff, on the Ochlockonee River, are composed of two fossiliferous units separated by a slight erosional disconformity.

Comparison of fossil molluscan and foraminiferal assemblages with extant communities in the Gulf of Mexico, western Atlantic, and Caribbean indicates that the Choctawhatchee sediments were deposited in an open-marine near-shore shallow to intermediate shelf zone, at depths of less than 21 fathoms.

The lower part of the lower unit ("*Ecphora* facies") is transgressive over the nonmarine Hawthorne (medial Miocene?), and the deposits representing maximum water depth for the section lie a few feet above the base of this unit. The upper part of the lower unit was deposited under shoaling conditions. The overlying unit ("*Cancellaria* facies") is transgressive, but was deposited at a depth of less than 8 fathoms.

The terms "*Ecphora* facies" and "*Cancellaria* facies" as applied to this section, are rejected.

Comparison of the Jackson Bluff Choctawhatchee deposits with those at Alum Bluff, Liberty County, Florida, indicates that the lower unit at Jackson Bluff is contemporaneous with Units 2 and 3 ("*Ecphora* shell bed") and Unit 4 (Aluminous clay) at Alum Bluff, and that the upper unit at Jackson Bluff is contemporaneous with the upper Choctawhatchee sand (Unit 5) at Alum Bluff.

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BIOSTRATIGRAPHY OF SOUTH-CENTRAL LAFOURCHE PARISH, LOUISIANA

A biostratigraphic study of south-central Lafourche Parish, Louisiana, was undertaken to solve some of the structural and stratigraphic problems of the area. Samples from wells in Valentine, Bully Camp, Golden Meadow, Leeville, and Bayou Raphael fields in Lafourche Parish were examined paleontologically. Samples from one well in Bayou Jean LaCroix field in eastern Terrebonne Parish were examined. Results of these paleontological examinations served as the principal source of regional correlations; electrical logs were also used at key locations when samples were not available, or were not collected from high enough in a well for the uppermost occurrence of index forms to be observed.