dominates the interpretation and other disciplines increase the confidence level.

Interpretive procedures illustrated are: a regressive marine wedge in the Miocene sedimentary rocks of Terrebonne Parish, Louisiana; supralittoral, littoral, and sublittoral sequences in the Oligocene sedimentary rocks of Starr County, Texas; and a channel system in the Cretaceous lower Tuscaloosa sedimentary rocks of Amite County, Mississippi.

8. GULF COAST SECTION S.E.P.M. STUDY GROUP

INTERPRETATION OF DEPOSITIONAL ENVIRONMENT IN GULF COAST PETROLEUM EXPLORATION FROM PALEOECOLOGY AND RELATED STRATIGRAPHY

Paleoecology is the relationship between ancient organisms and their environment. Interpretation of the depositional environments of foraminiferal species in the geologic section is based largely on information calibrated from studies of the habitat of Recent Foraminifera. In Gulf Coast clastic rocks, oil and gas occur most commonly in strandline or nearshore sediments composed of interbedded transgressive shallow-marine and regressive non-marine strata. Large deltas that formed in rapidly subsiding basins are typical of this environment. In carbonate rocks, reefs with back-reef bays and lagoons in brackish- and shallow-marine environments are favorable for oil and gas occurrence.

Accurate paleoecologic interpretation depends on sufficient knowledge and consideration of the associated lithologic types, sedimentation, and tectonics which are related components of stratigraphy. Gulf Coast sedimentation occurred in a mediterranean basin, and structural features, both regional and local, have affected deposition. An estimated 40,000 ft. of Cenozoic clastic sandstone and shale underlying the Texas-Louisiana coast thins eastward to a thickness of approximately 5,500 ft. under Florida where the terrigenous rocks grade into carbonate rocks. Eight major transgressive-regressive cyclic depositional units comprise Gulf Coast Cenozoic sedimentation; the units are Midway-Wilcox, lower Claiborne, upper Claiborne, Jackson, Vicksburg-Frio, Anahuac, Fleming, and Quaternary. Paleoecologic or depositional environment zones are classified as transitional, inner shelf, middle shelf, outer shelf, upper slope, lower slope, and abyssal.

9. ROBERT E. GERNANT AND ROBERT V. KESLING, University of Michigan, Ann Arbor, Mich.

FORAMINIFERAL PALEOECOLOGY AND PALEOENVIRONMENTAL RECONSTRUCTION OF OLIGOCENE MIDDLE FRIO IN CHAMBERS COUNTY, TEXAS

Middle Frio, here defined as material deposited from the time of *Anomalina cocoaensis* until the time of *Nonion struma*, has sedimentary rocks deposited in seven depositional environments in the subsurface of Chambers County, Texas: continental, brackish, saline bay, shallow inner shelf, deep inner shelf, middle shelf, and outer shelf. From the absence or abundance of various foraminiferal species, environments can be delineated by comparison of the Frio assemblages with the preferred distribution of living Foraminifera.

In Chambers County, eight persistent sandstone bodies can be recognized and correlated on the basis of seven foraminiferal chronologic indicators and of distinctive electric-log characteristics. Isopachous contour maps, incorporating thicknesses of sandstone bodies from approximately 400 electric-log sections, suggest depositional environments of the sandstone bodies.

The county is crossed by a system of middle Frio growth faults. Faunal analyses of sedimentary units indicate that topographic relief existed on the upthrown sides of the faults during deposition, and that turbidity currents periodically moved shallow-water sediments and their contained faunas to deep water on the downthrown sides.

Environments indicated on paleobathymetric maps, constructed from faunal analyses of 13 wells, correspond closely to the environments suggested by geometry of the sandstone bodies.

10. J. M. COLEMAN, Coastal Studies Institute, Louisiana State University, Baton Rouge, La.

ECOLOGICAL CHANGES IN MASSIVE FRESH-WATER CLAY SEQUENCE

Cored borings of Recent swamp deposits in the Atchafalaya basin presented a difficult problem in deciphering ecological changes. The fauna was either absent or badly leached; grade-size parameters remained nearly constant from top to bottom; and the 100 ft.-cored section consisted of "massive-appearing" clays. X-ray radiographs of core slabs, however, revealed a varied assemblage of primary, secondary, and post-depositional sedimentary structures and epigenetic and syngenetic inclusions.

Five environmentally controlled facies were recognized in the borings: poorly drained (stagnant) swamp; well-drained swamp; fresh-water-lacustrine; lacustrine delta fill; and channel fill. Overlying a cross-bedded sand and gravel substratum (braided channel-fill deposits) is a 10-ft. layer of swamp clay. Large carbonate and iron concretions, finely disseminated iron cement, and replacement of organic fragments by iron oxides attest to high-oxidizing conditions. Near the top of the layer, there is a gradual change to more reducing conditions and stable water levels. As the rate of sedimentation decreased, 22 ft. of highly organic clays was deposited in a poorly drained swamp environment. High pyrite and vivianite content, siderite concretions, high organic layers, and intensive root burrowing characterize this unit. As sedimentation rates increased, conditions gradually changed to allow better drainage; the accumulated clays are similar to the lowermost clay unit. During accumulation of this 12-ft. sequence, water levels apparently fluctuated considerably, because intensive leaching is apparent. A sharp reduction in sediment supply and compaction of previously deposited clays resulted in the formation of a large lake. Thirteen ft. of "massive" lucustrine clays was then deposited. Radiographs revealed that the lower part is highly burrowed, and few remnants of primary stratification remain. The upper section, however, consists of alternating laminations (0.1-2 mm. thick) of differing X-ray absorption caused from alternating layers of well-oriented clay particles (flocculated settling), as well as local concentrations of colloidal organics and carbonates. Sedimentation rates gradually increased, and normal lacustrine sedimentation was interrupted by an advancing lacustrine delta. Twelve ft. of alternating silt, silty clay, and clay forms this facies. A fresh-water shell layer marks the final fill of the lake. Poorly drained swamp conditions were established again and apparently continued uninterruptedly, until the present. Subsequent diagenic changes include growth of concretions, gradual change in concretion composition with depth, and enrichment of certain layers in carbonate.