The pore system is almost entirely of secondary origin, having resulted from the partial dissolution of labile framework grains and carbonate cements. The most effective stimulation of these reservoirs appears to be an acid-enhanced hydraulic fracture.

LEE, ALISON, Univ. Alabama, University, AL (now with Amoco Production Co., New Orleans, LA)

Lithofacies and Depositional Environments of Middle Ordovician Shelf Carbonates in Southern Appalachians

Detailed field and laboratory observations are the basis for the description of 13 lithofacies in the Middle Ordovician Chickamauga Group in Jefferson County, Alabama. These lithofacies, including stromatolitic, fenestral and bioturbated mudstones, and varieties of skeletal and peloidal wackestones, packstones and grainstones, represent deposition in seven major environments: high intertidal, low intertidal, tidal channel, subtidal wave baffle, subtidal bar, subtidal bank, and subtidal level bottom. Middle Ordovician deposition began on the extremely irregular karstic surface of the Cambro-Ordovician Knox Dolomite. A lag deposit of reworked dolomite and chert clasts (Attalla Member) is overlain by intertidal deposits. High and low intertidal lithologies vary laterally in thickness in response to deposition over highs present on the irregular Knox surface. With continued transgression, shallow-water facies were succeeded by a suite of subtidal deposits composed dominantly of level-bottom lithologies deposited below wave base. Changes in sedimentation and/or subsidence led to a gradual shallowing and deposition above wave base. Coarse-grained, high-energy tidal bars and skeletal bank deposits dominate this part of the sequence. In the southern part of the study area, subtidal level-bottom lithologies dominate the upper part of the Middle Ordovician sequence. To the north, these lithologies grade laterally into shallower subtidal and intertidal lithologies. The sequence is unconformably overlain by the Upper Ordovician Sequatchie Formation.

LOCK, BRIAN E., Univ. Southwestern Louisiana, Lafayette, LA

Toward a Better Understanding of Gulf Coast Miocene Deep-Water Sediments

Deep-water sands are known from many localities in the lowest Miocene of the Gulf Coast. They are recognized by a combination of paleontologic, conventional core, wireline log, and regional setting criteria. Almost invariably, subsurface geologic interpretations are difficult to make because of correlation problems. Turbidite deposition probably took place in deep-sea fan environments in most cases, but conventional models for these fans are over-simplified for application in studies of the Gulf Coast Miocene. The Miocene outer continental shelf and slope were not characterized by smooth, simple topography, but were extremely irregular, due principally to salt and shale tectonics. Thus the Walker and Mutti and Ricci-Lucchi fan model is inadequate and serves only as a starting point for Miocene studies.

Turbidite sand bodies in this setting can be classified into three major types: major channel deposits, levees, and suprafan lobes. In the Walker model, major incised channels with levees are characteristic of the upper fan, and suprafan lobes in the mid-fan, but in the Miocene they occur together in a complex manner. In the simplest cases we might anticipate that the channels cut through the lobes, resulting in rapid lateral facies change.

Recommended procedure for mapping and interpretation involves preparation of panel diagrams after initial correlations have been made as completely as the data permit. Reduced-scale log segments are pinned on a large-scale base map, channel trends are identified, and the channel sands contoured, to the exclusion of other data. Lobe sand bodies are then contoured as a secondary operation and a composite sand or net sand isopach prepared. Abrupt changes in contour trend will occur where lobe and channel sands meet, and the two stage contouring process will yield much more accurate isopachs, and give a better tool for prediction of sand body extensions.

LOCKLIN, JO ANN, Getty Oil Co. Research Center, Houston, TX, and ROSALIE F. MADDOCKS, Univ. Houston, Houston, TX

Recent Foraminifera Around Petroleum Production Platforms on Southwest Louisiana Shelf

In the spring, summer, and winter of 1978-79, 673 samples were taken from around petroleum production platforms and control sites on the southwest Louisiana continental shelf to assess the effects of long-term petroleum exploration, drilling, and production activity on marine organisms. The 64,326 living Foraminifera recovered represent 51 species and 35 genera.

Standing crops are high (up to 3,294 living Foraminifera per 10 cm^2), because of the large quantities of available food supplied by the Mississippi River, and because a wet picking method was used that preserved juvenile and delicate tests. Species diversity is generally low; two species, *Nonionella basiloba* and *Buliminella bassendorfensis,* account for nearly 76% of the total population. The species composition varies somewhat with season, water depth, and physical conditions.

The statistical analyses show little negative effects of petroleum operations on the benthic Foraminifera of this area. The foraminiferal populations are controlled by the physical parameters of this naturally stressed environment, especially by water depth, temperature and salinity fluctuations, sediment movement, and dissolved oxygen values. Proximity to platforms appears to cause no adverse effects on the organisms.

MAZZULLO, JIM, Texas A&M Univ., College Station, TX

Grain Shape Analysis—Application to Problems of Sediment Source and Transport

The shapes of quartz grains contain a valuable record of their source and transport history. Grain shape can be measured with a Fourier series in closed form, which calculates the relative contribution, or amplitude, of 20 separate shape components (harmonics) to the total grain shape. Subsequent analysis of these grain shape data can determine the number of grain shape types (end members) present in a suite of samples and their relative contribution in percentages to each sample; a knowledge of the nature and mixing proportions of end members, contributes to a better understanding of the source, transport history, depositional environment, and stratification of basin fill.

Two studies have been used to illustrate this technique. The first is a study of the Pleistocene sediments of the Hatteras basin, in which grain shape was used to monitor the input of sediments from two sources. The second is a study of the St. Peter Sandstone of Minnesota, in which grain shape was used to map eolian and aqueous beds in three massive, homogeneous sections of the formation.