of error in the interpretation of recent basin deposition. Visual and radiographical comparisons of samples from a piston corer with samples from a gravity corer used at the same stations confirms the existence of highly incompetent layers previously only suspected. The detection of these layers in a more consolidated sedimentary column, as well as undetected shortening of samples obtained by piston and gravity corers, is important if the sedimentary history and the engineering properties are to be examined.

J. W. ANTOINE AND W. R. BRYANT, Texas A&M Univ., College Station, Tex.

MAJOR TRANSITION ZONES OF GULF OF MEXICO: DESOTO AND CAMPECHE CANYONS

Deep well information throughout the Gulf of Mexico coastal plain has indicated that the Gulf margins can be divided into two distinct provinces, the subsided southeastern section which is underlain by carbonate rocks and the northwestern section that is underlain mainly by terrigenous clastic rocks. In the latter area there is complicated surface and subsurface structure controlled mainly by the influence of upward salt migration. Recent geophysical studies in the offshore areas indicate that DeSoto Canyon is the transition zone between the terrigenous clastic and carbonate provinces in the northern Gulf and that the Campeche Canyon plays a similar role in the southwestern part of the basin. Most salt diapirs in the region lie west of a line connecting the two canyons, but recent work suggests the presence of some diapiric structures east of the line.

The geophysical data from the DeSoto Canyon indicate that erosion has played an important part in its development. Two mechanisms for the formation of the canyon are suggested: (1) the loop current of the eastern Gulf of Mexico and associated circulation in the northeastern Gulf have sufficient velocity along the bottom during specific periods of time to effect a scouring action and/or keep sediments in suspension; and (2) erosion by turbidity flows takes place during periods of low sea-level stands associated with glacial stages. The fact that the DeSoto Canyon extends across parts of two distinct geologic provinces, the northeast Florida platform and the Mississippi cone, adds credence to an hypothesis involving erosional rather than tectonic processes.

Although there are insufficient data available to determine the origin of the Campeche Canyon, it is suggested that, unlike the DeSoto Canyon, its topographic expression probably is more the result of adjacent salt tectonics than of erosion. Some workers suggested that an alignment from the DeSoto Canyon to Campeche Canyon may represent a fracture zone across the Gulf basin. The hypothesis that this alignment forms the southeastern boundary of the Gulf of Mexico salt province is contradicted by the presence of diapirs in northwestern Matanzas Province, Cuba, and by the discovery of some possible diapiric structures in the Florida Straits and Yucatan Channel.

W. R. BRYANT AND CHARLES S. WALLIN, Texas A&M Univ., College Station, Tex.

STABILITY AND GEOTECHNICAL CHARACTERISTICS OF MARINE SEDIMENTS, GULF OF MEXICO

Studies of shear strength and consolidation characteristics of marine sediments were made from the following four major provinces of the Gulf of Mexico: Mississippi fan, Gulf abyssal plain, Texas-Louisiana continental slope, and Mexican continental slope. These studies indicate that the sediments in these regions, to a depth of 10 m below the sediment-water interface, are stable in their present environment.

Shear-strength *versus* normal-stress plots indicate that minimum average values of o (angle of internal friction) ranges from 11° for the Texas-Louisiana and Mexican continental slope sediments to 10° for the Mississippi fan and abyssal plain sediments. Average values of o ranged from a high of 20° for the Texas-Louisiana continental slope sediments to 16° for Mississippi fan and abyssal plain sediments.

M. MALEK-ASLANI, Tenneco Oil Co., Houston, Tex.

HABITAT OF OIL IN CARBONATE ROCKS

Entrapment of oil in carbonate reservoirs can be explained by analysis of (a) depositional environment, (b) diagenetic changes, (c) structural history, and (d) fluid mechanics.

Favorable reservoir rocks in carbonate environments include reefs, bioherms, oölite bars, and porous skeletal calcarenite. Production of organic material in such environments (with the exception of oölite bars) is prolific, but under normal conditions a major part of the organic soft parts are destroyed by bacteria scavengers and early diagenesis, whereas skeletal parts are preserved. Early diagenesis modifies the texture and the original porosity of carbonate deposits by recrystallization, solution, cementation, and replacement. Under favorable conditions, dolomitization enhances the reservoir characteristics of the carbonate sediment.

Hydrocarbons are found in cyclic carbonates which were deposited on unstable shelves and subjected to recurrent sea-level fluctuations with periodic influxes of terrigenous clastic material. Under a cyclic regime of sedimentation, a reservoir-type carbonate facies can be covered by sapropelic shale, evaporite, or basinal facies. This stratigraphic relation, in addition to providing an adequate seal, also can be suitable to preservation of organic soft parts within the reservoir facies. In the writer's opinion, cyclic sedimentation in carbonate rocks could explain *in situ* accumulation of hydrocarbons in carbonate rocks under certain favorable conditions.

The oil generated in carbonate rocks is subject to secondary migration as a result of structural deformation. An understanding of fluid mechanics is very useful for explanation of some peculiarities of oil distribution within the carbonate traps.

Tectonic setting of the carbonate shelf, relative to the stable nuclei and the mobile margins of the continents, has a profound influence on the type of trapping mechanisms likely to be found in the carbonate rocks.

ED GOODIN, Petroleum Information, Houston, Tex.

REINTEGRATION. SYNTHESIS EDP TECHNIQUES IN GEOLOGY

Information elements observed, defined, classified, and recorded by the variety of geological sciences are in focus with the aid of computer, mathematical, and information sciences. These information elements now can be tested for validity, reinforced in meaning, displayed for understanding, and combined semantically. Information elements normally kept segregated in specialty data files now can be integrated in new in-