

in 13 sections of late Paleocene and early Eocene strata yields a series of possible subdivisions. These subdivisions may be considered analogous to biostratigraphic zones, but they are defined in terms of a given level of the probability that a particular sequence is due to nonrandom distribution of species occurrences. Considering 144 species, and using a level of probability greater than 0.8, sequential relations exist between the lowest occurrences of 87 and between the highest occurrences of 86 of the species. Eleven stratigraphic intervals can be recognized using lowest occurrences exclusively and 9 intervals using highest occurrences exclusively. The limits of each interval can be defined in terms of mutually random occurrences of several different species.

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STONE CITY AND COOK MOUNTAIN (MIDDLE EOCENE)
SCAPHOPODS FROM SOUTHEAST TEXAS

Middle Eocene exposures on the Brazos and Little Brazos Rivers yield numerous specimens of a wide variety of fossils, especially mollusks. Although this fauna has been known to paleontologists for many years, relatively few of the fossil groups have received a detailed analysis.

Eighteen species of scaphopods have been found in the Stone City and Cook Mountain (Claibornian) Formations of the Brazos River valley. These include 11 species of *Cadulus*, 4 of *Dentalium*, and 3 of *Fustiaria*. Of these, 10 species are new.

Apical fragments show that some scaphopods truncate their apices by periodically discarding a significant portion of the test. By some mechanism or process, probably absorption, shell material is removed at a distance from the apex. The configuration of this shell removal is such that apical slits or grooves are already formed when truncation occurs. After truncation a pipe or sheath, which extends from the orifice of the truncated apex, may develop.

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STRATIGRAPHIC ANALYSIS OF DIPLOGS

Recently, the diplog has been used to estimate stratigraphic conditions of the formations penetrated by a borehole. In particular, the diplog frequently can be utilized to predict the trend, direction of thickening, and movement of depositing currents in channel- and barrier-bar sandstones.

Because of compaction and bifurcation, channel sands tend to be more complex and difficult to interpret using a diplog. However, barrier-bar sands commonly can be interpreted correctly from the diplog.

Many thick sequences of fluvial sands do not exhibit channel-dip patterns. In some problems, the use of statistical analysis is useful. In many instances, the determination of the type of sand from a diplog in fluvial sequences will be difficult.

Barrier-bar sands exhibit several different types of crossbedding depending on the relative importance of tides, longshore currents, and onshore winds in forming and modifying these deposits. The present interpretational techniques for this type of deposit use differential compaction of the overlying shales as a key to the analysis.

The general interpretation of diplogs for stratigraphic information requires the use of statistical plots. The polar coordinate (modified Schmidt) and azimuth frequency plots especially are useful in the analysis of certain stratigraphic anomalies.

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OCURRENCE AND ALTERATION OF CLAY MINERALS IN
CARIBBEAN SEA

Both vertical and horizontal trends in clay mineralogy are examined in cores from the southwestern and central Caribbean. X-ray diffraction, differential thermal analysis, infrared spectroscopy, and electron micrography are used to determine the clay mineralogy. Montmorillonite, vermiculite, mica, kaolinite, chlorite, halloysite, allophane, and gibbsite are identified by the above methods.

Alteration of clay minerals in the marine environment is examined by noting the trends between cores for various selected ratios. Diagenesis of a clay mineral is defined as the alteration of the mineral in such a way that it loses its identifying characteristics. Gibbsite and allophane probably alter to halloysite in the marine environment. Ratios for vermiculite and mica show a decrease in vermiculite with distance from the river mouth. Ratios for montmorillonite to mica show an increase in montmorillonite with distance from the river mouth. The chlorite to mica ratio also shows a decrease in a seaward direction, probably the result of both the alteration of chlorite and the increase in mica. A slight decrease is seen in the ratios for kaolinite and mica in a seaward direction due to mica forming at a faster rate than kaolinite. The chlorite to kaolinite ratio decreases in a seaward direction due to both the alteration of chlorite and development of kaolinite. The clay mineral ratios for the vertical profiles show an irregular pattern. Changes in source area or climate are stronger factors than marine alteration in determining the vertical trends in surface sediment cores.

Differential transport is seen in the montmorillonite and halloysite concentrations. Both minerals increase in a seaward direction. Their small particle size causes them to avoid coarsenate formation and flocculation upon initial entrance into the marine environment.

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INTERACTIVE GRAPHICS IN PETROLEUM EXPLORATION

During the past 10 years the digital computer has been used to assist in many of the discrete functions of petroleum exploration. However, the total petroleum exploration process requires that many discrete activities be carried out in varied and complex combinations to achieve the goal of anomaly isolation and evaluation. This process can be enhanced by a geologist operating interactively with a computer to select and control the sequence of functions. Communication between man and machine can be carried out by means of a cathode ray tube display.

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WHERE WE ARE IN NUCLEAR POWER DEVELOPMENT

No abstract available.

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MISSISSIPPI AND MEKONG DELTAS—A COMPARISON

The areal extent, the recent geologic history, and the landforms that have developed in the Mekong and Mississippi deltas generally are similar. Discharge, velocities, and stage variation are reasonably alike. Sinuosity, the rate of bank migration, delta growth and subsidence, and shoreline configuration and growth are