longer distances within the San Diego trough. Parallel and current-ripple cross-lamination, as well as imbricated mud pebbles, reworked from the underlying old clay, are more abundant than distinct grading. Study of grain fabrics (imbrication) by the use of magnetic susceptibility anisotropy and evaluation of cross-lamination foresets generally show downslope direction of sediment transport, confined to the canyon-fan valley system. Current measurements and observations from deep submersible vehicles indicate that bottom currents capable of transporting medium to coarse sand have a pulsating (tide-related?) flow (maximum velocity, 10–25 cm./sec.) both up and down La Jolla Canyon. These data suggest that probably most of the sand in water depths up to 1,100 m. was transported, or at least reworked, by ordinary tractive bottom currents (or diluted "steady" suspension currents), rather than by occasional "spasmodic" turbidity currents.

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RELATION OF HYDROCARBON ACCUMULATION TO DELTAIC SEDIMENTATION IN WESTERN KENTUCKY

Deltaic and fluvial sedimentation processes are recognized as primary dispersal mechanisms that operated to contribute sediments to the Chesterian depositional area in Illinois, Indiana, and Kentucky.

As the fluvial cycle was initiated, erosion channels were incised into the underlying strata. Clastic sediments were delivered to the depositional area by the Michigan River system. The channel fill may be traced from its outcrop into the subsurface and across Kentucky more than 300 miles. The fill may be projected, with considerable success, into areas where few tests have been drilled. Successful projections have been accomplished by making isopachous maps of the channel fill. Once the distributary network is outlined, a direct relation is apparent between the channel system and hydrocarbon accumulation within the Bethel Sandstone. The recently discovered Midland, St. Charles, Barnsley, Luzerne, and Sharon School fields occur within the distributary network.

All of these fields are combination traps. They are restricted to the channel fill and are localized by subsequent structural deformation.

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COMPACTION TESTS ON ARAGONITIC SEDIMENT

Microcrystalline aragonite from the Bahama Banks was compacted in the laboratory at pressures from 10^{-1} to 10^{5} psi. at room temperature; the effects of heating were explored. The important conditions affecting the maximum compaction were total pressure, rate of loading, rate of removal of water, grain-size, and cohesion of grains. Conditions having a minor effect were initial water content, time period of compaction (for periods of more than 3 hours), and temperature (for water-saturated samples).

A new parameter is proposed to characterize compaction: grain proportion (g), which is equal to the volume of grains divided by the bulk volume; g is equal to one minus porosity expressed as a decimal fraction. Grain proportion is a useful index of compaction because it is also the ratio of the dry bulk density to the grain density of the sediment, and thus is a linear measure of the approach to solid rock.

The effect of raising the pressure from 1 psi. to 10^{5} psi. on Bahaman aragonitic sediment is to increase the compaction from $g = 0.3$ to $g = 0.8$. Rapid loading of the sediment (at 10^{4} psi./min.) results in differential compaction ranging from $g = 0.85$ under the moving piston to $g = 0.65$ at the stationary piston; differential compaction also seems to occur at very slow loading rates (10^{-6} psi./min.). Constricted egress of water as the sediment is compressed can reduce the amount of compaction by $\Delta g = 0.1$. Sediment of 1μ median grain-size compacts to $g = 0.5$ under 500 psi., but sediment of 200μ median grain-size compacts only to $g = 0.4$ under the same pressure; furthermore, the compacted coarse sediment falls apart, but the fine sediment is relatively coherent.

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BIOSTRATIGRAPHY OF BLAKE PLATEAU (ATLANTIC) DRILL-HOLE SAMPLES

Paleontological study of cored sediments from six drill holes on the continental margin off eastern Florida, in water depths ranging from 25 to 1,030 m., has made possible the reconstruction of faunal successions of planktonic Foraminifera through most of the Tertiary. The oldest assemblage cored includes species characteristic of the middle Paleocene *Globorotalia pusilla pusilla* Zone. With the exception of the Oligocene, the foraminiferal sequences present beneath the continental shelf, Florida-Hatteras slope, and Blake plateau are in general accordance with those established in the Caribbean region for marine beds now exposed on land. The Oligocene interval is identified on the basis of foraminiferal faunas found in the Vicksburg Group of the Gulf Coast, this equivalent being absent from the otherwise well-developed Tertiary of Venezuela and Trinidad. Miocene sections are best developed in J-3 hole in the southeastern part of Blake plateau, where approximately 49 m. of lower Miocene, 16 m. of middle Miocene, and 10 m. of upper Miocene consist entirely of *Globigerina*-ooze facies.

A marked contrast in sedimentary facies, *i. e.*, shallow-water calcarenite and silty phosphatic clay in nearshore holes, versus *Globigerina*-coccolith ooze in offshore holes, appears to have persisted from Eocene through Miocene times. Eocene and Oligocene sediments from nearshore sites contain assemblages of planktonic Foraminifera mixed with the benthonic species characteristic of Gulf Coast stratigraphy, thus enabling clear correlation of the Gulf Coast stages with established planktonic foraminiferal zones.

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ROLE OF KINETICS IN EARLY DIAGENESIS OF CARBONATE SEDIMENTS

Because most modern carbonate sediments are a mixture of several metastable carbonate phases, studies of such deposits necessarily represent instantaneous observations of disequilibrium systems which may be undergoing slow but significant change. Conventional thermodynamic (equilibrium) models may be of little value in interpreting such observations, but kinetic and steady-state models promise to afford a clearer understanding of depositional and early diagenetic processes in natural environments.