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ROLE OF COMPACTION IN DEVELOPMENT OF GEOMETRY OF SUPERPOSED ELONGATE SANDSTONE BODIES

Pennsylvanian and Permian nearshore facies on the eastern shelf of north-central Texas contain channel-fill sandstone bodies, which have been mapped from the outcrop westward down the paleoslope for 50 miles. These elongate sandstone bodies range in width from several yards to 3–4 miles and in a few places are more than 100 feet thick. Where the thickness values of the subsurface dendritic (distributary) sandstone bodies are unusually great, sandstone from subjacent bar-finger deposits probably has been included.

Within shallow, poorly developed synclines, which apparently provided primary paleotopographic control of channels, superposed channel systems commonly are offset laterally as a result of (1) interchannel subsidence by differential sandstone (channel)-shale (interchannel) compaction and (2) channel subsidence by compaction of sediments beneath massive channel-fill sandstones. The common offset patterns of superposed channel pairs is mainly a result of dominant interchannel compaction. Stacked or cross-over relations of channel pairs are less common and occur where the lower member is unusually thick. Channel-pair intersect maps illustrate the persistent geographic position of stacking and cross-overs, which may reflect tectonic control of channel location.

Because of differential sandstone-shale compaction, axes of sandstone bodies commonly coincide with maximum thicknesses of thin, conformity-bounded sequences which enclose the elongate sandstone body. Axes representing maximum thickness of these enveloping strata, supplemented by high sandstone percentage trends, and synclinal axes, are useful in outlining the general position of channel-fill sandstone systems, but sandstone isopachous maps, paleotopographic maps, and cross sections (necessitating denser well control) are more definitive.

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PALEOECOLOGY AND STRATIGRAPHY OF HOLOCENE CARBONATES, FRAZERS HOG CAY, BAHAMAS

Vibro-coring and water-jet probing of the unconsolidated Holocene section in a 22-square-mile area of the southern Berry Islands region of the Great Bahama Bank have yielded data on the thickness and facies relations of this section, and the geometry of the underlying Pleistocene karst topography.

Six sedimentary facies are recognized on the basis of petrographic examination of grain types and amount of fine carbonate material smaller than 1/8 mm. Bankward from the bank margin, the facies are, in order: (1) an "algal-skeletal" facies, a thin veneer overlying the rock surface of the outer platform; (2) a much thicker (*ca.* 9 feet) "grape-rich oölite" facies which apparently is separated in the subsurface from the algal-skeletal facies by knoll-like features of the karst surface; (3) an "oölitic" facies which both overlies and replaces bankward the grape-rich oölitic facies; (4) a transitional "pellet" facies; and (5) a "grapestone" facies which occupies the most bankward position in the study area. Beneath part of the grapestone facies, and evidently occupying an interior swale in the karst surface, is (6) a "muddy-sand" facies which has the highest percentage of fine carbonate (up to 40 per cent) observed.

The anomalous position of the grape-rich oölitic facies is judged to be an effect of the "knolls" in the underlying karst surface. As sea-level rose after the Wisconsin low and began to cover the bank, these irregularities served as at least a partial barrier to strong currents—sufficient to allow the process of grapestone formation to proceed in an area much farther seaward than the modern site of formation. Similar irregularities (including nearby modern islands, or cays, which are exposed elements of the karst surface), and distance from the bank margin, are thought to account for the position of the muddy sand facies. The effect of these irregularities decreased as sea-level approached its present height.

Preliminary examination of the foraminiferal faunas indicates that marine waters of essentially normal salinity reached interior positions over the inundated karst surface early in the transgressive history in spite of the irregularities of that surface.

The study has revealed the existence of crusts or lenses of indurated sediment within the unconsolidated section which have cementation fabrics similar to modern beachrock at other Bahamian localities.

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FROM SHORE TO ABYSS: NEARSHORE TRANSPORT, SLOPE DEPOSITION AND EROSION, CANYON TRANSPORT, AND DEEP-BASIN SEDIMENTATION

NEARSHORE TRANSPORT

Along the Southern California coast "slugs" of poorly sorted sediment are injected periodically into the littoral zone. This river-borne sediment is subjected to transport and sorting in the nearshore area by currents generated by progressive surface waves, tides, and winds. The wave-induced currents dominate and are powerful enough to move boulders in the breaker zone and sand in depths greater than 150 feet. Net transport of water along the bottom is shoreward and results in net transport of sand to the beach. Waves not parallel with the shore transport sand along the beach. Silt and clay tend to be kept in suspension by wave-induced surge and form a dense turbid layer at the bottom. The turbid layer is believed to flow slowly down the sloping sea floor into deeper water. Sand is known to be removed from the nearshore where it is trapped in the heads of submarine canyons. Thus separation of sand from silt and clay results. (*Vernon*)

SLOPE DEPOSITION AND EROSION

The shoreward margin of the California continental borderland, termed a basin slope because it does not descend to the abyssal sea floor like true continental slopes, appears to be primarily a depositional feature, silt being the predominant sediment. A profile from the beach seaward usually shows a narrow rocky shelf thinly covered with sand or sandy silt, and in some places with rock cropping out at the shelf edge. The basin slope itself continues as a bedrock surface which becomes increasingly buried under an encroaching prism of sediment building up from the basin floor. Sea gullies found locally on the upper parts of the slope, but not on the shelf, are attributed to subaerial erosion during periods of exposure when lowered sea-