goons, bays, and estuaries up to 8 mi wide. Regional studies indicate that barrier morphology and texture and composition of beach sediment, although largely unrelated to modern rivers, are related to the distribution of sand-rich late Pleistocene facies on the inner continental shelf. For example, Matagorda Peninsula, near the Brazos River, is narrow, receding, and has a high oyster-shell content.

Narrow, regressive barriers occur where Pleistocene strand plains are absent, where Pleistocene deltas are mud-rich, and in Pleistocene interdeltaic areas. These regressive barriers have a high shell content (dominantly estuarine species), and varying amounts of caliche, siderite, beach rock, and sandstone fragment gravel. Beaches retreat 7–40 ft/yr in erosional areas. Dunes are rare on narrow barriers, and shell ramps extend several hundred feet bayward ending abruptly as steep avalanche faces.

Terrigenous sand is the dominant sediment type of wide barriers such as Matagorda Island; no modern stream contributes sand to this barrier. Broad barriers develop where sand-rich Pleistocene deltas and strand plains are present and the sand budget is large. Morphologic features of these barriers are fore-island dunes, beach ridges, and broad barrier flats. Beach ridges, indicating rapid accretion, are characteristic of the older barrier segments. Today, fore-island dunes, suggesting cessation of accretion, are relatively well developed on these barriers.

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EVIDENCE OF MIGRATING HYDROCARBONS IN DEEP SEA DRILLING PROJECT CORES

To date the Deep Sea Drilling Project has revealed migrated liquid hydrocarbons in 3 widely separate areas of the globe. The first occurrence was the highly publicized, visually observed accumulation of immature petroleum in sediments on the Challenger Knoll in the Gulf of Mexico. Subsequent to the discovery of this obvious saturation, chemical analyses revealed 2 more possible examples of migration. The first was a low-grade bitumen saturation in a thin porous zone in Pleistocene sediments on the Shatsky Rise in the western Pacific Ocean. The second and latest was a small but geochemically significant quantity of wet gas and gasoline-range hydrocarbon that apparently seeped upward into Miocene rocks in the Balearic basin of the western Mediterranean Sea. These migrated hydrocarbons—in addition to the methane gas commonly encountered in deep ocean cores—reveal that hydrocarbon source beds are present, and that liquids as well as gases have begun to migrate, at least locally, in deep-ocean sediments.

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ANATOMY OF DISTRIBUTARY CHANNEL-FILL DEPOSITS IN RECENT MUD DELTAS

Recent distributary channel-fill deposits (of various sizes) were studied in three mud-rich deltas of the Gulf Coast: the Mississippi, the Colorado-Matagorda, and the Trinity. Although the deltas differ markedly in size, they show similar geomorphology, depositional processes, and patterns of sand accumulation. Data were obtained from 2 major sources: (1) continuously cored borings with electric logs to study the depositional sequence of filled channels, and (2) fathometer surveys to study bed forms in modern channels.

Deposition within distributary channels reflects major depositional stages during the development of the channel. A complete depositional sequence consists, from the base upward, of an active-channel fill (deposited when the channel carried its full flow), a partial-abandonment fill (flow through the channel was reduced), and an abandoned-channel fill (deposited in essentially a still-standing body of water when channel was abandoned).

There is good agreement between cross bedding direction and sand-body elongation, *i.e.*, crossbedding foresets dip downstream parallel with the channel axis. The dip azimuths for accretion beds in the upper part of the channel are too variable in their orientation to be useful trend indicators. The shoestring channel-fill deposits generally trend subnormal to the regional depositional strike, but can show a wide directional scatter.

Because delta channels scour 20–200 ft below sea level, channel-fill sands are commonly positioned stratigraphically lower than their contemporaneous delta-front sands. Although distributary channel-fill and point-bar sands show a similar sedimentary sequence, some sedimentologic and stratigraphic features are helpful in distinguishing the 2 sand types.

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GEOCHEMICAL STUDY OF CRUDE OILS FROM GHADAMES BASIN, WESTERN LIBYA

Twenty-five crude oils from the Ghadames basin, western Libya, were analyzed to distinguish genetically distinct oil families and to attempt identification of different geologic processes that have affected the oils. The oils came from reservoirs ranging in age from Cambrian to Triassic. The samples were analyzed by mass spectrometry to identify molecular types of compounds present and to determine the stable carbon isotope values for the heavy saturate and heavy aromatic fractions. Gas chromatography was used to analyze the light gasoline fractions and the heavy saturate fractions of the oils.

Significant differences were noted between oils from different parts of the basin. At least 4 different Paleozoic oil families were distinguished. The oils from Triassic reservoirs appear to have migrated from Paleozoic strata. Alteration of some of the oils by water flushing and by bacterial degradation is evident. A study of the hydrodynamic flow of formation waters in the major reservoir zones supports the chemical evidence that flushing has affected the compositions of some of the oils.

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JOHANNES WALTHER'S LAW OF CORRELATION (OR SUCCESSION) OF FACIES

The writings of Johannes Walther (1860–1937) have been neglected in the west and his law of the correlation (or succession) of facies has been ignored or misstated in many text books of stratigraphy. Walther should be recognized as a pioneer stratigrapher-sedimentologist, important both as a world traveler and explorer of modern sedimentary environments (deserts, reefs, laterites) and as a theorist. His main theoretical contributions were his championing of the