level changes effected migration of depositional environments. Such migrations were evidently cyclic in nature, i.e., they comprise a repetitive series of transgressive-inundative-regressive sequences.

Retreat of Mesozoic shorelines, and inception of active erosion of former depositional areas, was commonly anticipated by the gulfward migration of lithotopes. An example of this is seen in the upward increase in grain size and clastic ratio in strata below the sub-Gulfian unconformity. Thus, in some areas of east Texas, the Buda Limestone is succeeded upward by the "Maness Shale," which is then succeeded by sands of the upper member of the "South Tyler Formation." The sub-Gulfian unconformity constitutes regionally the most useful means for determining the Gulf and Comanche Series boundary. Accordingly, strata deposited immediately before culmination of the South Tyler regression are assigned to the Washita Group. Strata deposited immediately after the beginning of Woodbine-Tuscaloosa transgression are assigned to the Woodbine Stage. Consequently, some lower sands along the lower Tuscaloosa fairway could be latest Comanche regressive deposits.

Fluviatile deposits have been described in the lower Tuscaloosa Formation near the inland edge of the Toledo Bend flexure. The presence of continental facies, within such a short distance of the Mesozoic shelf break, indicates that the shoreline previously had migrated almost completely across the Mesozoic shelf by the end of Washita deposition. The fluviatile deposits grade upward into finer grained strata of the middle Tuscaloosa Formation, thereby suggesting increasing distance of transport and deepening of waters. The upward change from the fine-grained middle Tuscaloosa to the coarse-grained strata of the upper Tuscaloosa suggests the gulfward spread of shallow-water conditions. Accordingly, the lower, middle, and upper Tuscaloosa divisions are interpreted to represent, respectively, the transgressive, inundative, and regressive phases of the Woodbine-Tuscaloosa depositional cycle.

An interesting phenomenon of inland areas was the opening of the Mississippi embayment. During this event, Gulf-related deposition spread inland across a series of basin-concentric, Paleozoic elements inland from the Ouachita deformed belt. These elements included a linear trend of fore-basins and a trend of large foreland uplifts. The embayment first extended northward across the Black Warrior basin, then across a saddlelike feature between the Nashville dome and the Pascola arch (i.e., the buried southeastern extension of the Ozark uplift). Coarse clastics were supplied to the Tuscaloosa by Paleozoic formations, such as the Fort Payne Chert, which cropped out on nearby structures. The embayment axis has since migrated progressively westward to its present position near the course of the Mississippi River.

Indicated reserves along the lower Tuscaloosa fairway seem impressive. Furthermore, the fairway opens up whole new types of Mesozoic reservoirs, those deposited along the Mesozoic slope. Since this trend defines the gulfward edge of the Mesozoic shelf, it permits the study of a complete suite of shelf facies and the definition of a new frame of reference for stratigraphic and environmental studies.

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Preliminary Observations of Modern Point Bar Facies, Amite River, Louisiana

The modern Amite River, an incised, flashy discharge stream, represents a coarse sand and gravel bed-load system typical of the Florida Parishes of southeastern Louisiana. Preliminary investigation provides general descriptions of channel morphology and sedimentology which permit the recognition of distinct point bar facies.

Bed-form and stratification types are used to differentiate lower bar, upper bar, and chute bar facies. The lower bar facies contain transverse bars, scour pits, dunes, and ripples. A vertical sequence reveals poorly defined tabular and trough cross-stratifications and horizontal stratifications. The upper bar facies appear similar to a longitudinal bar with superimposed ripples. A vertical sequence shows small scale ($<$ 5 cm thick) or medium scale (5 to 15 cm thick) trough and tabular cross-stratifications, horizontal laminations, ripple-drift cross-laminations, and clay drapes. The chute bar facies is characterized by coalescing lobate bars with superimposed ripples. A vertical sequence displays large scale ($>$ 15 cm thick) tabular cross-stratifications, small or medium-scale trough cross-stratifications, ripple-drift cross-laminations, and clay drapes.

Evaluation of observed facies characteristics indicates that the distribution of bar facies and the development of vertical sedimentary profiles appear to be related to the degree of meander curvature. Further research is being initiated to construct a semiquantitative geomorphic and sedimentologic facies model useful to investigators of both modern and ancient fluvial systems.

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Morphology of Turbidite-Channel Reservoirs, Lower Hackberry (Oligocene), Southeast Texas

Gas is produced from Hackberry sandstones at depths from 9,500 to 11,500 ft (2,900 to 3,500 m) in the western part of the Hackberry embayment. Adjacent shales contain a microfauna generally believed to represent bathyal depths. The Hackberry sandstones are turbidites in the form of dip-trending, channel-like bodies. Recent cores from fields in southeast Texas provide more details concerning reservoir character and morphology.

Hackberry reservoirs are found in narrow channels only 3,000 to 4,000 ft (914 to 1,219 m) in width. Channel sandstones thicken abruptly to 200 to 300 ft (61 to 91 m). Middle-channel locations are characterized by stacked, massive sandstones which represent the A division of the turbidite sequence. Stacked channel beds are about 10 ft (3.5 m) thick, but no intervening shales separate bed sets. The channel-margin sections consist of interbedded sandstone and shale. The beds are 3 to 5 ft (1 to 1.5 m) thick and consist of massive and laminated sandstones that form turbidite sequences of the A and