istic species of the Santa Barbara fauna are generally part of an association that lived in the deep-inner to shallow-outer sub-littoral depth zones (15–50 fathoms).

The lower part of the section studied contains fossils from the same depth zone as the Santa Barbara fauna. These fossils indicate that water temperatures were not detectably different than at present. The upper part of the section contains the Santa Barbara fauna, which indicates that waters at these depths were considerably colder in this region than at present. Most of the characteristic extra-limited species do not range south of Puget Sound. Associated with the characteristic species are others that do not live that far north today. This association of species not now living together must indicate either that the temperature tolerances of some have changed or that their distributions are controlled by some factor other than mean annual temperature.

The upper part of the section also contains numerous mollusks that lived in shallower water. The present distributions of extant members of these faunas indicate water temperatures not detectably different from temperatures today.

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DEPOSITIONAL PROCESSES IN DELTAIC ENVIRONMENT

Factors controlling depositional processes are analyzed for three of the world's major river delta systems: the Mississippi, Ganges-Brahmaputra, and Mekong. Despite variations in amount of factual data available it is apparent that these three river systems have developed different delta types which are of interest to the geologist attempting to compare ancient with modern deltaic environments.

Four basic factors control and influence delta formations: (1) *sediment load*—both quantity and particle sizes transported by the river to its delta; (2) *river regime*—in particular its sediment-carrying ability and seasonal variations in that ability; (3) *coastal processes*—essentially the influence of waves, currents, and tides in the deltaic environment, and (4) *structural behavior* of the depositional site—progradation across a stable platform or subsidence contemporaneously with sediment deposition.

Although the deltas which are considered here differ to some degree in most of the parameters involved, certain factors play dominant roles. The Mississippi delta area is characterized by rapid subsidence and its deposits are subject only to minor modification by coastal processes. Several overlapping deltas have formed during the Recent as sedimentation sites have shifted systematically during progradation. Rapid burial and minor modification by coastal processes preclude the development of laterally continuous sand bodies.

The Ganges-Brahmaputra delta is tectonically controlled. River courses and sedimentation sites have shifted erratically in response to structural change. Coastal processes are dominated by high tides which have created an extensive tidal plain of predominantly fine-grained sediments. Laterally continuous sands are not typical of this delta.

The Mekong has created a single delta system which has prograded across an essentially rigid platform. Contemporaneously, coastal processes (tides, waves, and currents) have reworked the delta front creating sand beaches which merge laterally to form sheet sands in the deltaic plain.

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CLASSIFICATION OF GRAVITY-FORMED SECOND-CYCLE BEDDING FEATURES IN MISSISSIPPIAN ROCKS OF OUACHITA MOUNTAINS, ARKANSAS

Stratigraphic studies in the Ouachita Mountains of Arkansas indicate the presence of a diverse assortment of rocks which have moved by gravity subsequent to initial deposition. A tentative classification of these subaqueous gravity features is proposed which, hopefully, gives a qualitative measure of downslope distance. By plotting thickness, types, and numbers of post-depositional sedimentary structures, a better understanding of basin geometry during deposition will be obtained.

One major deposit resulted from failure of both soft muds and interbedded incompetent sands. Slight downslope movement produced mixed masses of sand with flow structures and squeezed mud which might be pulled into clay "galls." Continued movement possibly caused disintegration of sand blocks to produce sandy mud and pebbly sand, finally becoming subaqueous turbidity flow as viscosity decreased. A second class of disruptive bedding resulted from plastic flow of soft mud only. Some interbedded sand behaved incompetently, failing by folding; the more competent sand eventually was pulled apart to become exotic blocks.

Slight movements generally can be determined by the character of slides, slumps, and contortions of interbedded sand. Longer-distance movement by mass flow produced contorted mud with exotic blocks of all sizes, shapes, and compositions. A third deposit had failure confined to fine-grained sand with high internal clay content. Some beds show minor plastic flow; others are visibly contorted. The downslope beds also would be turbidity-current deposits.

The Ouachita trough possibly consisted of an offsetting series of unstable mud slopes deepening southwest toward Oklahoma, laced with sand-feeder channels opening into laterally migrating submarine fans characterized by massive sand. More lateral or distal deposits generally are rhythmic and contain few second-cycle bedding features.