

probably were controlled by paleoenvironmental factors. Northeast-trending belts of thin, low-sulfur, low-ash coal coincide with structurally high areas; and a belt of thicker, higher sulfur, higher ash coal coincides with the trough of a major syncline. The thickness relations suggest that folding was contemporaneous with peat accumulation, and that the folds produced linear northeast-trending paleotopography which was covered by the ancient peat-producing swamps. The slight local relief would have affected water depths and associated anaerobic conditions. Sandstone-filled stream channels in the rocks below and above the Pittsburgh coal trended northwest across the old topographic grain. Compositional variations in the coal are independent of variations in type of overlying rock.

Northeast of Pittsburgh, Pennsylvania, the upper Freeport coal has no partings on depositional and structural highs; it has one parting on the flanks of the highs; and it has two partings in lows. Between Pittsburgh, and Brookville, Pennsylvania, northeast-trending areas of high sulfur in the upper Freeport and lower Kittanning coals coincide with each other and with areas that were topographically and structurally low when the coals were deposited.

Penecontemporaneous structural control of coal thickness and composition is evident within and east of a northeast-trending zone on the east side of the Appalachian basin, across which 300-ft fold amplitudes increase abruptly to 600 ft. The control was not effective in areas west of the zone. Folds on the west probably are younger than those on the east, and they did not affect deposition of Upper Pennsylvanian coal.

KERR, S. D., JR., Shell Oil Company, Denver, Colo.

PATTERNS OF COASTAL SEDIMENTATION: CARBONATE MUDS OF FLORIDA BAY

Muddy carbonate sediments of Florida Bay have accumulated in response to hydraulic processes characteristic of coastal environments. These processes are reflected in faunal distribution as well as physiography of the accumulations. The frequently encountered coastal sedimentary pattern of "banks," "lakes," and mainland veneer is expanded laterally in Florida Bay because of topography of the underlying Pleistocene rock surface.

In Florida Bay the dominant physiographic pattern consists of circular "lakes" of deeper water surrounded by curvilinear banks and islands. The banks, composed predominantly of mud sediment, reach within a foot or so of mean sea level and are largest in the western bay nearest the open Gulf of Mexico. The northeastern ("interior") segment of the bay is characterized by narrower banks, in many places exposed subaerially as islands.

Spitlike accretion is apparent from growth lines on islands and some banks. This indicates locally directed currents; however, overall randomness of orientation and circular patterns of sediment distribution suggest that significant currents develop in all directions. The larger submerged banks of the "outer" bay display prominent accretion lines and are in addition elaborately channeled. The channeling follows a distinctive cycle of establishment and decline that seems closely related to bank growth.

Current control of deposition of muddy sediments is reflected also in the ancient sedimentary record, notably the Pennsylvanian Virgil "mounds" near Alamo-

gordo, New Mexico, and Pennsylvanian Lansing "mounds" in southeastern Kansas. Sediment-baffle processes previously proposed for the construction of mound-topography appear unneeded inasmuch as current processes may achieve similar results.

KESSLER, L. G., II, Dept. Geol., Univ. New Mexico, Albuquerque, N.M.

CHANNEL SEQUENCE DEVELOPMENT IN AGGRADATIONAL STREAMS WITH EXAMPLE FROM SOUTH CANADIAN RIVER, TEXAS

At least 8 channel sequences of varying relative age have been observed in the floodplain of the South Canadian River. These sequences initially identified by vegetational differences on aerial photographs probably represent deposition during major flood events. Surface features on the most recent channel sequences include longitudinal bars, elongate scour marks, and extensive ripple-marked areas near bars. Within an individual sequence the only sedimentary structure types observed are plane bed, trough cross-stratification, and ripple cross-stratification. Channel sequences, or small divisions within them, are punctuated by mud or silt-mud layers. These layers or clay drapes are deposited as the result of the settling out of fine sediment during waning flood conditions.

Channel sequences older than the most recent 2 or 3 flood events are heavily vegetated and commonly discontinuous downstream. Moving correlation coefficient (r) analysis indicates that the sinuosity and position within the floodplain of channel sequences or remnants of all ages are controlled by the confinement of the South Canadian River valley and location within the valley of earlier sequences. This shows that major floods with a strong aggradational effect are probably a valley-wide phenomenon within this depositional system.

Daily discharge data show that floods, with a discharge of greater than 10,000 cu ft/sec, occur less than 1% of the time in the South Canadian River. These floods are catastrophic events which cause major changes in the configuration of the river floodplain.

KIER, J. S., Univ. Texas Marine Sci. Inst., Port Aransas, Tex.

NONSKELETAL CARBONATES FROM BAFFIN BAY, TEXAS

Twenty-five piston cores were taken from Baffin Bay, Texas, and 1 piston core was taken from an adjacent blue-green algal mat lagoon. The cores ranged in length from 85 to 670 cm. X-ray diffraction analyses and scanning electron microscope examination of the carbonate-rich layers in the sediment show that aragonite, calcite, Mg-calcite, and dolomite are all present as nonskeletal carbonates. Each varies from 0 to 100% in the individual samples studied.

Aragonite is the most common carbonate constituent, and occurs as needles less than 4μ in length. However, it also occurs as clusters of radiating needles, whose delicacy seems to indicate that the aragonite formed *in situ* and is not of a detrital origin. Aragonite also occurs as friable, partly lithified material and in 1-mm thick flakes. Calcite and Mg-calcite are found in unlithified muds in the form of anhedral to euhedral crystals 1–10 μ in size. One sample composed of 100% Mg-calcite was semilithified. Dolomite has been reported from the subsurface where it occurs as lithified,