"offshore" trace fossil assemblage; (5) coarsening-upward sequence of lithologies; and (6) position with respect to the strandline facies. Scarce evidence, such as coal partings and plant fragments, from irregular-shaped fields seems to be inconsistent with deposition offshore. All evidence, however, along with the shingling of the sediment sheets can be explained by retrogradational shelf sedimentation. Modern sediments of the New Jersey shelf are analogous.

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Depositional Facies, Geometry, and Genesis of Upper Cretaceous Mid-Shelf Sand Complex—Sussex Sandstone at House Creek Field, Powder River Basin, Wyoming

At House Creek, cores of the producing Sussex zone reveal a coarsening-upward marine sequence beginning with silty shale and ending with a conglomeratic sandstone. Producing sandstone, 36 mi (58 km) in length, rarely exceeds 1 mi (1.6 km) in width and has an outward "shoestring" appearance. However, distribution of producing and nonproducing sand shows that the thickest part of the complex is immediately southwest of the producing trend and that the sand complex is geometrically asymmetrical—about 17 mi (27 km) across.

The sand zone appears asymmetrical also with respect to sand facies. On the steeper northeast side, the sand complex maintains a sanding-upward profile. In contrast, on the gentler sloping side the facies sequence merges into a single widespread facies. This asymmetry has made possible development of an E-log model for the sand zone.

Deposition of Sussex sand in the House Creek area may have been 50 to 100 mi (80 to 161 km) from the general shoreline in water depths of 50 ft (15 m) or greater. The Sussex zone forms the marine "topsets" of a major basin-filling wedge of fine clastic sediments which prograded from the northwest.

We have difficulty in explaining how sands and gravels in this depositional setting were transported great distances offshore by shelf processes alone. A suggested analog, the Atlantic shelf ridges formed during post-Pleistocene transgression by shoreface erosion and being restructured by the shelf hydrologic regime, is unacceptable because regression and shoreface retreat cannot be documented for the Sussex at House Creek. A model proposed here combines up-coast regression, shoreline retreat, and along-shelf transport. The model emphasizes wave-generated unidirectional currents transporting sediment southerly along or oblique to shelf isobaths.

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Fractional Preservation of Transgressive Coastal Lithosomes on Atlantic Continental Shelf

Migration of coastal environmental lithosomes across the continental shelf is a response to the latest Quaternary rise of the sea. Preservation of fractions of the transgressive sequence is dependent on depth of erosion, which is a function of impinging wave energy, sediment supply, resistance to erosion, and rate of relative sea-level change. Materials deeper in the column have a greater potential for preservation. The relative sea-level curve for Delaware, based on C^{14}-dated basal peats, rises smoothly from 25 m below present from 10,000 years B.P. to the present at a decreasing rate with time. Shells and peats 9,000 to 10,000 years old on the shelf are 40 m deeper, suggesting an east-southeast shelf tilt, tectonically or hydro-isostatically induced. Sea-level rise results in rates of coastal retreat of 10^2 m/year for 10,000 years B.P., 10^1 m/year for 5,000 years B.P., and 10^0 m/year at present. In a model of constant volume of net erosion per unit length of coast, a much smaller depth of erosion applies early in the transgression, allowing a greater preservation potential. Changes in wave climate, sediment supply, and downwarping across the shelf also apply. Recovered sediments, seismic profiles, and recognized morphic features indicate better preservation of shoreline elements on the outer shelf, and more planing off and reworking on the inner shelf. Similar analysis of Delaware Bay indicates that it too follows such a model, in changing from a dendritic fluvial system to a broad estuary.

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Drilling for Methane Gas in Fishers Peak Area, Las Animas County, Colorado

In July and August 1978, two holes were drilled in the Raton basin 12 mi (19 km) southeast of Trinidad, Colorado, for measuring methane gas in coal beds. The sites are near the Morley mine, where the presence of abundant methane gas had been reported during mining operations.

The principal objective was the Morley coal, located just above the Trinidad Sandstone. The geology, drilling procedures, coal beds encountered, tests for gas, and experience gained are described. The amount of methane, although lower than expected, is consistent with the correlation of coal rank to gas yield. The coal is classed as high volatile A; the ratio of fixed carbon to volatile matter is 1.69.

Strong shows of methane are known in other parts of the basin where thicker, more consistent coal sections of higher rank occur. Such localities will most likely prove the importance of the region for methane gas production by future exploration and drilling.

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Devonian Reefs Exposed Along Central Cantabric Coast, Northern Spain

In sea cliffs along the central zone of the Cantabric coast, near Cabo de Peñas, Asturias, the Peran Member of the Candas Limestone (Middle and Upper Devonian) appears in two stratigraphic sections situated near the towns of Peran and Luanco respectively. Faunal assemblages consist of alternations of compact biostromes with units of diversely populated marls. These interbedded deposits reveal that different organisms and mor-