cross strata; (5) alternating beds of horizontal, burrowed laminae and small-scale trough cross strata; and (6) massive and burrowed beds.

Tabular cross strata and small-scale trough cross strata show a consistent northwest orientation, whereas the large-scale trough cross strata show no preferred orientation. Both tabular and large-scale trough cross strata consist of medium-coarse sand, whereas the small-scale trough cross strata and horizontal laminae are of medium sand. Discontinuous horizontal laminae, present at irregular vertical intervals in the section, consist of interlaminated medium to fine sand and silt.

Recently, the sand waves of the North Sea have been proposed as an analog for the St. Peter environment in Wisconsin, because of the presence of such sedimentary structures as very large-scale tabular cross strata. However, the sedimentary structures, directional data, and textures observed in the Starved Rock Member resemble more closely those developed on nonbarred coasts, like that of Oregon. The presence of inferred deeper water sediments within the St. Peter, landward of the Starved Rock Member, indicates that this sand body may have been deposited as an offshore shoal.

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TEMPORAL DOLOMITE-CALCITE SEQUENCE AND ITS ENVIRONMENTAL IMPLICATIONS

Where dolomite and calcite cements occur together, calcite is commonly the younger. This is true of cements that fill both primary (intergranular and intraskeletal) and secondary (vug and vein) pores. Rarely there is an alternation of cement types, but where this occurs, dolomite is still usually the penultimate, and calcite the ultimate.

In primary pores, the most likely unidirectional process producing the sequence, dolomite-calcite, is a change from marine to freshwater phreatic conditions through a lowering of sea level, elevation of the land, or increase in freshwater head.

In secondary pores, fluid inclusion studies of epigenetic dolomite-calcite show the dolomite to be both hotter and saltier than the associated younger calcite. Therefore, this sequence most likely records precipitation concomitant with erosional unloading, which should both reduce the geothermal environment and promote a freshening of the water.

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ASPECTS OF GEOLOGIC HISTORY AND MARINE GEOLOGY OF NEW YORK BIGHT

The New York Bight consists of two shelf sectors: (1) New Jersey shelf, trending NE-SW; and (2) Long Island shelf, trending east-west, which are separated by the Hudson shelf valley (extending southeast from outer New York Harbor to the Hudson apron at the shelf edge near the head of the Hudson submarine canyon). Although the present shoreline configuration of the bight results from the Holocene submergence, 2 important earlier developments include post-Miocene uplift of the Appalachians and especially of New England, and Quaternary glaciations.

During the Pliocene, uplift inland created the present regional dips of the coastal-plain strata and supplied sediment to fans which prograded a thin sheet of gravel across the marine coastal-plain formations. There followed a great drop in base level and deep cutting of major river valleys. The inner cuesta and adjoining inner lowland of the coastal plain, part of which is now filled by the water of Long Island Sound, were formed and large quantities of sediment built the shelf edge seaward. Erosion in submarine canyons was especially active at this time.

During the Pleistocene, in connection with continental glaciations, many changes of base level and climate occurred. During the Wisconsin Stage, ice flowing from about N20°W deposited 2 prominent terminal moraines atop Long Island's coastal-plain cuesta—the Ronkonkama (older and more southerly) and Harbor Hill (younger and more northerly) moraines. During each deglaciation, wide outwash plains spread across parts of what is now the Long Island shelf and extensive lakes floored by varved clays formed north of each moraine ridge. Rapid drainage of these moraine-dammed lakes through the Narrows (between Staten Island and Brooklyn) is thought to have been responsible for final erosion of the Hudson shelf valley and for major deposition on the Hudson apron.

As the sea transgressed across sandy outwash (Long Island shelf) and fluvial gravels (New Jersey shelf), it formed barrier chains and reworked the sediments. During parts of the submergence, some barrier chains retreated progressively landward, and the surf zone reworked all shelf sediments. At other times the barriers were drowned in place.

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GENERATION OF LAMINATED GYPSUM IN SEA-MARGINAL POOL, RED SEA

In the rock record, laminated gypsum commonly is interpreted as formed by precipitation from a body of brine. A study of a hypersaline pool at Ras Muhamad, the southernmost tip of the Sinai Peninsula, suggests an alternative interpretation of origin. Algal mats carpet a sea-marginal hypersaline pool, which has a salinity of 127°/oo in the spring when the sulfate concentration has reached 9,700 mg/l; by mid-summer salinity has risen to 314°/oo and, as a result of the precipitation of gypsum, the sulfate level has dropped to 4,570 mg/l. In the spring the SO_4/Cl ratio is almost identical with that of seawater (14.0×10^{-2} for seawater; 13.9×10^{-2} for the pool), but has dropped sharply by mid-summer as gypsum precipitates (2.4×10^{-2}).

Algal mats not only survive, but are remarkably active at this high salinity. Gypsum precipitates as a meshwork between the mats and, depending on the algal growth, concentrates as crystals in laminae ranging in thickness from 1 to 2 cm. Compaction of such laminae as they become part of the rock record would result in much thinner laminae. Dark organic mats alternate with white layers of gypsum. Such a deposit in the rock record has, in the past, been mistaken for a deep-sea deposit.

Laminites of aragonite precipitated by algae alternate with laminae of gypsum. Oncolites, pellets, ooids, and spherulites are particles precipitated within the algal mats.

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SEDIMENTOLOGY AND STRATIGRAPHY OF RECENT SHALLOW-MARINE AND TIDAL-FLAT SEDIMENTS, SOUTHWEST ANDROS ISLAND, BAHAMAS

Shallow-marine and tidal-flat carbonate sediments form a seaward-prograding wedge (maximum 6 m thick) on the southwest coast of Andros Island. Sediments have been deposited in a large (85 × 25 km), arcuate embayment in Pleistocene limestone. Incursion of the sea over freshwater peat reached the inner, central margin of the embayment 5,000-7,000 years ago. Subsequent lateral progradation (maximum 30 km perpendicular to strike) of marine and tidal-flat sediments has occurred in several phases. 1. Continuous lateral progradation of a very shallow (less than 1 m), wide (3-5 km) subtidal platform adjacent to the shoreline. Sediments on the platform are poorly sorted, massive, fossiliferous, white-pellet muds with prominent filled burrows. 2. Development of 5 major shorelines, roughly parallel and 2-5 km apart, during the past 5,000 years. Each new shoreline developed, presumably by storm action, onto the subtidal platform, and isolated a shallow linear lagoon. Abandoned shorelines form parallel bands of discrete to coalesced,