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MONTAUK POINT, AN ESSENTIAL FIELD EXPERIENCE FOR STUDENTS IN THE NEW YORK CITY AREA

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Except for a thin strip of Proterozoic and Paleozoic metamorphic and igneous rock along its very western edge and an outcropping of coastal plain deposits along its northwestern edge, the surface of Long Island is immediately underlain by unconsolidated deposits consisting of moraines of glacial till, outwash plains of stratified drift, and beach and dune complex formed by wave action. Two very prominent features of the island are the Harbor Hill Moraine, which marks the southernmost extent of the last major advance of continental glacier ice in the New York area during the Pleistocene and the Ronkonkoma Moraine, which marks the southernmost extent of an earlier one. East of Lake Success, the Harbor Hill Moraine did not extend as far south as the Ronkonkoma Moraine and so, the Ronkonkoma Moraine is preserved there. West of Lake Success the Ronkonkoma Moraine is obliterated by the later advance of ice that formed the Harbor Hill Moraine. The Harbor Hill Moraine extends from Brooklyn Heights in NYC to Orient Point. The Ronkonkoma Moraine runs from Lake Success to Montauk Point. The moraines are submerged east of Long Island but reappear on the coast of Rhode Island, at Martha's Vineyard and Cape Cod to the east. Montauk Point is a headland, experiencing intense wave erosion that allows only very coarse material such as boulders and cobbles to remain. These boulders and cobbles come from the bedrock that the glaciers traversed on their way south and include many different types of rock. Rip-rap, terracing and planting of vegetation have been employed as erosion control measures to protect the lighthouse at Montauk Point from destruction. Westward along the south shore a WWII vintage coastal artillery structure has been undercut by wave action and is being destroyed by waves. Beach sand is observed as one moves farther west with patches of garnet and magnetite rich sand showing density sorting by wave activity. Bluffs of till being eroded by waves can be observed and, in some places, one can see stratified drift overlying the till. Farther west, in Hither Hills State Park, beach and dune development can be observed. It may be noted that the Village of Montauk is on a double tombolo formed by wave action between Islands of till rising above sea level. A visit to Montauk Point and vicinity is a very worthwhile educational experience for geology students.



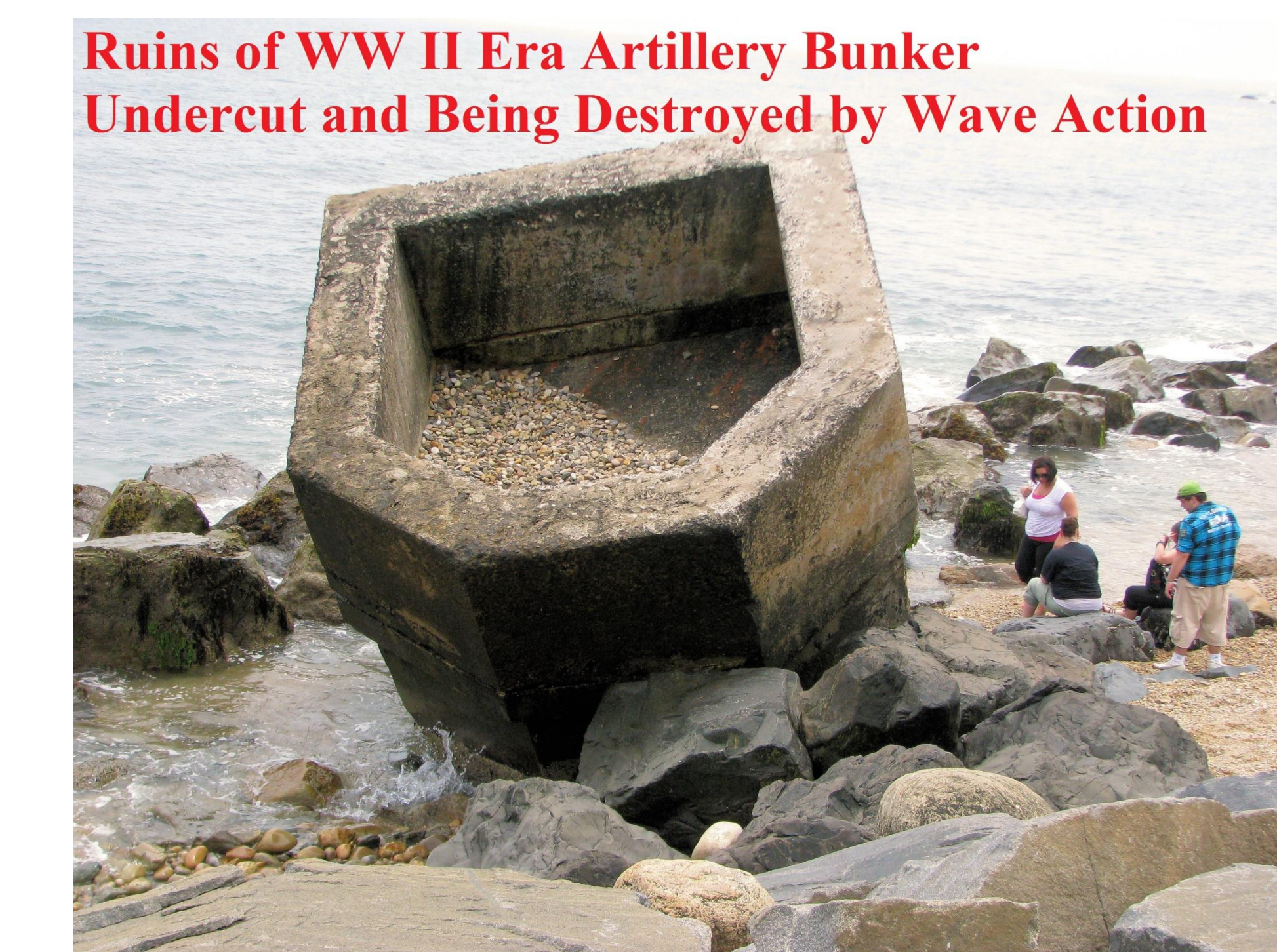
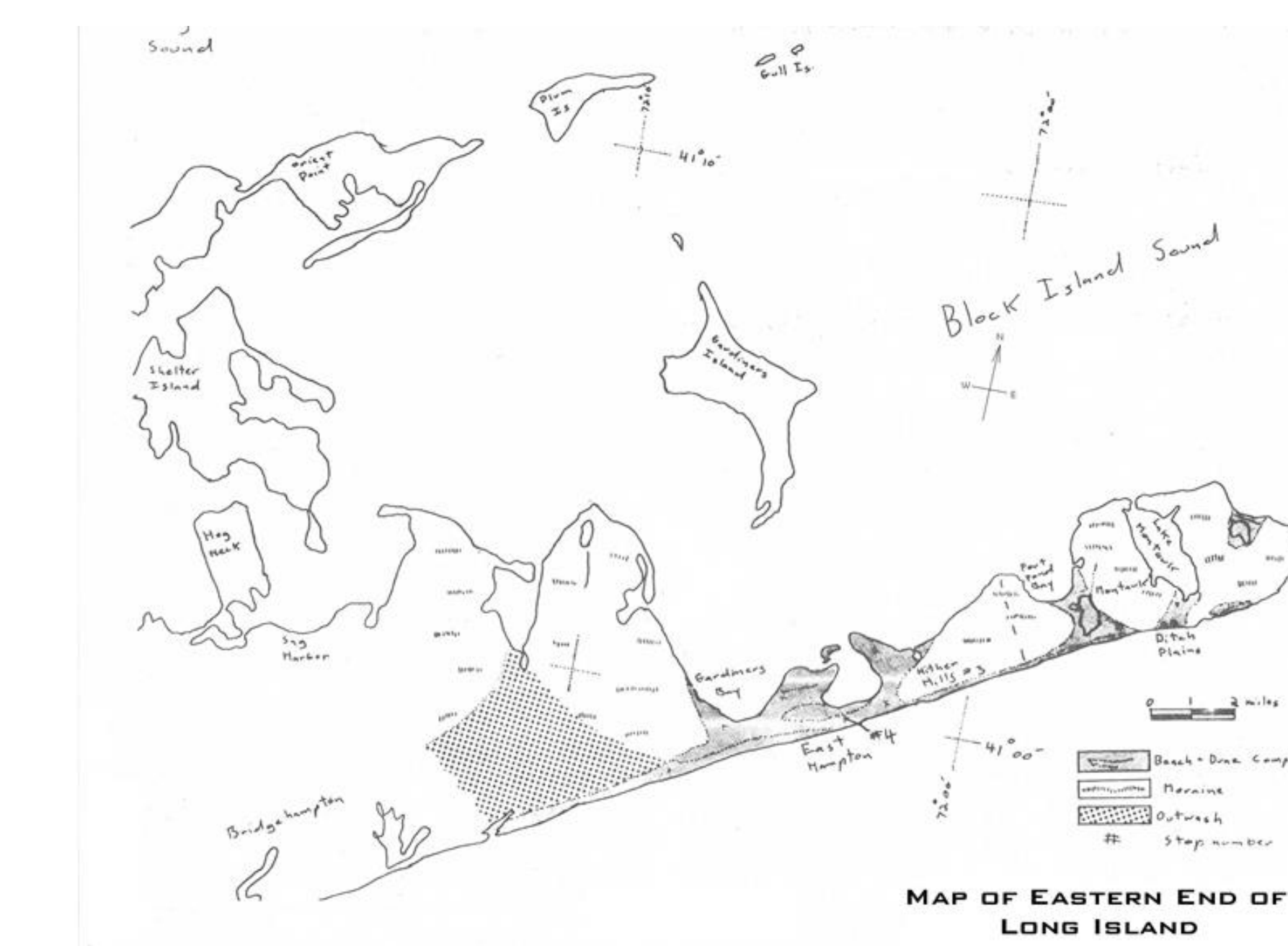
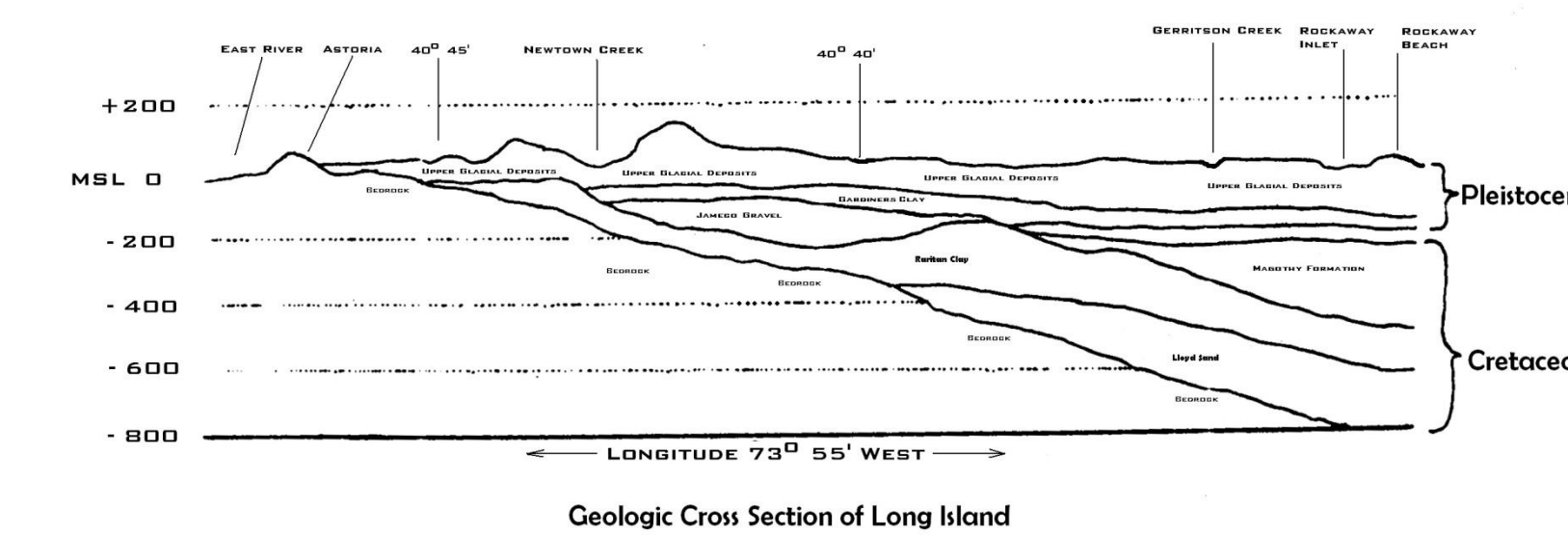
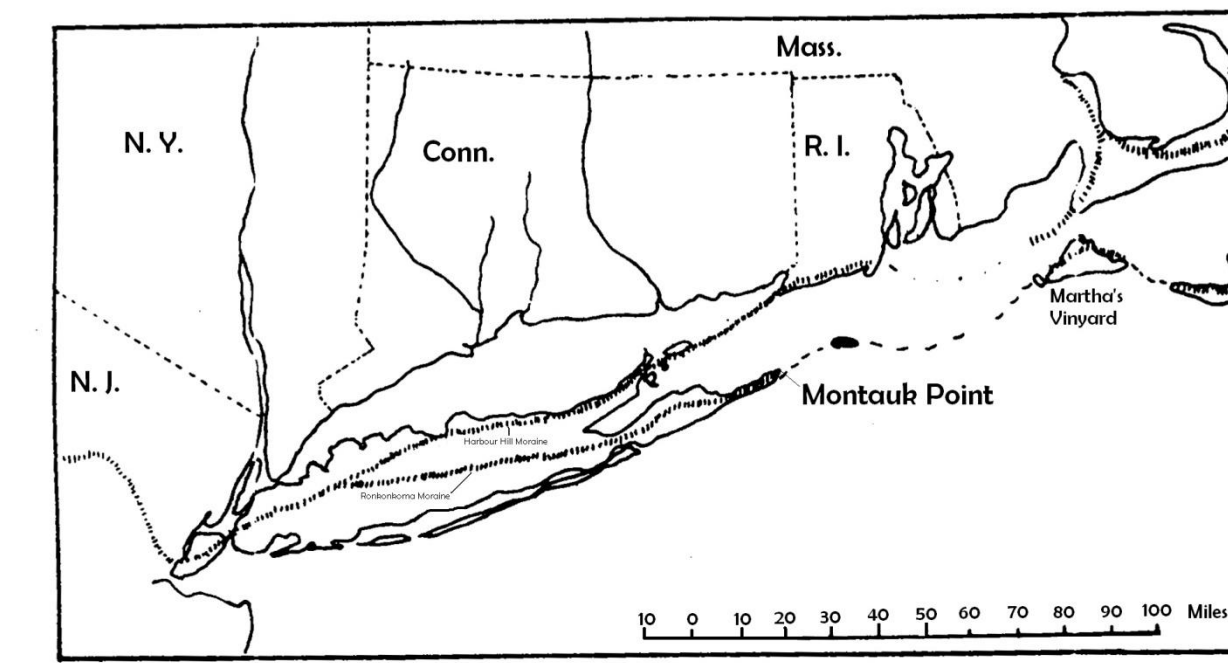
Boulder Eroding out of Glacial Till Ronkonkoma Moraine, Montauk Point



Erosion of Grass Stabilized Dune Hither Hills State Park



Stratified drift overlying glacial till on the Ronkonkoma Moraine Montauk Point, Long Island, NY



Ruins of WW II Era Artillery Bunker Undercut and Being Destroyed by Wave Action



Students Collect samples of Garnet-Magnetite Sand concentrated by Wave Action Near Montauk Point



Professor Khandaker standing on rip-rap placed at Montauk Point headland in an attempt to protect the lighthouse from erosion.



Lighthouse at Montauk Point



Boulders, cobbles and pebbles of many different rock types from areas traversed by the continental glaciers

References

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2015 GSA Annual Meeting in Baltimore, Maryland, USA (14 November 2015)
A COMPARATIVE SEDIMENTOLOGICAL INVESTIGATION INVOLVING BEACH SAND DEPOSITS: FAR ROCKAWAY (QUEENS) AND MONTAUK POINT (LONG ISLAND), NEW YORK
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