

A PUMP INSTALLATION TO DRAIN A 300-ACRE SALT MARSH

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Cape Island Creek, where it passes through Cape May City, was inclosed within a five-foot diameter pipe for a distance of approximately one-half mile. The change was made in 1929 by the City, after securing permission of the War Department to close the original tidal stream, which was approximately eighteen feet wide. The pipe was fitted with a tide gate at its outer end to prevent flooding of the 300-acre marsh at its inner end by incoming tides.

The pipe was too small to properly care for the drainage from the marsh, and its capacity was further reduced by installing it at an elevation so high that the upper portion of the pipe rarely carried any water. The design specified an invert elevation of -2.0 ft. at the upstream end and -2.5 ft. at the discharge end, but as constructed, the discharge end was found to be at -1.3 ft., or 0.7 ft. above the inlet end.

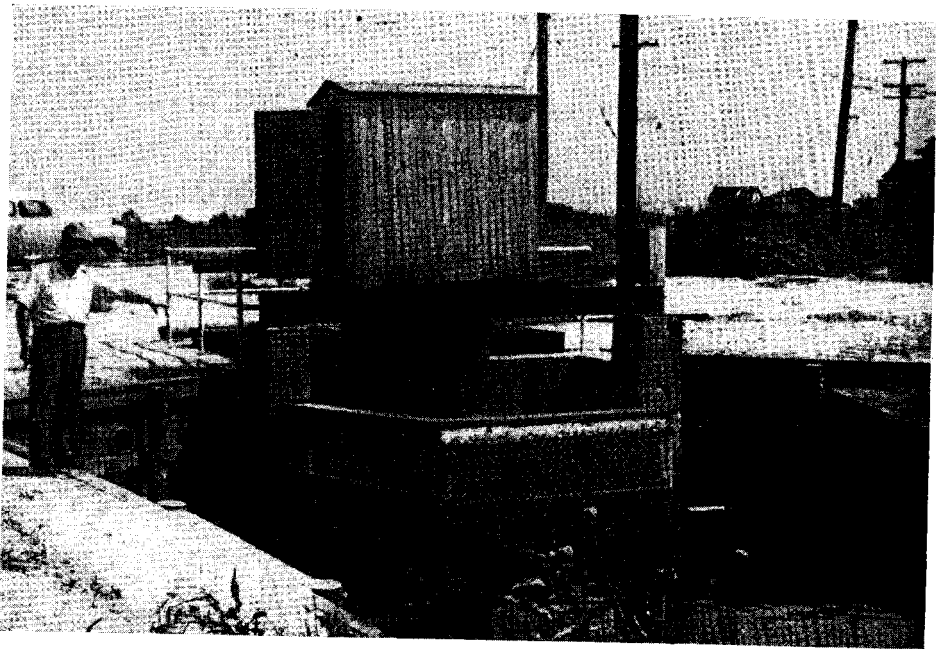
The city officials were requested to take remedial measures, but to no avail, and considerable mosquito breeding subsequently took place in the marsh and in a fresh-water swamp and pond at its upper end. Species involved included *Aedes sollicitans*, *Aedes cantator*, *Anopheles crucians*, and in the more fresh portions of the marsh, *Anopheles quadrimaculatus*, *Aedes vexans* and *Culex pipiens*.

In 1941 the Army established a camp on the edge of the marsh, and a mosquito trap operated by the Commission within the camp caught at times more than 100 *Anopheles quadrimaculatus* per night. Accordingly a plan for relief of the breeding was developed in collaboration with the New Jersey Agricultural Experiment Station. The principal features of the plan were the establishment of a bulkhead across

the stream at the upstream end of the pipe; the installation of a pump to lift the water from the marsh over the bulkhead thereby elevating it and creating sufficient head to secure gravity flow through the pipe; the construction of a sump into which the marsh water might drain and from which it could be readily pumped; and the reconstruction of the main stream through the marsh for a distance of more than a mile. The specifications called for the installation of tide gates in the bulkhead to permit gravity operation when mosquitoes were not breeding, and the use of a 12-inch Fairbanks-Morse Vertical Lift Propeller Pump, driven by a 10 horsepower electric motor, and having a capacity of 3000 gallons per minute.

Because of the malaria hazard, the U. S. Public Health Service was interested in this area and in 1941 promised cooperation in the installation of the mosquito control structures. However, no construction was begun until 1943, when the Cape May County Board of Chosen Freeholders was prevailed upon to construct the pump and sump unit, on plans prepared by the County Engineer following the plan previously worked out but substituting concrete for wood.

In July 1945 the unit was placed in operation under the joint control of the County Engineer and the County Mosquito Extermination Commission. A few days later, a rainfall of 3½ inches flooded the marsh to a depth of 2 inches, representing approximately 16,335,000 gallons of water. The water level was drawn down to the marsh surface in the first 48 hours of pumping, and thereafter fell rapidly, 6 inches in the next 24 hours, 7 inches in the next similar period, and 24 inches in the next period, after which the pump was



Mr. O. W. Lafferty explains the operation of the Vertical Lift Propeller Pump at Cape May City.

automatically shut off by the control switch as the minimum elevation of -2.0 feet had been reached.

A similar rainfall, previous to the instal-

lation of the pump, would have resulted in the flooding of the marsh for a period of ten to fifteen days, with ample time for the emergence of a brood of mosquitoes.

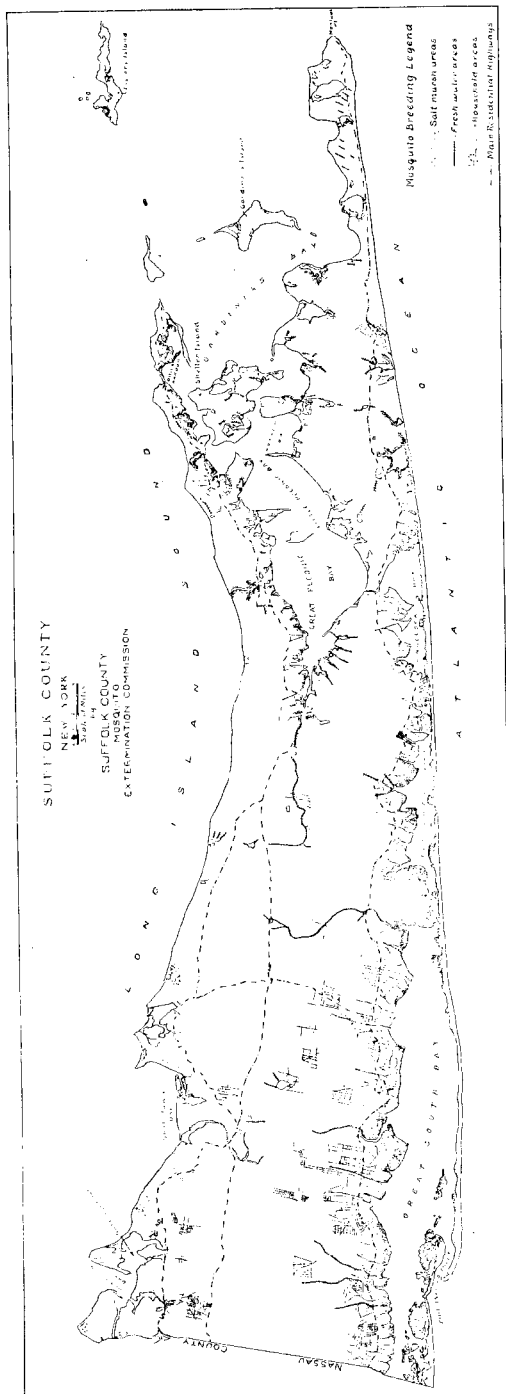


Fig. 1. Suffolk County has an area of 922 square miles, or 590,080 acres. Of this about 80,000 acres are mosquito breeding salt marsh, much of which is accessible only from the water. Up to five-eighths of a mill special tax is available for mosquito control work. Assessed valuation of county in 1945, \$298,000,000.