

Introduction: Why study Jamaica Bay?

Imagine a wonderful, loud, and ebullient party that overflows the house and spills out into the back yard. If New York City is the party, Jamaica Bay is the back yard. The author Elizabeth Barlow described Jamaica Bay is a "happy amalgam of many things; salty honky-tonk, serious Ornithology, lazy angling, and jet travel" (Barlow 1971).

Many cities lie near estuaries but until quite recently few cities knew what to do with them. They were seen as places where miasmas arose and disease carrying mosquitoes bred. City planning, if it was done at all, called for filling them in. To even the most romantic minds of the 1800s, salt marshes were not places to inspire dreams of manifest destiny, spiritual transcendence, or imperial ambitions. In the opening scene of *Great Expectations*, Charles Dickens used the salt marsh to symbolize the loneliness of Pip's orphaned existence and the evil that would soon come into it in the form of the escaped convict Magwitch. Even the painters of the Hudson River School, the first great exponents of the American landscape largely ignored salt marshes. The one exception was of Martin J. Heade (1819-1904). Heade's painting of the marshes around Newbury Port, Massachusetts are seen by some critics as a celebration of an ordinary landscape where people and nature come together in beneficial ways.

As New York City grew outwards and around Jamaica Bay the bay became a place where people and the landscape came together in ways that were continually changing and often

clashing. From about 1860 to 1930, Jamaica Bay was simultaneously a source of sea food, a place to recreate, a place to live, a transportation hub, a manufacturing center, and a place to dispose of the city's putrescent waste products. How all of these uses could have coexisted is a fascinating story of environmental management and mismanagement.

Geographers proclaim that geography is destiny and soldiers know that terrain is a tyrant. Each time Jamaica Bay's geography seems to have dictated its destiny, change would come and a new destiny would emerge. Usually these changes were brought about by new technologies such as railroads or new waste management processes.

Jamaica Bay was once an isolated backwater and this attracted both the waste processing and tourism industries in the 1840s. The coming of the railroads brought thousands of tourists from a growing city but the same growing city put increasing demands on the waste processing industry leading to some of the better-known conflicts over the future of the bay. The growth of tourism also led to conflicts with traditional fishermen while at the same time, suburbs and sewers began to destroy the commercial shellfish industry. There were no plans to manage all of these conflicts, rather the city would eventually call for the entire bay to be sculpted into a massive new seaport. The seaport never materialized but the bay did become a massive city, and later a National Park. But the conflicting demands on the bay never entirely went away. The Jamaica Bay National

Wildlife Refuge is the only wildlife sanctuary in the world that has a subway running through it.

In thinking about ordinary places like coastal marshes, Emerson said: "I ask not for the great, the remote, the romantic...I embrace the common, I explore and sit at the feet of the low." (Emerson, *The American Scholar*, 1837) Jamaica Bay may be low-lying and it is hardly remote, but as the following history will demonstrate, it is anything but common.

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Chapter One

Physical Description

Jamaica Bay is a shallow tidal estuary on the southern shore of Long Island. The eastern portion of the Bay is in the Borough of Brooklyn and the western portion is in the Borough of Queens. The bay measures approximately 52 square kilometers (20 square miles.) It is roughly semicircular with many sandy marsh islands in the center. The Rockaway Inlet is the only opening of the bay to the Atlantic. It is located at the western end of the peninsula separating it from Coney Island and Brooklyn.

Eastward flowing currents along the southern shore of Long Island have increased the size of the Rockaway Peninsula. Between 1889 and 1980 the peninsula has been extended approximately 4 km westward. A rock jetty was built in 1980 to prevent further growth (Stalter, Byer, Tanacredi 1996, 41-51).

Jamaica Bay has eight tributaries of various sizes, Sheepshead Bay, Paerdegat basin, Fresh Creek, Hendrix Creek, Spring Creek, Shellbank Basin, Bergen Basin, and Thurston Basin (Watershed Protection Plan, 36).

Today the north shore of Jamaica Bay is dominated by John F. Kennedy International Airport. The airport's southern boundary is Grassy Bay and the Bergen Basin forms its western edge. In Bergen Basin an aviation fuel tank farm is served by four fuel handling

wharves. Two of these facilities were active as of 1999 (USACE Port Series 1999).

There are about fifteen named marshes forming islands in the bay. These marshes are one to three meters thick and overlie sandy substrates. Shrubs and thickets dominate the uplands on many of the larger islands. Some islands contain peat-rich marshes with meandering tidal channels. Other islands such as Rulers Bar Hassock have a sandy shore tidal marsh with limited channel inlets (Hartig 2002).

Currents in Jamaica Bay run counterclockwise but have been blocked by the extension of John F. Kennedy Airport's runway 4A southwestwards into Jamaica Bay. As a result it now takes three times longer for tidal flushing to remove pollution from the bay than it did 100 years ago (NPS Study 1976, page 46).

Tidal mixing provides the majority of water circulation. Each tidal cycle exchanges approximately one-third of the bay's water although the degree of mixing varies over time. Freshwater inputs account for only 0.5% of the water in Jamaica Bay. As of 1990 two-thirds of freshwater inputs were from secondary wastewater treatment plants and 10% were from combined sewer overflows (CSO's) (Bopp, Simpson, Chillrud and Robinson, 1993). As of 2005, there were 26 CSO's discharging into Jamaica Bay

(Benotti, Abbene and Terracciano 2007).

Paerdegat Basin, Barbadoes Basin, Conch Basin, Mill Basin, Shellbank Creek, and Mott Hook are straightened and dredged tidal creeks (Barlow 1971, 4).

Chapter Two

Before The City Came to the
Bay, 1631 to 1868

The earliest European settlement on Long Island was the area near Jamaica Bay known as Flatlands, which was established by the Dutch in 1631. The patent for the 1651 settlement of Flatbush granted the lands of the Canarsie Meadows “east of the Indian planting ground.” Much of this land was low and flat. It overflowed with each tide and was described in the journal of Jasper Danckaerts (1679-80) as being “miry and muddy at the bottom” (Barlow 1971, 109). Danckaerts also wrote about land that was better suited to agriculture. “There is also a tract which is somewhat large, of a kind of heath, on which sheep could graze, though we saw none upon it. This marsh, like all the others, is well provided with good creeks which are navigable and very serviceable for fisheries. There is here a grist-mill driven by the water which they dam up in the creek; and it is hereabouts they go mostly to shoot snipe and wild geese. In the middle of this meadow there is a grove into which we went, and within which there was a good vale cleared off and planted.” The area provided an important resource in the form of salt hay. Described by Danckaerts as a “hard salt grass or reed grass” it grew wild in the tidal wetlands and was said to be preferred by the local cattle over fresh hay or grass (Danckaerts, 60)

As white settlements expanded out onto Long Island the question of who should control Jamaica Bay and its natural resources was bound to arise. The idea that Jamaica Bay was the property of the freeholders of the town of Jamaica, Long Island was first established in the 1660s. The land patent granted by Governor Nicolls in 1665 was for lands extending from the town's southern borders to the "Rockaway Swampe." Although the

exact location of the swamp is unclear it may have meant the wetlands on the north shore of the Rockaway peninsula and thus encompassing the entire bay. However an earlier, 1656, patent granted residents of Flatbush the Canarsie Meadows east of the “Indian Planting Ground” (Barlow 1971, 109). This would have granted them control over at least a portion of the bay’s western shoreline.

Because salt hay was important cattle fodder, the Canarsie salt meadows were held as common lands for the town of Flatbush. Grass was mown with scythes and stacked on staddles, clustered poles driven into the ground above the high tide line. Much later farmers used horse-drawn mowing machines. As late as the 1960s longtime residents still remembered mowing machines working at Fresh Kills (Barlow 1971, 31). In addition to fishing, seals were harvested from the beaches, sandbars, and areas of broken marsh (Barlow 1971, 110).

Another use of the area was the waterpower provided by tidal flows or the creeks running into the bay. One of the most important mill sites was at Gerritsen Inlet. It was known to the Canarsee Indians as Weywitsprittner and to the early Dutch as the Stromme Kill. In addition to waterpower, the creek provided oysters, sturgeon, striped bass, and crabs. The Stromme Kill and nearby waters soon became a center for the production of wampum. Primarily traded with the Indians for furs, it was also used by white settlers as

currency. Wampum was made by drilling out the purple-colored “hearts” of clam shells and fashioning them into beads. As the region developed it also became known for livestock, cultivated maize, squash, beans, and tobacco. This was the pastoral landscape around Flatlands that was described by Jasper Dankers (Campanella 1996).

Dankers also described a farm and tide mill owned by one of the oldest white families on Long Island, the Gerritsens. Their mill was operated from the early 1600s until the 1890s. It was reported to be one of the first tide-powered mills in North America. The mill operated with the aid of a dam constructed across the narrow neck of the Gerritsens creek, or as it was known in Dutch, the Kill (Campanella 1996). Floodgates were opened and allowed the incoming tide to enter the creek. They were closed at the height of the tide. Although the mill head could not exceed the creek’s normal tidal range and the mill could only operate at high tide, it was the only practical source of water power in such a low-lying area. In addition, building the mill on tidal waters meant that it would be possible to transport the product to market by boat.

Turn of the century photographs depict an “ungainly but noble structure towering over the mud flats.” Although there was some discussion of preserving the mill as an historic site, Mayor Walker (1926-1932) took little interest in preserving the structure and was reported to have denounced it as a “chicken coop.” The mill was destroyed by

arson in September of 1935 (Campanella 1996).

Despite its proximity to the settled areas of Kings and Queens Counties, until the 1860s the bay shores were sparsely settled marshlands and the primary resource utilized in the area was the marsh grasses. Because good roads connected the farming centers to the Brooklyn Ferries from an early date, Jamaica Bay never developed as anything but a minor maritime center. This lack of development may have preserved the bay's charm for the legions of tourists who would come later, but it had another very long-ranging effect. Without maritime trade, there would be no port facilities. Without port facilities there would be no reason to build freight railroads, and without freight railroads, there would only be limited industrial development. In a vicious cycle, the lack of industrial development discouraged both railroad development and further development of new port facilities. The cycle would not be broken until the entire bay became a park in the 1930s and 1940s.

There are other significant events in the history of Jamaica Bay occurring in this period and these will be discussed in the remaining chapters. For now, it is important to remember that the towns surrounding the bay were independent and each had their own claims to Jamaica Bay's waters, tidal lands, and natural resources. If such a thing may be permitted in scholarly writing, it is also appropriate to take a moment, let the romantic

imagination have free reign, and see the lands around Jamaica Bay as a rural backwater that was home to sturdy yeoman farmers and honest fisher folk. Such a rosy-colored view, while unrealistic, does explain some of the disputes that would arise as the city grew out and encircled the bay.

Chapter Three

How the City Got There:

Subways, Railroads, and

Mass Transit

In recent years there has been considerable interest in the role of railroads as agents in environmental history. This has been occurring in both the scholarly and popular arenas. Unquestionably the best source of information about the railroads around Jamaica Bay has been the railroad hobbyist press, but books and articles of this type were not written from an environmental history perspective.

The single most important reason to include a detailed discussion of railroads in this study is to appreciate their role as change agents. It is no exaggeration to say that for most of 1800s the only two reasons any part of the bay attracted development were the presence of dry land and the availability of railroad connections. These were the conditions that created the tourism industry at Canarsie, Broad Channel, the Raunt, and the Rockaways. Bergen Beach had neither dry land nor railroads and the developers of that resort had to build both. Ramblersville had a railroad and would thrive despite the availability of dry land. This was only because the construction of houses on stilts over the creeks was seen as an integral part of its charm.

The industrial revolution and the modern tourism industry began at the same time. Wealthy persons of course had always been able to make extended visits to fashionable watering places or country homes. Before the industrial revolution, a religious pilgrimage was about the only acceptable reason for a lower or middle class person to

travel. In protestant societies, some sort of pilgrimage with an educational component was acceptable. Artists were expected to travel from their city studios and take inspiration from nature. Farmers could attend fairs or make a trip to the seaside where they would fish or gather shellfish. There are even accounts in New Jersey of disgruntled workers at the early iron furnaces putting down their tools and going to the beach. But vacations in the modern sense did not yet exist.

If the idea of the modern vacation was still in its formative stages, the idea that a person could commute to work was even more radical. With the development of the first railroads from central cities to outlying countryside, commuting became possible for the affluent. But the vast majority of people had to live within walking distance of their workplaces. This was true even for the people who owned the workplaces and the growing cadre of professional managers who ran them.

Railroads changed all of this, and Jamaica Bay was just one of the many places they transformed. Like most cities of the period, the growth of Brooklyn after the Civil War was facilitated by the expansion of rapid transit lines and passenger railroads. Brooklyn seems to have been particularly blessed with an abundance of steam dummy lines. A “steam dummy” is a locomotive whose boiler and machinery were enclosed by a wooden body. This body muffled the sounds coming from the locomotive and in theory, it could

operate on city streets without frightening horses or disturbing pedestrians. In the 1800s people unable to speak were called “dumb” and what was a common disability gave the locomotive its name. By 1873 there were steam dummy lines in operation at Flatbush, Fort Hamilton, Bath, Coney Island, Canarsie, East New York, and other neighborhoods. The growth of these railroads was not without its critics. A letter writer to the *Brooklyn Daily Eagle* noted in March of 1873 that Long Island was only four to twelve miles wide but would soon have six steam railroads running through it. Most of the enthusiasm for new railroad construction, according to the writer who identified himself only as "Anti-Pandemonium," was the result of hype created by real estate promoters and railroad companies. More steam dummy lines, according to Anti-Pandemonium, would fill the streets with locomotives "hissing and rattling" horses would be frightened, it would not be safe for old people to venture outdoors, and dwellings would be filled with smoke, steam, and "the abominable odor of coal gas." The suggested solution would be to increase the frequency of horse car service (“No Steam on the Streets Wanted, But One-Third More Horse Cars”, Letter to the Editor, *Brooklyn Daily Eagle*, Mar.21, 1873).

Horse-drawn transportation in the form of a stagecoach route had already linked Far Rockaway to the rest of Long Island for several decades when in 1868 the South Side Railroad Company organized the Far Rockaway Branch Railroad Company. The original route of the South Side Railroad was laid out in 1860 and by 1867 the railroad was operational between Jamaica and Sayville, a distance of 41 miles. The stations along the

line included Springfield, Pearsall's Corner (Five miles from Far Rockaway) Rockville Center, Oyster Bay, Amityville, Islip, and Saysville. Stagecoach connections from Pearsall's Corner ran to Rockaway although it was hoped that a branch line or horse cars would soon replace the stage (“The South Side Railroad Open”, *Brooklyn Daily Eagle*, Nov.8, 1867).

The goal of the Far Rockaway Branch Railroad Company was to build a railroad between Valley Stream and Far Rockaway. The route circled around Jamaica Bay on its eastern side. It posed no particular challenges and it was completed relatively quickly. (Figure 1) The railroad had a terminal near the beach, at a point just west of the Village of Far Rockaway. After a year or two of operation severe winter storms shifted the beachfront. In 1871 the company was forced to organize the Rockaway Railroad Company for the purpose of building an additional 4 miles of track to a new terminal (Hinsdale 1898, 13).

During the time that the passenger business to Far Rockaway and Rockaway Beach was being developed by the South Side System, the Long Island Railroad Company was determined to enter the field. In 1870 the Long Island’s managers organized the New York and Rockaway Railroad Company to construct a railroad from Jamaica to Far Rockaway. It began at Rockaway Junction, about 1 mile east of the Village of Jamaica, and ran south to a crossing with the South Side Railroad at Springfield Junction and on to

the Village of Far Rockaway. Its terminal was reported to be more convenient than that of the South Side Railroad's. Immediately after completion of the line, competition between the South Side Railroad and the Long Island Railroad intensified (Hinsdale 1898, 13). The older railroad was bankrupt by 1886 and its sale was set for March 23rd, 1886 ("Assignee's Sale in the Matter of the South Side Railroad Company", *Brooklyn Eagle*, March 5, 1886). The South Side eventually became a part of the Long Island Railroad.

About the same time that the South Side Railroad and its subsidiaries began bringing visitor to Jamaica Bay on the east, another started bringing tourists to the Rockaway Peninsula from the west. The Brooklyn and Rockaway Beach left the Bay Ridge Branch of the Long Island Railroad near the shore of Jamaica Bay east of Canarsie, ran over the shoreline marshes and drove straight through the center of Canarsie, and terminated at the steamboat docks of Canarsie Landing. (Figure 2) Passengers transferred to a steamboat for the trip to the Rockaway Peninsula or remained in Canarsie to swim, fish, or boat in quieter waters of Jamaica Bay. The railroad originated DeWitt C. Littlejohn (1820-1890) obtained a charter from the State of New York to build a railroad from Broadway in Brooklyn, through Vesta Avenue, and to Canarsie. As Littlejohn's brother was then speaker of the state assembly, there was no difficulty obtaining the charter and the land required for the right of way was inexpensive. There was little reason to build such a railroad and less reason to expect that it would be profitable ("To Improve Canarsie",

Brooklyn Daily Eagle, May 29, 1891). Other press reports credit the construction of the railroad to DeWitt C. Littlejohn's father-in-law, identified only as Dr. Thompson.

Thompson was reported to have a large tract of land on the Rockaway Peninsula and wanted a railroad to bring people to the beach. ("To Stop for Winter", *Brooklyn Daily Eagle*, Sep.08, 1896)

A real estate promoter named James S. Remsen, after whom a neighborhood on the Rockaway Peninsula is named, owned 150 acres on the peninsula's beachfront that he wanted to develop into a tourist resort. Remsen offered Littlejohn 75 acres if he built the railroad. A 3.5 mile single track railroad was completed by 1865. The railroad began operation with a few four wheeled cars and two dummy locomotives ("To Improve Canarsie", *Brooklyn Daily Eagle*, May 29, 1891).

By 1871 the Canarsie railroad came under the control of Phil H. Reed, owner of the Howard House Hotel (not to be confused with the Hotel Howard at Howard Beach) The bar at the hotel was a popular place to wait for the trains and people come pouring into the hotel between 9:00 Sunday morning and 3:00 Sunday afternoon. In the heat of summer, an estimated 8,000 to 10,000 people use the railroad and visit Rockaway Beach ("East New York, Canarsie, and Rockaway", *Brooklyn Daily Eagle*, June 21, 1871).

The railroad was immediately popular. According to one press report the "restaurant men and mosquitoes of Canarsie did a lively business." The mosquitoes were less of a nuisance on the Rockaway Peninsula but the large numbers of "noisy young men" who frequented Fort Hamilton for baseball and bathing did tend to discourage the "better class of people" from using the beaches there ("Sunday Out Doors", *Brooklyn Daily Eagle*, June 24, 1872).

The rolling stock of the railroad was described as consisting of a number of open passenger cars. Two new steam locomotives were built at the Grant Locomotive works in Paterson, New Jersey. The engines had 2-4-2T wheel arrangements and were designed to run double ended. (The 2-4-2 designation means two unpowered leading wheels, four powered driving wheels, and two unpowered trailing wheels. The "T" stands for "tank" meaning the locomotive carried its water supply in a tank mounted above the boiler. Fuel was carried in a small bunker behind the cab and the locomotive did not require a separate tender.) These locomotives were reported to have been dummies. With 50-inch diameter driving wheels they had an estimated speed of 30 mph. However an engraving of a 2-4-2T locomotive reported to have been built for the railroad survives from this era. (Figure 3) The locomotive in the engraving was built by the Rogers Locomotive Works of Paterson, New Jersey, it was not a dummy, and the driving wheels are not fifty inches in diameter. A detailed examination of the railroad's locomotive roster will be required to resolve this discrepancy. Whatever type of locomotive brought the train to the

waterfront, the next stage of the journey was by steamboat. From Canarsie to Rockaway the voyage on the steamboat "*E. Corning, Jr.*" took about an hour. No liquors sold on board ("East New York, Canarsie, and Rockaway", *Brooklyn Daily Eagle*, June 21, 1871).

The route followed from the waterfront was from the Howard House to the curve of East New York Avenue and then into what was still undeveloped county, woods, fields, and farms. The route over the marsh grass meadows was described as "serpentine". Occasionally the train passed frames for the drying of nets or fishing boats. Fishing stakes appeared along the creeks and finally the Bay View House came into view. Canarsie itself was described as sandy and very dusty on windy days. The tourists at Canarsie were described as lounging, strolling on the beach, or going out in boats. Newspaper accounts say that they "stuff themselves with shellfish" play billiards at the hotels, or take a punt out to fish ("A Sunday Out, Opening of the Excursion Season", *Brooklyn Daily Eagle*, May 13, 1872).

Some additional insight into the state of the railroad in the early days is provided by press reports of a fire that claimed its engines and rolling stock in January of 1876. Fire alarms rang out through the areas around East New York about 5:30 am, on Wednesday, January 19. Fire companies were called out to see great tongues of fire reaching into the sky. At

first the firefighters thought that the blaze was in New Lots, and only after arriving in the village did they see that the fire was in Canarsie. Reports reached the firefighters that one of the large hotels in that village was burning but eventually word reached the firefighters that the railroad's shed, its wooden cars, its locomotives, fifty tons of coal, and a store of lubricating oils and kerosene were on fire. The locomotives' fires were out and none of them had steam. Bystanders attempted to push them out of the shed but at 18 tons apiece this could not be done (“In Flames, The Engines and Rolling Stock of the Canarsie Railroad Burned”, *Brooklyn Daily Eagle*, Jan.19, 1876).

The fire started when a fireman was attempting to start the fire in one of the cold engines saw a tongue of flame shoot out of the firebox and onto the woodwork of the locomotive's body. The dry wood of the locomotive's body caught fire and the flames soon spread done (“In Flames, The Engines and Rolling Stock of the Canarsie Railroad Burned”, *Brooklyn Daily Eagle*, Jan.19, 1876).

The report is interesting for the details it sheds on the railroad's operations. First, that all of its rolling stock fit inside a single shed, reported to be about 50 feet long and containing four tracks. Press reports also state that there were 11 cars, all with wooden bodies. It is also interesting to note that the railroad was operating on that January morning; it was not just a summer tourist operation. The reports state that there were two

wooden-bodied dummy locomotives and two other locomotives. Other sources state that there were only two dummy locomotives operating on the railroad done (“In Flames, The Engines and Rolling Stock of the Canarsie Railroad Burned”, *Brooklyn Daily Eagle*, Jan.19, 1876).

The fire spared the Bayview House, a nearby hotel but consumed another hotel owned by a man only identified only as a Mr. McFall. Another hotelkeeper, identified only as Mr. Smith, had one of his buildings damaged but his other structures were spared. It is notable that there were at least three hotels close to the train shed. The railroad was obviously serving more than day-trippers and that Canarsie had a well-developed tourism infrastructure done (“In Flames, The Engines and Rolling Stock of the Canarsie Railroad Burned”, *Brooklyn Daily Eagle*, Jan.19, 1876).

The summer schedule for 1877 called for three trains daily meeting the steamboat. They would leave the Howard House in East New York at 10 am, noon, and 8 pm, daily and Sunday. Return trains ran 11:15 am, 1:45 pm, and 5:30 pm, daily and Sundays. Advertisements informed patrons that this was the "most pleasant, safe, and popular family route" to the Rockaways and the trip was free from danger and sea sickness. For passengers who did not need to meet the steamboat, trains for Canarsie ran daily, and Sundays hourly and half-hourly from 6:30 am to 8:30pm (“Canarsie, and Rockaway

Beach Railroad and Steamboat Line”, *Brooklyn Daily Eagle*, July 5, 1877).

The steamboat trip was not beautiful for about 50 passengers aboard the railroad's *Julia*. On her last trip out of Canarsie on Sunday night, August 19, 1900, one of her paddle wheels was lost. (Press reports did not say if the wheel fell off the side, was somehow damaged, or if there was an engine failure.) The tide was running out strongly and the *Julia* began to drift. The steamboat *Hornet* was coming into Canarsie and took the *Julia* in tow. The *Julia* was towed to Barren Island where she awaited repairs (“Accident to the *Julia*”, *Brooklyn Daily Eagle*, Aug. 20, 1900). A report of the Army Corps of Engineers stated that the principle users of the dredged channels near Canarsie were the steamboat companies that moved 750,000 passengers annually to and from the resorts of Rockaway, Bergen Beach, and Ruffle Bar (Government Printing Office 1897, 1117).

The 1894 edition of the *Brooklyn Citizen Almanac* states that during the summer months, the railroad ran trains to Canarsie every hour between 6:30 am and 8:30 pm. Trains from Canarsie ran on the half hour. The trip lasted 13 minutes (*Brooklyn Citizen Almanac*, 1894, 123). Plans to double track the railroad were announced in 1891 and the double tracking was completed in 1894 (“To Improve Canarsie”, *Brooklyn Daily Eagle*, May 29, 1891).

In September of 1896 the railroad notified the New York State Railroad Commission that they would not run service during winter months. The railroad had been operated year round but the owners claimed that revenues did not meet expenses after October (“To Stop for Winter”, *Brooklyn Daily Eagle*, Sep.8, 1896). Clearly there were still tourists to be carried, but the year-round population had other transportation options, such as the expanding streetcar and rapid transit networks.

The railroads serving the Rockaway peninsula from the east and west would now be joined by one coming directly across the bay from the north, the New York, Woodhaven, & Rockaway Railroad. The railroad was able to cross the center of the bay by laying track on Broad Channel and some of the smaller islands. (Figure 1) To reach these islands, in 1879, the railroad began driving what would become a total of 1,719 piles grouped into bents for a trestle over the north and south edges of Jamaica Bay. The trestle bents were twelve to seventeen feet between centers but state inspectors noted that some of them were driven at an angle to the main line of the bridge. This appears to have been an error. The inspectors did note that the masonry piers of three drawbridges crossing the main navigation channels at Beach channel, Broad channel, and Goose Creek were all well constructed and rested upon well-braced, closely-driven piles. Modern signals warned the trains’ engineers if they were approaching an open bridge and full-time bridge tenders were hired for the season. The trestle was built so that the top of rail was about nine feet above at mean tide. Rails were laid on cross ties that supported

both tracks and measured eight by six inches and twenty-two feet in length. Each tie was spiked to track stringers that rested on the trestle bents (Documents of the Senate, 298).

Although the trestle looked impressive, state inspectors found some minor flaws. Each trestle bent consisted of eight spruce piles each one foot in diameter but some of the piles had not been driven deep enough and began settle. Where this occurred an additional three piles per bent were driven. In railroad bridge construction, guard rails are extra lengths of rail laid between the running rails so that in case of an accident, the railroad car wheels were forced to remain on the track. The Jamaica Bay trestle appears to have been provided some sort of wooden guardrails. But because some of these had gaps at the ends, they would not have been effective in case of derailment. The inspectors recommended the installation of steel or iron guardrails. State inspectors observed that some of the piles had been damaged by shipworms and replacement with creosoted piles was necessary. Because the railroad was only operated during the summer months, the inspectors noted that special care had to be taken to check the trestle before trains began running again each spring. The inspectors also noted that in the sandy soils of the region spruce cross ties could not be expected to last more than five years (Documents of the Senate, 298).

The railroad had some curious throwbacks to earlier practices, no doubt intended to save

money but still satisfactory to the inspectors. The rails were a mere fifty-six pounds per yard. Only half of the track was laid with steel rail, the remainder was iron. The line used stub switches that were soon to be widely regarded an obsolete technology. A modern interlocking system was installed at Wood-haven and Glendale junctions by the Union Switch and Signal Company. All metal bridges on the railroad, including the moveable spans, were constructed by the Passaic Bridge Company. Most of these bridges crossed highways and other railroad lines (Documents of the Senate, 298).

The state inspectors noted that the railroad's eight locomotives, fifty-three "first-class" coaches and nine combination cars were all "in first-class order; passenger cars, modern in style, very neat and bright." The passenger cars had 42-inch wheels and weighed about twenty tons. They were fitted with vacuum brakes, a technology that was suited for light equipment but not the heavy passenger cars operated on mainline trains. They also were fitted with Miller hook couplers (Documents of the Senate, 298). The inspection report does not mention the railroad owning any freight cars.

The inspectors concluded that "A careful examination was made of the whole property, and nothing presented itself as objectionable or unsafe, except the matter of guard rails for a short distance on the long pile bridge" (Documents of the Senate, 298). What emerges from the report is an account of a lightly-built railroad that was well suited for

hauling a large number of summer visitors to the Rockaway Peninsula and the island of Broad Channel.

In 1881 passengers destined for Rockaway Beach could board the trains of the New York, Woodhaven, and Rockaway Railroad at one of three terminal points, Hunter's Point on the East River, Bushwick Avenue, or Flatbush Avenue. All of these stations were owned by the Long Island Railroad. The Hunter's Point station was located opposite Manhattan's 39th Street. Hunter's Point - Rockaway trains had the longest runs, 15 miles, which was made in 45 minutes. This was the longest run of any trains operated by the railroad. The Bushwick Avenue terminal was located at the end of a short branch line where three horse car lines converged. The Flatbush Avenue terminal had direct horse car connections to the Fulton Ferry. Trains using to the Flatbush Avenue station traversed a short length of the Long Island Railroad to reach the main line of the New York, Woodhaven, and Rockaway Railroad. According to the 1881 railroad guide the trains of the line featured the "finest excursion cars upon any railroad in the world" and these were equipped not only with steam brakes but "every appliance requisite for the safety and comfort of its passengers" (*Official Railway Guide* 1881, 79).

After crossing Jamaica Bay the tracks turned west and ran on the Rockaway peninsula for approximately another one and a half miles. There were five station stops at the various

hotels and resorts, Hammel's and Eldert's, Holland's Station, Seaside Station, Neptune, and the Rockaway Beach Hotel (*Official Railway Guide* 1881, 79).

During the summer months the railroad promised surf bathing and "as pleasant promenading as can be asked for." On the bay side of the peninsula there were opportunities for "still water bathing," boating, and fishing. (Holland's Station was also the site of a yacht club.) The first trains for the Rockaways departed in the early morning between 5:30 and 7:00 (times varied by station) and the last trains left the peninsula around 10:30 pm. The 1881 timetable lists a total of 27 trains per day. It is not clear if any trains were beginning to be operated during the rest of the year (*Official Railway Guide* 1881, 79). Press reports from 1902 mention a small freight yard at Holland's Station which appears to have been used for delivering building and other supplies to the peninsula ("Killed by a Falling Log", *Brooklyn Daily Eagle*, July 22, 1902).

The New York, Woodhaven, & Rockaway Railroad was not the only way to reach the ocean but it was the most direct route to the Rockaway peninsula. Its completion prompted discussions within the city government of a public, non-commercial beach on the Rockaway Peninsula. There had by that time, already a large number of private beach developments on the peninsula. The city began looking for the land in 1904 and purchased much of the land at the site of the future Jacob Riis Park in 1912. The use of

this land for a Naval Air Station would later create tensions between the city and the Navy (Low, Taplin and Scheld 2005, 108).

There were now two steam railroads serving different portions of the Rockaway peninsula and in 1898 the Ocean Electric Railway connected them with a streetcar line running parallel to the Atlantic Ocean. Other local trolley lines were established near Far Rockaway and in the eastern half of Queens. A plan to reach across Jamaica Bay with a trolley line parallel to the New York, Woodhaven, and Rockaway Beach railroad was created in the late 1890s but was never realized. (Meyers, 123) When the Cross Bay Boulevard highway bridge over Jamaica Bay was opened in 1924 there were no streetcar lines on it. (Lucev, 56)

The last significant railroad construction project on the Rockaway peninsula was to elevated the Long Island Railroad's tracks to eliminate grade crossings. This project was completed in the 1930s and the reinforced concrete structure is still used by the subway system.

Most the railroads built to reach the ocean ran from the developed portions of Brooklyn to Coney Island. The number of these lines illustrates the importance of the resort area in

the life of the city. The railroads included the Brighton Beach Railroad, the New York & Manhattan Beach, the Prospect Park & Coney Island Railroad, the Union Elevated Railroad, and the Brooklyn Bath & West End Railroad (“Rockaway Beach”, *Brooklyn Daily Eagle*, Mar.21, 1890).

The New York & Manhattan Beach Railway took the shape of a trident with the base planted firmly on Manhattan Beach. One prong of the trident went to Bay Ridge, another ran to Greenpoint, and a shorter, middle prong, ran to Prospect Park. Passengers on this railway had a choice of two services, the Greenpoint and the Bay Ridge Division. From Manhattan the Bay Ridge Division passengers boarded steamboats at one of three piers on the Hudson River (22nd Street, Leroy Street, and Pier 8) for Bay Ridge and from thence by train to Manhattan Beach. Because the first leg of the trip required three stops and a short trip down the bay, the time required for the 8.5 mile trip was one hour and twenty minutes. Passengers on the Greenpoint Division left from Manhattan's 23rd Street pier on the East River and transferred to trains at Greenpoint. The time required for the 14.5 mile trip was only 35 minutes (*Official Railway Guide* 1881, 78).

When the railroad opened for business on the 26th of May, 1881, the *Manufacturer and Builder* reported that the passenger cars had recently been improved and was the best of any of the railroads serving Coney Island. It was also reported that it was the only

railroad providing a connection with the New York Jockey Club's racetrack at Sheepshead Bay. The magazine predicted that the racetrack would soon be patronized by the city's best people. The Oriental and Manhattan Hotels were considered among the finest of any resort and the railroad could look forward to an affluent class of passengers (*Manufacturer and Builder*, June 1881, 140).

Passengers on the New York & Brighton Beach Railway traveling from Manhattan boarded boats at either 22nd Street or Pier 6 on the Hudson River (*Official Railway Guide* 1881, 78). This railroad was opened in the fall of 1875 from 9th Avenue and 20th Street to Coney Island. Most of the original trains served the fair grounds on race days ("New Steam Railroad", *Brooklyn Daily Eagle*, Oct.4, 1875).

For the summer of 1881 the Prospect Park & Coney Island Railroad announced that it would operate trains between Greenwood Station (Ninth Avenue and Twentieth Street) and West Brighton Beach from 7:00 am until 10:45 pm, except on Sundays when a somewhat abbreviated schedule was in effect. Trains to Coney Island ran on the hour until 9:00 am and then on the half hour until 1:00 pm, and then every fifteen minutes. Returning trains followed the same pattern and with the last returning train at 11:15 pm. The running time for the trains was 15 minutes (*Official Railway Guide* 1881, 78).

The Brooklyn Bath & Coney Island Railroad's trains for the same summer would run between Greenwood Station for Coney Island hourly from 6:15 am to 11:30 and the every half hour until 10:00 pm. Returning trains followed a similar schedule starting at 7:15 in the morning. Sunday trains to Coney Island ran hourly starting at 1:30 until 11:40 pm. The first returning trains left for Greenwood at 3:30 pm and left hourly until 9:00 pm. How passengers on the trains that left Greenwood after 9:00 pm were supposed to return was not explained. It seems likely that the railroad was simply positioning trains at its Coney Island terminal so they would be ready for the morning runs. The railroad also ran two trains daily to Guntherville at 10:40 and 11:40 in the evening and back to Greenwood Station at 5:40 and 6:20. The 1881 *Official Railway Guide* lists George A. Gunther was the General Manager of the Railroad and C.G. Gunther was the owner (*Official Railway Guide* 1881, 78).

Charles Godfrey Gunther (1822 -1885) served as New York's mayor from 1864 to 1865 and later became involved in the railroad. The Brooklyn, Bath, and Coney Island Railroad was formally opened. An opening day the party of distinguished guests made a point of inspecting the small "dummy" engine. Steam Dummies, still a new technology, were described as being a locomotive, "toned down and civilized. The locomotive inspected that day was only 15 horsepower and had a top speed of 20 miles per hour. They were intended to operate about as fast as a horse walked ("Another New Railroad", *Brooklyn Daily Eagle*, June 9, 1864).

The railroad's western terminal was not located inside Brooklyn's city limits. There seemed to be little point because there was already an extensive railroad network inside the city. The route passed through New Utrecht and Bath, following 35th Street and the Bath Plank Road, which was described at the time as being a "shady country line" although we may take the claim that the plank road was "free of dust" as being somewhat optimistic ("Another New Railroad", *Brooklyn Daily Eagle*, June 9, 1864).

By 1884 what had become known as "Gunther's Railroad" was 7 miles long, owned 7 locomotives and 28 passenger cars and carry just over 400,000 passengers annually ("Report of a Local Railroad", *Brooklyn Daily Eagle*, Dec. 16, 1884). It would seem that the train schedules were arranged for accommodating the maximum number of passengers in the afternoons and evenings. The comparative lack of Sunday trains is somewhat surprising given the reliance these railroads placed on passenger traffic.

By the start of the twentieth century, all of the railroads that ran directly to the Rockaway Peninsula had come under the control of the Long Island Railroad and its parent company, the Pennsylvania Railroad. The Long Island also came to own an extensive network of suburban rail lines on eastern Long Island.

The resort destinations of Arverne, Edgemere, and Far Rockaway featured prominently in the railroad's promotions as did their beaches. Commuters were enticed by visions of a place that was at once urban and rural, thanks of course, to the reliable service of the Long Island Railroad. Multiple-ride tickets were available at the rate of two cents per mile but had to be purchased in advance. The railroad stressed that these tickets, while nominally issued to the head of a family, "can be used by any immediate member or domestic servant" (*Long Island Railroad, International Passenger and Ticket Agent Journal*, August 1901).

The Pennsylvania had grand plans Long Island subsidiaries. They began boring tunnels under the East River for direct access to Manhattan in 1902 and in 1906 began the electrification of all of its lines in Brooklyn and Queens ("Pennsylvania Railroad's Extension to New York and Long Island – The Long Island City Power House", *Railway Age*, Apr.6, 1906).

In writing about the electrification, *Railway Age* noted that the heaviest power demands on the railroads would come on days that the racetracks at Belmont Park and near Springfield Junction were operating. But these would only be once a day for four weeks. A heavy demand that would last for longer periods would come from the trains of the

Brooklyn Rapid Transit. These trains would leave the elevated structure at Chestnut Street Junction, run 1.8 miles to Woodhaven Junction, and then over Jamaica Bay to Rockaway Park. *Railway Age* noted that while these trains might be lighter in weight compared to those of the Long Island Railroad, they would be running more frequently (“Pennsylvania Railroad's Extension to New York and Long Island – Rotary Converter Stations on the Long Island Railroad”, *Railway Age*, June 22, 1906).

The trestle over Jamaica Bay was electrified in 1904. By 1906 the electrification extended to Valley Stream, which meant that the eastern half of Jamaica Bay was completely encircled by high capacity commuter rail service. (Figure 4) Although primarily a passenger railroad, the Long Island did have facilities large enough to handle 52 freight cars at Far Rockaway and advertised that express service was available on Broad Channel (*Queens Borough New York City, the Borough of Homes and Industry* 1920, 52-59). The efficiencies allowed by running trains directly to Pennsylvania Station on Manhattan were expected to vastly shorten commuting times. The trip between Pennsylvania Station and Far Rockaway or Rockaway Beach was only 33 minutes. It is estimated that eliminating the ferry ride over the East River would save commuters between 20 and 25 minutes in each direction (“Progress of Long Island Railroad Electrification”, *Electric Railway Journal*, Apr.16, 1910).

In 1920 the Long Island railroad ran between 50 and 75 daily trains to the Rockaway Peninsula and about twice that number on weekends (*Queens Borough New York City, the Borough of Homes and Industry* 1920, 129). Some idea of the demand generated by day-trippers for railroad service to the Rockaway Peninsula comes from a 1913 account of a service interruption. On June 29, a Sunday night, a short circuit caused a fire in two railroad cars and caused minor damage to the bridge. Some of the passengers on the stranded train panicked and jumped into the bay. Fortunately they landed in either shallow water or mud and there were no injuries. The remaining passengers were unloaded and had to walk. The train crew then tried to put out the fire but had only buckets and barrels of water. Trains following on the trestle were stopped and passengers were forced to walk back to the shore. An estimated 30,000 passengers were stranded at Rockaway Beach. A parade of streetcars providing alternative service passed through the streets of Jamaica between midnight and 3 a. m. Thousands more people slept on the beach and the police station housed women and children. Householders charged as much as \$5 for a single room and the owners of motor trucks collected up to \$1.50 per passenger for a trip off the peninsula. Finally, a special train from Rockaway Beach to Jamaica by way of Far Rockaway and Valley Stream relieved the situation (“A Big Disturbance From a Small Accident”, *Railway Age* 1913, Vol.55, no.1). The 1913 incident serves as a reminder that Jamaica Bay trestle was a major maintenance headache from the beginning.

In 1950 a fire destroyed the railroad trestle over the bay. The Metropolitan Transportation Authority (MTA) acquired the line, rebuilt the trestle, and connected it to the subway system in 1953 (Wolfe n.d., 611). (Figure 5)

The reconstruction of line across the bay in 1953 helped create one of the most important features of the Jamaica Bay wildlife refuge. Six million cubic yards of dredged sand were used to create are two impoundments which were then planted with vegetation by New York City Parks Department. The choice of plantings was determined by their ability to thrive in coastal conditions and to provide food and nesting sites to bird populations (Tanacredi 1983, 143-150).

The railroads that served Jamaica Bay were all built originally with private money and were all primarily passenger routes. There was money to be made supporting the tourism industry and hauling day-trippers to the beaches and fishing resorts. Such an arrangement could only last as long as Jamaica Bay remained unspoiled and the huge urban population had few alternative destinations. The coming of the automobile would both allow the city to expand outwards around the bay and open up more distant opportunities for recreation. Eventually the railroads that helped popularize the beaches would serve a growing number of permanent residents.

Jamaica Bay was not entirely unspoiled when large numbers of tourists first began to arrive as it had already been the site of an odiferous and vital industry for many decades.

Chapter 4

Jamaica Bay and the City's

Waste Management

Infrastructure.

In the 1800s New York City was never a particularly clean place. The Common Council had the authority to oversee sanitary conditions since the start of the century. (Burrows, Gotham, page 588) But enforcement of the sanitary laws was infrequent at best. By the 1830s heaps of mud, rotting food, and animal excrement piled up on the streets forming a foul mass dubbed "Corporation Pudding." To this mass were added the waste streams from tanneries, slaughterhouses, dyers, distilleries, glue works, bone boilers, and stables. In the absence of regular garbage collection pigs were allowed to roam the streets and convert at least a portion of the wastes to food (Burrows and Wallace 1998, 588).

Although the city had a master plan, there was no effective planning authority. (Spann page 160). While individual neighborhoods might protest against the presence of slaughterhouses, stables, bone boilers, and other nuisances, the protests were usually ineffective. In such disputes the city government tended to side with property owners and merchants (Spann page 161).

An 1832 cholera epidemic swept through Europe and fears that it would cross the Atlantic lead to a call by the city's Medical Society to establish a system of emergency hospitals and begin disinfecting cesspools and privies using quicklime. They also called on the city government to clean up the streets, yards, and vacant lots (Burrows and Wallace 1998, 590). Although the Medical Society represented two-thirds of the city's

practicing physicians, the city government largely ignored their suggestions. In writing about the 1832 outbreak Burrows and Wallace assert that the city government believed that the outbreak would bypass the "virtuous parts of town and descend, like God's wrath, on the sin-infested quarters" (590). By June 15th word reached the city that cholera has crossed the ocean and had broken out in Montreal and Quebec. The first confirmed cases in the city were reported by the end of June (590). About half the population, an estimated 100,000 people eventually fled the city. A total of 3,513 persons died during the course of the epidemic, mostly in the poorer neighborhoods (591) During the epidemic, the city's Bellevue Hospital admitted 2,000 cholera patients of which about 600 died (592).

Eventually the Board of Health took the lead in fighting the epidemic. The clothes and bedding of the sick were taken out and burned. Streets were swept clean as were the vacant lots, docks, and other places where years of filth had accumulated. Working people laid off in the epidemic were paid to clean their dwellings. The city's wealthier citizens established soup kitchens, and set up a system for distributing food and clothing (Burrows and Wallace 1998, 591). In August the number of new cases began dropping and by the 29th medical authorities declared the city safe (593).

After the epidemic subsided, the physicians, civic leaders, and the clergy took stock and

tried to make sense of the event. They had little information to go on. It would be another decade and a half before Dr. John Snow of London (1813-1858) would firmly establish the link between contaminated water supplies and the spread of cholera. The first edition of his groundbreaking *On the Mode of the Communication of Cholera* was published in 1849 and an expanded edition came out in 1855. The germ theory of disease would not be well established among the medical community for another five decades (Olsen, MSU Symposium, 2010). About the only thing that could be said with any certainty was that the disease struck most often in the poorest and dirtiest parts of the city. Opinion was divided as to whether the disease was divine retribution for slovenliness, breaking the Sabbath, indulging in drink, or some other vice. An only slightly more charitable view held that the poor were naturally slovenly and thus brought the disease on themselves (Burrows and Wallace 1998, 593).

The majority of these explanations allowed affluent New Yorkers the comforting thought that the poor had largely brought the disease on themselves and therefore they had little to fear from any future epidemics.

In New York City of the 1800s the filth and mess on the streets was about as evenly distributed as the city's wealth. The more affluent residents paid for regular garbage collection, street sweeping, and frequent privy cleaning. (Nagel, MSU lecture, 2010)

Cholera broke out again in 1848, and after 5,000 deaths, the calls for sanitary reform could no longer be ignored (Burrows and Wallace 1998, 786). What was worse, this time the disease was spreading beyond the slums and infecting both rich and poor alike. On Friday, July 13, James Reyburn, a well-known 55-year old cotton broker and Wall Street lawyer began exhibiting the first symptoms cholera. Despite the efforts of his physicians Reyburn was dead by Saturday night. Reyburn was well known and respected in the city and his death threatened to set off a panic. Newspapers reported that several of the recent cholera victims were members of the "respectable classes, including even ladies" (Miller 2000).

One of the most far reaching reforms after the outbreak was the construction of a sewer system. The city's Croton Aqueduct Department had recently been reorganized so that they would also be responsible for sewer construction. The city had spent millions to build the original aqueduct and having satisfied its responsibilities to provide drinking water, balked at the cost of providing sewers (Spann, n.d., 133). For many years the city saw the purpose of what few sewers it did have as carrying off rainwater and not human wastes. Tubmen, the workers who emptied the privies, were specifically prohibited from placing wastes into the sewers and in 1819 the Common Council went so far as to require grates installed on the sewers to keep fecal matter out (Burrows and Wallace 1998, 589). In the wake of the outbreak however the situation changed. Between 1850 and 1855, 70

miles of new sewers were laid. It was only a start. In 1856 the city had 500 miles of streets and in a city of 600,000 people there were only 10,384 water closets and a mere 1361 baths (Spann n.d., 133).

There were numerous other sanitary reforms in the wake of the epidemic. The city seized up an estimated five to six thousand hogs from individual homeowners. Another 20,000 hogs were driven to the still undeveloped northern parts of Manhattan. Bounties were paid for stray dogs and 3,520 were killed mostly by club-wielding boys. The reform with the greatest impact on the future of Jamaica Bay was the decision in 1851-2 to banish all bone boiling works from Manhattan. (Burrows and Wallace 1998, 786)

In 1850 it was estimated that New York had 748 places where there was a "greater or lesser amount of animal matter undergoing decay." These places included 206 public markets, 11 slaughterhouses, and 531 butcher shops (Spann n.d., 129).

The state of private abattoirs on Manhattan Island was described by Mary Trautmann of the Women's Health Protective Association in 1898. The association was formed in 1884 by eleven women from the exclusive Beekman Hill neighborhood overlooking the East River. The association took on the problem of foul air in their neighborhood. They did

not have to look far for one of the causes, 20,000 tons of manure were stored by a one Michael Kane, a fertilizer dealer whose brother-in-law was a State Senator. The women brought Kane to court and unlike previous efforts to force Kane to remove the manure, they would not be ignored (Trautmann, *Women's Health Protective Association, Municipal Affairs*, vol.2, no.2, June 1896).

The Association next toured the private abattoirs in an area known as the "Abattoir District" along First Avenue from 43rd to 47th streets. The earlier legislation that moved bone boiling and rendering works out of the city only covered the southern part of Manhattan Island. The abattoir operated by Rafferty and Williams had 55 "dirty little pens." The slaughtering was done "in the presence of children" who stood by and watched the entire process. The walls and floors of the pens reeked with filth. The meat was hung on hooks over the curbs, exposed to swarms of flies, and whatever dirt and dust was swirling in the air. Animals awaiting slaughter were kept in basement pens, often crawling over one another to reach the gratings and a breath of fresh air (Trautmann, *Women's Health Protective Association, Municipal Affairs*, vol.2, no.2, June 1896).

The odors from the bone boiling works were described as "overpowering." One of the problems was that bones were not collected on a regular schedule and those that had been awaiting collection were often putrid. The simple expedient of requiring bones and offal

to be collected and processed daily was enough to eliminate the problem (Trautmann, *Women's Health Protective Association, Municipal Affairs*, vol.2, no.2, June 1896).

City Inspector Alfred White established a franchise system to handle the city's waste in 1849 and using a dummy partner as a front, arranged for himself to have a monopoly on waste disposal. He and co-owner William B. Reynolds selected Barren Island in the east end of Jamaica Bay as the site of a plant that would turn the city's putrescible waste products into grease and fertilizer (Miller 2000). (Figures 6, 7, and 8)

Shortly before the 1870s the firm of P. White's Sons won a contract with the Board of Health for removing dead animals from the streets of New York. The primary product of the company was the products of the rendering process. In one five-day period in August of 1896 the company removed 1,256 dead horses from the streets of New York. The company had its own pier on the Hudson River and two steam boats to carry carcasses to Barren Island ("To Use New York Garbage", *New York Times*, Sept.27, 1896).

If the nuisances were removed from the city, they were still smelly and disease-breeding. In 1870 an unidentified writer in *Punchinello* noted that the New York Rendering Company, which at the time was located near the Hudson River, was an odiferous

nuisance to its neighbors. In the summer months the odors drifted over the river and enveloped the excursion boats filled with passengers seeking relief from the city. The writer stated that the rendering company's vats were kept filled by the dead horses from the street railway companies. New York Mayor Abraham Hall (1829-1898) made a complaint against the company and an indictment was expected from the grand jury in the early fall of 1870. The writer hoped that the "boiling nuisances" would soon be seized and that the company would soon "render up the ghost, and go out sputtering, like a dip candle from one of their own rancid renderings – and so an end of them." The writer it should be noted, did not propose an alternative disposal site or method (*Punchinello* 1870).

Moving New York's waste processing industries to Barren Island solved the problem of recycling organic wastes but did not solve the problem of the odors that the industry created, it only shifted them to Jamaica Bay. As the bay became increasingly popular as a tourist destination and population grew in the surrounding communities, the odors associated with Barren Island were growing increasingly unwelcome. The *Brooklyn Daily Eagle* reported in August of 1899 that steamboat passengers on Jamaica Bay were exposed to a belt of smells from horse-boiling works, menhaden oil works, offal baking works, and garbage drying plants ("Barren Island", *Brooklyn Daily Eagle*, Aug. 14, 1899).

For the first fifty years, the city concentrated on using the waste recycling process to dispose of animal carcasses, butcher's offal, and slaughterhouse wastes. It was not until 1897 that the city attempted to collect all food wastes from home and commercial kitchens, markets, butcher shops, slaughter houses, hotels, and restaurants and recover marketable products from them (Waring, "Great Business Operations III, the Utilization of City Garbage", *Cosmopolitan*, vol.24, 1898, 405).

The grease recovered had a number of important industrial uses. Tallow was used in leather tanning, as a lubricant, and in the manufacture of soap and candles.

Making good quality candles careful preparation of the tallow. The first step was rendering the animal fat. Rendering fat was simply melting it in a vessel for two or three hours. It was then passed through a sieve. After being allowed to cool, the remaining solids were separated out. The mass was loaded into a perforated pail and the tallow squeezed out by use of a screw press. The remaining solids were often used as swine food while the tallow was re-melted and became purer and whiter (*Manufacturer and Builder* Oct.1873, 235).

Processing animal fats for soap manufacture used a slightly different process. In addition

to animal fats, coconut oil, palm, and olive oils were widely used. A number of improvements on the basic rendering process were in use by 1870. The Wilson Process used a sealed tank. The typical tank was an upright cylinder holding 1200 to 1500 gallons with a pipe for the admission of steam. Valves allowed condensed steam and the processed fat to be drawn off. The tank was loaded through a manhole at the top. Suet was steamed at 50 psi for up to 15 hours. More time was required for processing lard. The residual material in the tank was reported to be rich in nitrogen and phosphorous and it was probably sold for fertilizer (*Manufacturer and Builder* Aug.1870, 232).

Residual water in process often contained dissolved remnants of the original animal tissues. These were subject to bacterial decay and caused the processed fats to have an unpleasant odor. These impurities were removed by subsequent washing steps (*Manufacturer and Builder* Aug.1870, 232).

During the 1800s it was important to recycle food waste products back into fertilizer because without massive inputs of nutrients the sandy soils of Long Island would not have been able to sustain a large urban population. While some food stuffs such as grains could be transported long distances, until the twentieth century, there was no technology that could fresh fruits and vegetables from distant farms. Recycling the city's organic waste products; food scraps, offal, night soil, manure, dead animals, and bones allowed

the farmers on Long Island to use twice the amount of fertilizer as farmers in other parts of the country. It also removed smelly, disease-breeding nuisances from the city.

Despite competition from western corn, wheat, and cattle, farming in the New York and New Jersey regions increased dramatically. Between 1840 and 1860 the value of crops produced in region's market gardens for urban consumption increased by eight times. Tomatoes, asparagus, cabbages, cauliflower, peas, beans, carrots, and potatoes flowed into the city by boat, market wagon, and railroad (Spann n.d., 122).

A number of persons pointed out the tremendous waste of resources that discharging sewage into the oceans represented. At an 1853 meeting of the City Farmer's Club, Robert Ellis of Ulster County, claimed that in one year, the sewage that New York City discharged into the oceans contained enough nitrogen to raise 180 million pounds of wheat (Spann n.d., 30).

It was not however, that New York was neglecting this resource. The city's night soils were sold to fertilizer manufacturers like the Lodi Manufacturing Company of New Jersey. As early as 1840 the Board of Aldermen was advocating new railroad construction so that the market for manure would be expanded (Spann n.d., 131). The

city realized considerable amounts of revenue through the sale of manure. In 1845 the proceeds reached \$45,000 (460). But as the supply increased, the price went down. In 1856 there were 22,500 horses pulling just the public conveyances such as omnibuses, streetcars, and cabs. The number of horses kept for private carriages and wagons was uncounted (129). By 1857 the revenues from the sale of manure disappeared completely (460).

Municipal studies from the Department of Sanitation in 1889 and the office of the Mayor 1894 concluded that large scale refuse combustion was both uneconomical and unproven. Early experience with this technology (at the time employing mostly low-temperature combustion under 675 C) supported these conclusions. Staten Island's three-year old municipal incinerator was closed by court order in 1898 after repeated complaints about the odors. The incinerator which replaced it failed after only one year. Of 180 waste incinerators built in the United States after 1885, 60% were closed by 1908. Once high temperature burn technology became available after 1908, 200 successful incinerators were in operation within ten years (Walsh, "Incineration, What Lead to the Rise and Fall of Incineration in New York City?", *Environmental Science and Technology*, Aug.1, 2002, vol.36, no.15, 317A – 322A).

Thus it was the threat of disease and the nuisance odors from putrescible food wastes that

continued to dictate the city's waste management policies. In 1896 the city adopted waste management laws that would feed the plants on Barren Island a seemingly inexhaustible stream of waste. It became mandatory for householders to separate moist food wastes, rubbish (defined as dry wastes), and ashes. Writing in 2002, Daniel C. Walsh of Columbia University concluded that this decision delayed New York City's adoption of incineration technology for at least three decades (Walsh, "Incineration, What Lead to the Rise and Fall of Incineration in New York City?", *Environmental Science and Technology*, Aug.1, 2002, vol.36, no.15, 317A – 322A).

The problems with incineration were obviously well known among the public and seem to have preceded their construction. In 1896 some of the bidders for garbage removal contracts in Brooklyn announced that they would build an incinerator on Barren Island. In response to this announcement, the Citizens' Association of Flatlands announced that it would take legal action to prevent construction of an incinerator on Barren Island, or "anywhere within smelling distance of the homes along Jamaica" ("Object to Cremators Near Them", *New York Times*, Oct.14, 1896).

Writing about the relative merits of incineration, or as it was known at the time, cremation, George E. Waring did note that incinerators had lower labor costs since they required fewer operators (Waring, "Great Business Operations III., The Utilization of

City Garbage”, *Cosmopolitan*, vol.24, 1898, 405). The American and English experience with incineration were very different. English operators generally succeeded in running their incinerators at a higher temperature. Observers at the time attributed this to two factors, the use of soft coal for heating, and secondly that the English diet had fewer vegetables. When fireplace ashes were comingled in the waste stream the un-burnt chunks of coal provided significant extra fuel. Fewer vegetables in the waste streams meant less water in the incinerator.

Tests of incineration technology by the City of New York showed that regardless of the operating conditions there was always some unburned vegetable matter and even unburned paper (Waring, “Great Business Operations III., The Utilization of City Garbage”, *Cosmopolitan*, vol.24, 1898, 405).

Having settled on waste reduction, the city had to choose between several competing waste reduction companies and each had a slightly different process. The Pierce and Merz companies used a mixture of steam and light hydrocarbons in a tightly closed vessel to extract the usable grease. The Merz system was used in Buffalo and Saint Louis it used a mixture of benzene and naphtha for the extraction. The Pierce process used only naphtha. The Arnold, Holthaus, and Preston companies used processes were described as being "purely mechanical" and used no naphtha (Waring, “Great Business Operations III.,

The Utilization of City Garbage”, *Cosmopolitan*, vol.24, 1898, 405).

After a careful examination of companies using each of these competing technologies, the city decided that steam without naphtha extraction would be adequate for the city's needs and invited bids for the new waste reduction plant. In the first round of bidding Arnold bid \$169,000, Holthaus \$175,000, and Merz \$144,000. At the next round of bidding Merz did not lower its bid, Holthaus dropped out, and Arnold lowered its bid to \$89,990. Arnold thus won a five year contract that would require them to build the largest waste reduction plant in the world. The \$89,900 that would be paid by the city each year was estimated to be approximately equal to what it would cost the company for the barge transport of garbage between Manhattan and Barren Island. The Arnold Company would make its profits entirely from the sale of grease and tankage. At the time that the contract was awarded, the plant was expected to receive about 600 tons of garbage every day. Since the price crude grease was 3 cents per pound and tankage was \$6 a ton, the Arnold Company could expect to make \$1,000 a day from grease and another \$600 from in tankage. Shortly after the contract was awarded the price of grease dropped to 1.5 cents per pound but the volume of garbage increased and it was hoped that these two trends would cancel each other out and the company would continue to make money (Waring, “Great Business Operations III., The Utilization of City Garbage”, *Cosmopolitan*, vol.24, 1898, 405).

The technology of waste reduction was fundamentally no different than that used for rendering but had to be scaled up if it to process the garbage of an entire city. By 1900 the waste reduction works were recovering 1000 tons of marketable grease every day and 1500 tons a day at peak times. A report made to the Institute of Civil Engineers said that the 48 digesters each had a capacity of 10 tons, stood 14 feet high, and had a diameter of 5' 6". The bottoms of the digesters were conical and the top were dome-shaped. The digester was first filled with water to a depth of three or four feet and then filled with garbage. The hatches were closed and steam was admitted into the jacketing. This raised the temperature inside to boiling and the pressure was allowed to stand at 30 to 80 psi for eight hours ("The Barren Island Garbage-Reduction Works, Greater New York", *The Institution of Civil Engineers*, Sess.1889-1900,Pt.III, Sec.1, Feb.6, 1900, 389).

After digestion the tankage was pressed to remove the last amounts of recoverable grease and any residual water. On Barren Island the tankage was loaded in thin layers into crates that were surrounded by gunny sacking. The stack was pressed at 240 tons of pressure although it is not recorded how this pressure was achieved, with hydraulics or some system of gears and screws (Waring, "Great Business Operations III., The Utilization of City Garbage", *Cosmopolitan*, vol.24, 1898, 405). (Figure 9) After pressing, the tankage was sent into driers, large steam jacketed cylinders equipped with revolving arms that kept the material stirring. The fumes from the driers were a source of noxious gasses and were not easily destroyed. A combination of a water spray, heated

retorts, and finally a tyre directed them into the "hottest part" of the furnace that supplied heat for the steam boilers (405). However Waring admitted that some gasses remained and as will be seen complaints about the waste processing plants on Barren Island would continue for some years (405).

The residual liquids squeezed from the tankage were described as being a "dark-colored caramel refuse" was piped into the Rockaway Inlet. Waring claimed that the discharge could "do no harm whatsoever" because the volume was small compared to the tidal currents. However it was possible to trace the effluent 100 feet back to the discharge pipe by its color (Waring, "Great Business Operations III., The Utilization of City Garbage", *Cosmopolitan*, vol.24, 1898, 405). Waring may well have believed that the effluent was harmless but his attitude is somewhat naive. The effluent pipe would have sent the discharge toward Coney Island when the tide was going out, and towards Rockaway and Canarsie when it was flowing in. The ultimate solution was to send the liquid to an evaporator so that the water would be boiled off and the thick, organic-rich remainder added to the tankage (405).

In scaling up rendering technologies for waste reduction one of the most important changes was the adoption of improved material handling technologies so the barges would be unloaded faster (Waring, "Great Business Operations III., The Utilization of

City Garbage”, *Cosmopolitan*, vol.24, 1898, 405). (Figure 10)

Looking forward to the future of the industry Waring predicted that a system of continuous pressing would need to be adopted along with other labor saving machinery so that a city as small as 50,000 persons might profitably operate a waste reduction plant (Waring, “Great Business Operations III., The Utilization of City Garbage”, *Cosmopolitan*, vol.24, 1898, 405).

The waste reduction system conceived by the City of New York was only valid for food wastes "garbage" and left the other waste streams, street sweepings, ashes, and "rubbish" untreated. "Rubbish" was generally defined to mean items like paper, rags, bottles, and cans that could be recycled. In the mid-1890s New York generated 950,000 cubic yards of waste rubbish annually. The city was offered \$245,000 dollars annually for the privilege of culling this waste stream. The cost of culling this material was estimated to be \$6,000 annually for every 50,000 city residents (Waring, “Great Business Operations III., The Utilization of City Garbage”, *Cosmopolitan*, vol.24, 1898, 405). (Figure 11)

The requirement for sorting garbage came just before the opening of the garbage reduction plant of the New York Sanitary Reduction Company. The company had been

incorporated in New Jersey with \$1,000,000 in capital. The New York Sanitary Reduction Company would have a five-year contract with the city. The President was David Martin, a famous Philadelphia political boss, the Vice President was Thomas F. White of New York, Secretary William W. Gooch, and the treasurer was W.V. Cranford who was affiliated with a Brooklyn contracting firm. Vice President White was co-owner with his brother Andrew J. White in the firm of P. White's Sons. P. White's Sons already had a large plant on Barren Island. The company was the largest landowner on the island and its largest employer. At the time that the New York Sanitary Reduction Company was founded P. White's Sons had already signed contracts with a number of the city's leading hotels for the removal of garbage (“To Use New York Garbage”, *New York Times*, Sept., 27, 1896).

The plant of the New York Sanitary Reduction Company was designed with 48 cylindrical cooking vessels, each one five feet wide by fifteen feet high. Steam for cooking the garbage was let into the tanks from a pipe at the bottom. Each tank could hold six tons of garbage and operating three cycles each 24 hours the total capacity of the plant was 864 tons. The tanks were capable of reaching a temperature of 300 F. They were designed with openings at top and bottom. They were loaded at the top from conveyors that brought the garbage from the boats. The cooked materials were dropped out the bottom opening and into a sheet-iron receiving tank. Water would then drain out the bottom of the tank. At this point the garbage should, in theory at least, be odorless.

Any noxious gasses released during the heating cycle would be captured and sent into the steam boiler's firebox. The cooking process was also expected to kill bacteria. The receiving tanks in turn emptied their contents into bags about 30 inches square which were then closed and stacked in one of 12 screw press each about four feet square. Pressing removed the last of the grease and waster. The grease was sent for washing with water to remove impurities while the dry tankage was sent to driers ("To Use New York Garbage", *New York Times*, Sept., 27, 1896).

The first step in the process was a trip on a tram car to the drying house. The tankage was dumped into a pit where a masticating machine kept it stirred. There were more than a dozen driers. These were steam-jacketed horizontal tanks, 16 feet long with stirring arms attached to a rotating shaft. The drying operation lasted three to six hours. When the moisture content reached 10% the tankage was screened before being bagged for sale as fertilizer ("To Use New York Garbage", *New York Times*, Sept., 27, 1896).

At the time that the New York Sanitary Reduction Company plant was opened, New York generated about 800 tons of garbage each day. There was obviously little or no excess capacity so landfilling and ocean disposal would continue to be used ("To Use New York Garbage", *New York Times*, Sept., 27, 1896).

In writing about the new plant the New York Times took pains to reassure its readers that the plant would not be a problem for the city. Barren Island was "so remote" that "few New-Yorkers would know how to find it." Works of this type, so readers were assured, when properly operated would not produce offensive odors. It seems not to have occurred to the writer in the *Times* that Barren Island was only a short distance from Coney Island, Rockaway Point, and Canarsie ("To Use New York Garbage", *New York Times*, Sept., 27, 1896).

When reduction plants joined the rendering works in the mid-1890s, a whole new class of public nuisance was introduced to Jamaica Bay. When the New York State Department of Health held hearing on reduction plants in 1916, the report identified twelve reasons why garbage reduction created nuisances ("37th Annual Report of the New York State Dept of Health", *Report of the Division of Sanitary Engineering*, 1917, vol.2, 751):

1. Garbage is subject to putrefaction and decay resulting in offensive odors and possibly toxic gasses. At the time the science of toxicology was not sufficiently advanced to determine if the odor-causing compounds were in fact harmful to health. Evidence from animal studies and statistical analysis was inconclusive.
2. Garbage may contain bacteria from human feces and saliva. While feces were rarely found in garbage, saliva was much more common although it was though not to play a significant role in disease transmission.
3. Flies bred in household garbage.
4. Piles of garbage would attract flies.
5. Passage of garbage scows would expose persons living near the water or traveling aboard ferryboats to odors.

6. The sight of large garbage scows under tow would be offensive.
7. Odors would be generated at the plant from scows awaiting unloading, filling and emptying digesters, processing the tankage, and general odors around the plant.
8. The odors from the plant would cause loss of appetite and general mental discomfort.
9. Discharge of effluent water might contaminate drinking water supplies.
10. Discharge of effluent water, loose garbage, and wash water would harm fish and other marine life.
11. Discharge of effluent water, loose garbage, and wash water would create offensive sights and smells to persons living on or near the waterways.
12. Under Section 1754 of the Penal Law, the process was noisome and unwholesome and therefore could not be conducted near a public highway.

In 1899 it was reported that the plant managers did attempt to make the process less odiferous. Refuse was unloaded from the scows quickly and brought immediately into the plants instead of being allowed to pile up on the docks. The processing technology was described as being "quick and thorough" and deodorizing compounds were freely used ("Barren Island", *Brooklyn Daily Eagle*, Aug.14, 1899).

An editorial in the *Brooklyn Daily Eagle* noted that the State Legislature in Albany would be conducting hearing about the odors coming from Barren Island. The editorial noted that there was no "healthful and inoffensive way" to dispose of refuse. Science, they wrote, stands "helpless before this elementary problem." The sewage of cities was being poured into streams where they would foul the drinking waters of downstream cities.

Refuse had to be recycled into agricultural fertilizer and this is what happens on Barren Island. The owners and managers of the plants claimed that this was done without "injury to health or offense to the senses." Indeed one of the plant managers claimed the only odor was like that of chocolate. The *Brooklyn Daily Eagle* pointed out that the plants have tall chimneys which carry the fumes into the air. In theory this should have solved the problem but by the time that the plume of smoke reached the other side of the bay, it had descended to ground level. The newspaper gleefully predicted that it would not be long before the State Legislature would learn that the residents near the plants did not find the fumes very much like chocolate ("The Barren Island Zephyrs", *Brooklyn Daily Eagle*, Feb.14, 1900).

If the plants were producing a nuisance, could they actually be closed? Shutting down the plants would not be easy. As of 1899 the sale of recovered materials from Barren Island were netting \$2,000,000 a year. The revenues were used to finance garbage collection. Should this revenue stream dry up, the city would be forced to finance its own collection routes. It was also noted that in addition to resource conversion, there was the business of recovering tin cans, rags, and paper. The oil was still an important industrial feedstock and used to manufacture soap, hair oil, candles, lubricants, and other products ("Barren Island", *Brooklyn Daily Eagle*, Aug.14, 1899).

But these considerations did not prevent the State Legislature from trying to shut the plants down. A law provided that after May of 1901 it would be illegal to render or boil, garbage, swill, or offal in the borough of Brooklyn (“Constitution Extends Even to Barren Island”, *Brooklyn Daily Eagle*, Nov.10, 1900).

However the contracts between the city of New York and the New York Sanitary Reduction Company had more than a year to run beyond the May 1901 date. The company then brought suit against the city restraining it from enforcing the law. Justice Francis M. Scott of the Manhattan Supreme Court heard the case and ruled that the act violated the constitution in that it did not declare the business to be a nuisance (which under common law would entitle injured parties to injunctive relief) or prohibited the activities in any other part of the city. Lastly, Justice Scott ruled that even if the legislature did have the right to cancel a contract whose purpose was the preservation of public health, it could not do so without providing compensation for the injured party (“Constitution Extends Even to Barren Island”, *Brooklyn Daily Eagle*, Nov.10, 1900).

In considering alternatives to the process it was noted that ocean dumping was wasteful and the way it was practiced was not very effective. Instead of going the required forty miles out to sea, the scows were only going six to eight miles. Incoming tides brought the garbage onto the beaches of Coney Island, Rockaway, and even Long Beach. The

materials fester in the sun and breed "maggots and flies by the millions" ("Barren Island", *Brooklyn Daily Eagle*, Aug.14, 1899).

Alternative disposal sites on the New Jersey Shore and Staten Island were considered. The former location was rejected due to anticipated community opposition while the latter seemed preferable since it was already under a constant cloud of smoke from the oil refineries in New Jersey. Even so, it was noted that the borough was developing rapidly and new residents would certainly object to garbage processing plants in the community. Another option was an artificial island twenty miles off shore. Such a scheme was already under consideration as a gambling resort ("Barren Island", *Brooklyn Daily Eagle*, Aug.14, 1899).

In the late 1890s, Brooklyn also decided to adapt waste reduction technology. Brooklyn's City Works (Theodore Willis) and Health (Emory) commissioners signed a five-year garbage removal contract with the Brooklyn Sanitary Company (H. Cranford President) in December of 1896 ("Garbage Contract Awarded", *Brooklyn Daily Eagle*, Dec.11, 1896). The contract called for daily collection of kitchen wastes and also for the immediate removal of the garbage which had been accumulating in empty lots and on the streets. But it did not specify the means of ultimate disposal, only calling for a disposal plant with a capacity of 500 tons every 24 hours and that construction of the plant would

start within thirty days of the contract being signed (“Garbage Contract Executed”, *Brooklyn Daily Eagle*, Dec.12, 1896). A few weeks before the contract was signed the Brooklyn Sanitary Company announced that they would use the plants already on Barren Island until their own plant was ready. As the contract moved forward the company announced that it would adopt the Arnold system of waste reduction when it built its own plant. Responding to concerns about potential odor problems Mayor Wurster personally contacted officials in Philadelphia to ask whether the system was a nuisance. Philadelphia at the time was one of the largest cities using the process (“Wurster and Garbage”, *Brooklyn Daily Eagle*, Nov. 21, 1896).

The city of Brooklyn was understandably eager to sign the contract since the federal government ordered that ocean dumping of garbage cease after June 1, 1896. Brooklyn's mayor Frederick W. Wurster was urged to act in conjunction with Mayor William L. Strong of New York to request a delay at least to the end of the year, the cities having no better means of disposal (“The Garbage Question”, *Brooklyn Daily Eagle*, Feb.5, 1896).

The New York Sanitary Reduction Company and other operators on Barren Island would be joined by the Brooklyn Sanitary Company which was owned and operated by F.L. Cranford, President, W.V. Cranford, secretary, and their father J.P. Cranford, a well-known Brooklyn contractor. The announced their plans in November of 1896 promising

to spend \$200,000 for a waste processing plant that would have a capacity of 500 tons per day and be operational by May of 1897. Their bid for the five year contract was \$605,000 which according to J.P. Cranford would mean operating at a loss. The revenue would be made up by the sale of grease and fertilizer. Most of the latter was expected to be sold in the southern states for cotton growing (“Sanitary Company's Plans”, *Brooklyn Daily Eagle*, Nov. 18, 1896). The plant was operational in 1897 and the odors coming from it were described as being no worse than would be experienced in a "large hotel kitchen" (“The City's Garbage Plant”, *Brooklyn Daily Eagle*, Dec.1, 1897). The tankage not sold for fertilizer was used as fuel for the boilers and as with the other plants on Barren Island, the syrupy waste water was treated in vacuum evaporators so the last remaining waste materials could be recovered and added to the fertilizer. The company's chemist, Dr. Terne, developed this process. The tankage was sold to fertilizer manufacturers who, after enriching the material with phosphates and other nutrients, sold it to cotton cultivators. As the final sifting of the tankage took place, the operator of the sieves, described as a "boy" but his age was not given, claimed the silverware that "careless servants" threw into the garbage pails (“The City's Garbage Plant”).

By 1902 the Brooklyn Sanitary Company was established on Barren Island and was even able to sponsor an excursion for 200 of the island's children to Steeple Chase Park on Coney Island. The outing was supervised by Reverend T.F. Horan of the Holy Family Roman Catholic Church of Canarsie (“Children Enjoy Outing”, *Brooklyn Daily Eagle*,

Sep.4, 1902).

Although the 1896 contract between the City of Brooklyn and the Brooklyn Sanitary Company was to run five years, consolidation terminated that arrangement and the Brooklyn Sanitary Company began the new century with a day-to-day contract that could be terminated at any time by the Commissioner of Street Cleaning. In 1902 the first five-year garbage disposal contract for Brooklyn would be awarded to the New York Sanitary Utilization Company. The company underbid three rivals with a low bid of only \$47,990. The Brooklyn Sanitary Company did not bid on the contract. No explanation was given for this decision in the press reports. However the low bid did not include street cleaning or collection of garbage. The City's Street Cleaning Department was supposed to supervise those activities (“Nagle Plan Carried Out by Successor Woodbury”, *Brooklyn Daily Eagle*, Apr.15, 1902).

Barren Island served three functions, waste disposal, fertilizer production, and industrial chemicals, particularly grease and glycerin. As early as the 1700's farms in the surrounding countryside produced cash crops for New York's urban market. By the mid-1700's large areas of farmland in New Jersey were already abandoned as soil fertility was exhausted (Olsen, n.d., *Hadrosaurs*). As New York's population grew even faster throughout the 1800s, it became clear that without an effective means of replenishing the

soil the farmers would be faced with ever decreasing crop yields (Miller 2000, 47).

For many decades farms close to the major cities successfully used manures as fertilizers. The same carts, wagons, boats, and even railroads that carried crops to the urban centers carried manures back to the countryside. An 1842 report of the King's County Agricultural Society noted the positive correlation between manure use and farm income (Linder and Zacharias 1999, 29). The shift to more "manure-intensive" vegetable production in western Long Island corresponded to the rise of horse-drawn transportation in Brooklyn and New York (50). All of the stable manure from Brooklyn, most of New York's, and even a portion of Albany's were used to fertilize farms on western Long Island (47). In addition to horses, manures were available from the city's dairy cows and pigs. In 1878 the U.S. Census Office observed that Brooklyn had 75,000 homes and 25,000 privies that provided 20,000 cubic feet of night-soil to farms in Kings County each year (49). In time, a group of dealers arose who collected manures, composted them into light and friable manure, and sold them at premium prices to farmers (48). In 1872, the typical market gardener near a large city would use as much fertilizer on one acre as other farmers used on 50 acres (49).

But by the late 1800s and early 1900s the limitations of manure were becoming obvious. The tradition of returning manure from the city this would not be enough to stem the loss

of soil fertility. Manure scooped off the streets was contaminated with other wastes. Even when it is pure, manure's high water content made transport inefficient. Manure also lacked sufficient amounts of potassium and phosphate for it to fulfill the needs of the region's farmers (Miller 2000, 49).

In 1907 the City of New York reported the results for the analysis of their street sweepings and found that using them as agricultural fertilizer was unrealistic. In street sweepings, the nitrogen, phosphoric acid, and potassium were almost entirely from animal excrement. The amounts of nitrogen, phosphoric acid, and potassium varied considerably. On average in every one ton of street sweepings, there were 8.52 pounds of nitrogen, 8.40 pounds of phosphoric acid, and 7.32 pounds potash. The other 98.8% of the sweepings were considered inert. Additionally, as much as half of the phosphates were sometimes present in an insoluble form (*Report of Commission on Street Cleaning and Waste Disposal*, City of New York, 1907).

The total value of these nutrients varied with fluctuations of the fertilizer markets so that the costs that the city could recover were never guaranteed. In the first years of the 1900s, the value of the nitrogen, phosphoric acid, and potassium was just over 2.00\$ per ton. And while there were 550,000 tons of street sweepings produced annually in the city, the approximately \$1,000,000 in agricultural value was not enough to offset the

problems associated with the material (*Report of Commission on Street Cleaning and Waste Disposal*, City of New York, 1907).

The fundamental problem was that 98.9% of the material was inert. This made transport, distribution, and spreading inefficient when compared to other types of fertilizers. At best, street sweepings had less than half the fertilizing value of stable manure, which itself was getting harder and harder to sell to farmers (*Report of Commission on Street Cleaning and Waste Disposal*, City of New York, 1907).

The cities were reluctant to use street sweepings as landfill material because they fermented underground and generated ammonia and other noxious gases. The City government was also concerned about disease causing bacteria breeding in this organic-rich stew (*Report of Commission on Street Cleaning and Waste Disposal*, City of New York, 1907).

Fortunately for New York the street sweepings could be used as landfill material because they were collected in the same carts as the ashes from coal and wood fires. Since only 20% of the mass consisted of sweepings the total organic matter was relatively low. When used as landfill, it was thought that the antiseptic properties of the ashes would

prevent putrescence (*Report of Commission on Street Cleaning and Waste Disposal*, City of New York, 1907). In New York around 1910 the majority of the ashes, rubbish, and street sweeping were used a fill at Riker's Island (Baskerville 1911). (Figure 12)

Because of the limitations of manure as a fertilizer for the exurban farmer, the tankage from rendering operations filled an important need. In 1857 advertisements appeared in agricultural magazines promoting an "animal fertilizer" that was manufactured on Barren Island from the offal of New York City. This product was claimed to be a "very powerful and lasting manure." It could be purchased from George W. Mayher for \$50 per ton in either barrels or bags. It was sold through the United States Agricultural Warehouse and Seed Store on Water Street in New York (*The Cultivator*, vol.5, no.4, Apr.1857, 135). The Brooklyn Fertilizer Manufacturing Company advertised its "ammoniated tafeu" for \$25 a ton and claimed that it contained phosphates, potash, "ammoniacal and organic substances." Because the company had been manufacturing fertilizer from the night soil, blood, and butchers' offal of Brooklyn for ten years they were guaranteed a steady supply of good quality wastes. Prospective purchasers were invited to send for a circular which included a chemical analysis of the material. It is not clear if this company was located in Barren Island but it did maintain offices in both New York and Brooklyn (135).

Once the food wastes were separated from the other refuse, the extraction of grease proceeded by one of three different methods. In all cases the result was the recovery of two material streams, grease and the remaining solids, referred to as the dry tankage. The simplest method was cooking under pressure with steam. Wet garbage was loaded into a pressure vessel and heated. Both water and fats were then pressed out and the oils were skimmed off the surface of the water. The dry tankage was sometimes extracted with gasoline to recover the last of the grease. Another method began with crushing and drying the food wastes in a rotary hot-air drier. The dried materials were extracted with gasoline and the remaining tankage was ground for a final time. The third method was to extract wet wastes with gasoline at a temperature equal to the boiling point of gasoline. The advantage of this approach was that both water and grease were removed in the same step (Schroeder, "The Fertilizer Value of City Wastes Part Two, Garbage Tankage, Its Composition; the Availability of its Nitrogen, and its Use as a Fertilizer", *J. Industrial and Engineering Chemistry*, May 1917, vol.9, no.5, 513).

At the time that the operations were moved to Barren Island waste recovery was smelly. The starting materials were butcher's wastes, rotting meats, bones, and animal carcasses. Any carcasses that were acquired whole were first skinned and then chopped into smaller pieces. All of these materials were boiled in a large iron vat equipped with a tightly fitted cover that did not eliminate the escape of noxious gasses. The pressure was not allowed to rise above a few pounds per square inch. Boiling separates meat from the bones, and

recovers most of the grease. The larger bones were charred and used as a filter medium in sugar refining. Smaller bones were cut up for button manufacturing. The meat became a feedstock for the manufacture of ammoniated superphosphate of lime. The recovered grease used for manufacturing soap and candles (Sharples Oct.1874, 234).

One of the main drawbacks to boiling was that the water used became a smelly soup. It also contained 5 to 6 % glycerine. The soup, along with any blood, was simply disposed of (Sharples Oct.1874, 234).

The use of closed tanks for the recovery of grease was a step designed to allow higher pressures and as a side benefit allowed noxious gasses to be captured. Higher pressures also caused bone to disintegrate. One of the earliest types of a grease rendering tank was the Wilson Patent Tank, described in 1856 as “a cylindrical vessel of boiler iron, about ten feet high, and four feet in diameter; it is made steam tight, having openings which can be closed at pleasure near the top and bottom, for the admission and discharge of fatty matters to be melted. Heat is applied by introducing steam through a pipe opening into the bottom of the tank; the pressure used is about fifty pounds to the square inch (equal to 280 degrees F). The heat is applied from six to nine hours in succession” (Seaman 1873, 23) A later type of tank was Perry's. This was a cigar-shaped vessel with a steam jacket and a port on the top from which grease could be drawn off (Sharples Oct.1874, 234).

By 1874 technologies were introduced that would direct any noxious gasses created during the digestion process and direct them into the same fires that were used to create the steam. However before this could happen any steam in the gas stream had to be superheated so that it would not extinguish the flames. The Lockwood and Everett system used 500 feet of iron piping arranged into a coil and placed over the fire. The steam from the digester was passed through the coil which was heated to red hot. A similar method was to condense the steam in the gas stream and then blow the noxious gases, which were not condensed, up through grates into the fire (Sharples Oct. 1874, 234).

The oil and grease were sold on both American and European markets at a price that varied between 2 to 4 ½ cents per pound. The purchasers refined them into commercially valuable oils the chief constituents of which were glycerine, stearine, and red oil (Report of the Commissioners on Street Cleaning 1907). (Figure 13)

In some instances sulfuric acid was used in fat extraction. Typically the acid could be up to 12% of the weight of the fats to be rendered. After extraction the acid was removed by washing with water at a high temperature. But if the tallow was used as a lubricant in a steam engine any remaining acid would be liberated by the heat and pressure of the

steam. The acid would attack the metal and cut grooves into the surface. The grooves resembled the tracks of wood-boring worms in timber leading machinists to describe the damage as “worm-eaten.” An 1869 textbook cautioned that pure grease or beef tallow “rendered by heat alone” should be used for lubrication (Watson 1869, 192).

After the grease extraction was complete, the tankage was used as fertilizer although it is not clear from the contemporary descriptions of the process how the material was processed prior to application. If it was not applied directly to fields, the next step might be treatment with sulfuric acid. This has been mentioned as one means of making the phosphates soluble. Another approach would have been to compost the material but the author has seen no mention of this being done, at least not deliberately.

Accounts of the Scandinavian and Newfoundland whale fisheries of the late 1800s describe processing whale flesh and blubber in a process similar to that used to process food wastes on Barren Island. After the oil was extracted the meat was placed in a rotating drum with “swinging” knives. While the knives cut in the meat the drum was heated to dry it. The resulting dried material was said to make an excellent fertilizer and in Scandinavia was used as cattle feed (Boston Society of Natural History 2006, 232).

In 1917 the typical load of food and kitchen waste was found to contain:

| Substance | Percentage |
|--|------------|
| water | 73.78 |
| Organic matter | 22.63 |
| oil | 5.32 |
| ash | 3.6 |
| Nitrogen | 0.7 |
| Phosphoric acid (P ₂ O ₅) | 0.43 |
| Potash (K ₂ O) | 0.27 |
| Total | 106.73 |

(Schroeder, "The Fertilizer Value of City Wastes Part Two, Garbage Tankage, Its Composition; the Availability of its Nitrogen, and its Use as a Fertilizer", *J. Industrial and Engineering Chemistry*, May 1917, vol.9, no 5, 513)

After processing to remove the water and grease the percentages of the various nutrients become:

| Substance | Percentage |
|----------------|------------|
| water | 0.0 |
| Organic matter | 81.90 |
| oil | 0.0 |

| | |
|--|-------|
| ash | 13.03 |
| Nitrogen | 2.5 |
| Phosphoric acid (P ₂ O ₅) | 1.56 |
| Potash (K ₂ O) | 0.98 |
| Total | 100 |

(Schroeder, May 1917, 513)

It will be seen that the nutrients are enriched by a factor of 3.6 but in terms of overall percentage they remain fairly low in comparison to many commercial fertilizers. It was recognized at the time that the fertilizer value of garbage tankage was low, containing only 3 to 4% "ammoniacal tankage" which made the product a high volume but low cost material that made an excellent filler. (Terne, Dec.1904, 421).

An alternative source of agricultural nitrogen was the production of gas from coal. Gas for heating and lighting was manufactured by heating coal to release flammable hydrocarbons. The process of creating gas from 100 pounds of coal will yield 65 pounds of coke, 500 cubic feet of gas, 0.6 gallons of tar, and between 0.23 and 0.32 pounds of ammonia (Coit, Peck and Colby 1903, 128). In 1904, writing in the Journal of the Franklin Institute, the industrial chemist Bruno Terne estimated that the total US production of ammonium sulfate (NH₄)₂SO₄ from coke ovens and manufactured gas

plants was between 25,000 and 30,000 tons (Terne, Dec.1904, vol.158, no.6, 421).

Bruno Terne also experimented with an alternative method of producing agricultural ammonia from garbage which used destructive distillation of pressed garbage in coke ovens. In 1897 he approached the Semet-Solvay Company in Syracuse, New York, with his idea. The company was interested enough for a trial run and allowed Bruno to process a railroad car full of pressed garbage from Barren Island. The initial results were encouraging and a series of tests were conducted. Each ton of moist garbage yielded about 61.3 pounds of ammonium sulfate and 6,800 cubic feet of gas of which 8 to 10% was methane and 33 to 36% hydrogen. However with just under 25% water the pressed garbage was difficult to heat. Believing that the water could be successfully pressed out of the garbage once the operation was operated on an industrial scale, a deal was brokered between the New England Sanitary Product Company that would operate the plant, the Semet-Solvay Company that would design and build the equipment, and the City of Boston whose garbage would be converted to ammonia. The agreement was reached in April of 1898 and the plant was ready by the late fall of that year. Excess water in the garbage proved to be fatal to the process. Pressing in huge rollers succeeded in removing both water and grease but was subject to frequent mechanical failures. Heating in a rotating drier was more successful. However the Boston plant burned down in February 1899 and was never rebuilt (Terne Dec.1904, 421).

In 1885, P. White's Sons were described as "manufacturers of Barren Island Fertilizers, Superphosphate of Lime; Dried Blood, Bone and Meat, &c." The company was managed by Thomas F. and Andrew J. White. It maintained an office on Peck Slip in Manhattan and a small plant near New Brunswick, New Jersey, but had its main plant on Barren Island. They had no shortage of raw materials in the form of blood, bones, and meat as their company controlled the dead animal and offal contracts for both New York and Brooklyn. In addition to the fertilizer sold under the name "Farmers' Pride", the company manufactured a number of specialty fertilizers including sulfate of ammonia, dried blood, and dried fish scrap (Edwards and Critten 1885).

P. White's Sons sold horsehair, hides, and glue stock. They rendered large quantities of tallow and grease (Edwards and Critten 1885).

In 1905 the population of Barren Island was 1,400 the majority of whom were described as Poles. The island had several factories and the New York Sanitary Utilization Company's plant. Some of the island's population was boatmen and fishermen. There were three hotels and a public school ("Part of Barren Island Sinks", *New York Times*, Nov.26, 1905). The Reverend Father Horan of Canarsie was the pastor of the island's church ("Building Cut in Two to Save it from the Sea", *New York Times*, Nov.28, 1905).

By 1910 Barren Island was home to some 2,000 workers, mostly Italian and Polish but also Russian and African American. Four saloons catered to this diverse clientele and a two-man police station, described as “a small yellow hut” was in the island to keep order among the “unruly foreign population” (“Fatal Explosion on Barren Island”, *New York Times*, May 10, 1910). (Figure 14)

Kitchen waste from the Street Cleaning Department scows was loaded onto four-wheeled trucks that were wheeled up an iron spiral ramp into the third-floor pressing room. Twelve cast iron digesters ten feet high and four feet wide were located in the room. Doors on the top of each of the digesters were loaded from the trucks as they moved past. As the tanks were filled, the doors were locked, and steam at 100 psi was admitted from the bottom. Two products resulted, the grease that was drawn off and the dry tankage (“Fatal Explosion on Barren Island”, *New York Times*, May 10, 1910).

As of 1910 the dry tankage was used as landfill along the Barren Island (“Fatal Explosion on Barren Island”, *New York Times*, May 10, 1910). It may be supposed that the sinking of the eastern end of the island and the need to shore up the land precluded recycling the tankage into fertilizer.

In 1910, the New York Sanitary Company's plant on Barren Island was three stories high, had a sloping metal roof, and a 150-foot high yellow brick chimney. Beside the plant was a crematorium owned by a company that held the contract for cremating the city's dead animals. These facilities were on the eastern side of the island while the remaining plants and several hundred worker huts were clustered on the western side of the island ("Fatal Explosion on Barren Island", *New York Times*, May 10, 1910).

In November of 1905 one of the New York Sanitary Utilization warehouse and docks disappeared into the waters of the Rockaway Inlet. It was reported at the time that three powerful currents met at that point. On Saturday, November 25th, 1905 workers in the factories heard a roaring underfoot. Running to the windows they saw the Sanitary Utilization Company's 150-foot long, two story warehouse, and the company's dock sinking into Jamaica Bay. The steamboat *Fanny McKane* had just arrived at the dock and a line had been put ashore to make her fast. When the Captain saw the warehouse totter, he rang the engine room for full speed astern. The boat was about fifty feet from shore when the land gave way. The warehouse roof was last seen floating seaward and about 5,000 barrels of oil were lost ("Part of Barren Island Sinks", *New York Times*, Nov.26, 1905).

The population of the island was thrown into a panic and an estimated 500 men and

women rushed to the other side of the island. Several men apparently believed that the entire island was about to sink had jumped into the bay. It is thought that all were eventually rescued. Charles Yousesky was carried several hundred yards from shore before being rescued by a boat sent from the *Fanny McKane*. Captain Reimels of the Canarsie Police Station saw the warehouse disappear and sent two tugboats to the scene (“Part of Barren Island Sinks”, *New York Times*, Nov.26, 1905).

The area that sank measured about 400 feet long by 200 feet wide, or 80,000 square feet. The water depth at the site was between 75 and 85 feet (“Part of Barren Island Sinks”, *New York Times*, Nov.26, 1905). In the days that followed more land was lost. A second piece of “apparently solid” land sank and minor losses continued. People speculated that some shift in the three currents that met at the site caused the land to be undermined. Another possible contributing factor may have been a sandbar that formed between Barren Island and the Rockaway Peninsula. Water channeled by the sandbar may have been responsible for wearing away at the island. Whatever the cause, a whirlpool was visible on the surface and could be seen cutting into the island (“Building Cut in Two to Save it from the Sea”, *New York Times*, Nov.28, 1905).

An office building fell into the bay but was not drawn into the whirlpool. Cables secured it to the remaining shore until it could be towed out into the bay and beyond danger.

Another building was being undermined but was cut in two and the half that was being undermined was allowed to drop into the bay (“Building Cut in Two to Save it from the Sea”, *New York Times*, Nov.28, 1905).

Boatmen throughout the bay began collecting the floating barrels for which the Sanitary Reduction Company paid between 15 and 25 cents each. Workmen worked double shifts driving piles in an effort to stabilize the shoreline. Father Horan was the pastor of the island’s Catholic Church although he lived in Canarsie. He made several trips from his home to comfort his flock. He was quoted as saying that “I do not think there is any danger of any extensive destruction. There have been several landslides of this sort on the island, although those of the last few days have been more destructive than any for some years” (“Building Cut in Two to Save it from the Sea”, *New York Times*, Nov.28, 1905).

Father Horan may have been referring to the collapse of the fertilizer plant of the Wimpfheimer Company that had sunk into the bay seventeen years earlier. That building was also on the eastern end of the island. The company’s owner, Mr. Wimpfheimer, was quoted as saying that he had thought the building was located on quicksand. Following Wimpfheimer’s building collapse a stone jetty was built around the end of the point. It was thought that the jetty would prevent another accident from occurring (“Building Cut

in Two to Save it from the Sea”, *New York Times*, Nov.28, 1905).

Less than one year after the collapse a serious fire broke out in the digester building. It caused \$1,500,000 worth of damage, destroyed fifteen buildings, and left the city without refuse processing capacity. In 1906, the digester building was a three-story brick structure at the east end of the island. The building was 500 feet long by 200 feet wide and contained 150 digester tanks (“\$1,500,000 Fire Loss on Barren Island”, *New York Times*, May 21, 1906).

The fire broke out around 1:00 pm on Sunday, May 20, 1906. Watchman Christopher Behlin was making his rounds when he noticed flames in the digester building. Before he could sound the alarm the flames had penetrated the building’s roof and were jumping to the adjacent pump building. The pump building was a three story frame structure and housed the company’s firefighting apparatus. By the time the island’s volunteer fire department arrived, the pump building was engulfed in flames (“Building Cut in Two to Save it from the Sea”, *New York Times*, Nov.28, 1905).

The fire spread to the plant’s other buildings. The fireboat *Seth Low* was sent to fight the fire but was delayed because the crew had no experience in Jamaica Bay and no pilot

could be found to steer her through the Rockaway Inlet. When the boat finally arrived on the scene the crew began pumping water on the fires along the island's southern shore. Nothing else could be done. The Sunday crowds on the nearby beaches watched fascinated, believing large ships were burning ("Building Cut in Two to Save it from the Sea", *New York Times*, Nov.28, 1905).

The flames spread to the hydraulic press plant and destroyed 52 presses valued at \$3,800 each. The two drying buildings, each a city block long, were destroyed as were the company's warehouses ("Building Cut in Two to Save it from the Sea", *New York Times*, Nov.28, 1905).

Half-a-mile away from the Sanitary Utilization Company were the "horse buildings." These were owned by the company that disposed of animal carcasses. Despite the distance from the flames, their roofs were catching fire. The *Seth Low* was able to direct streams of water onto them, preventing the "horse buildings" from burning ("Building Cut in Two to Save it from the Sea", *New York Times*, Nov.28, 1905).

When the fire began to consume the buildings of the Brooklyn Refuse Company the 600 families living on the island began to think about evacuation. Fleeing with hastily packed

belongings the families raced to the boats tied up to the island's docks. The scows, rowboats, launches, small sailboats, and yachts filled with refugees. They were described as carrying clocks, bedding, carpets, mirrors, and household pets. One woman fell into the water and let go of a caged parrot and a marble clock. After fishing her out, her husband scolded her in Bohemian for letting go of them. The parrot was rescued and taken to Canarsie. Later, the couple found fishing-tackle, and were seen attempting to recover the clock. Several other fleeing persons also fell into the water but no persons drowned.

The McKeever brothers, owners of one of the other fertilizer plants on the island, raced to the scene aboard a chartered steamboat. Finding their buildings had not yet caught fire, the McKeevers collected an estimated 400 men and began to wet the roofs of their buildings. The fire was still burning at midnight when it spread to the docks, derricks, and rigging along half a mile of shoreline. These were all consumed and the remains fell into the bay. The fire damage was later estimated to have spread over 16 acres ("Building Cut in Two to Save it from the Sea", *New York Times*, Nov.28, 1905).

The effect on waste disposal was immediately felt. New York once again began dumping garbage at sea outside Sandy Hook. Bathing beaches on Long Island between Coney Island and Smith's Point and along the Jersey Shore from Sea Bright to Atlantic City

were said to be "literally covered with garbage" (Baskerville 1911).

Four years later another fire broke out on the island. Shortly after noon on May 9, 1910, one of the 12 digesters exploded at the New York Sanitary Company's plant on Barren Island. One worker was killed and five were injured. The explosion could be heard as far away as Canarsie. The dead worker, Antonio Carditz, described simply as "a Russian," was killed by shock after a cast iron piece broke his leg in three places and his body was enveloped in steam. Three of the five injured workers were listed as Wernier Service, a Russian; Cyprien Carewitch, a Russian; and Matthew Hubbard, "negro." John Waters and Carl Moggs were listed as injured but were not described. Some 2,000 Polish and Italian workers were said to be thrown into chaos ("Fatal Explosion on Barren Island", *New York Times*, May 10, 1910).

At the time, the New York Sanitary Company was described as processing "Practically all the garbage which the City's Street Cleaning Department collects in Brooklyn every day" ("Fatal Explosion on Barren Island", *New York Times*, May 10, 1910).

The steam gauge on the digester was later found and it read 65 psi. A ten foot hole was torn through the roof and a cloud of steam rose fifty feet over Jamaica Bay. Pieces of the

digester struck the workers and the force of the blast threw them off the loading ramp and into the corners of the pressing room (“Fatal Explosion on Barren Island”, *New York Times*, May 10, 1910).

The floor of the pressing room collapsed under the exploded tank and splattered the workers below with parboiled waste. The 400 workers inside the building, some blinded by the explosion and exposed to scalding steam, were sent into a panic. Witnesses on boats in Jamaica Bay reported seeing many jumping from the windows and sliding down the spiral ramps (“Fatal Explosion on Barren Island”, *New York Times*, May 10, 1910).

Ironically the only person who did not hear the explosion was a one Snyder, the company’s licensed boiler engineer who was on duty in a noisy boiler room located an adjacent building. Snyder only realized that the boiler had exploded when he noticed a drop in steam pressure. Snyder shut off the steam and went outside where he saw the chaos. He then began going to the other plant boilers and securing them against additional explosions (“Fatal Explosion on Barren Island”, *New York Times*, May 10, 1910).

The real heroes of the day were the New York City Police officers who were stationed at

the island's two-man police station. They had seen the explosion through the station's windows. Rushing through the fleeing workers, Officer Isaac Van Houten and Sergeant Atkinson, entered the building. They found Carditz lying on the second floor and improvised a tourniquet from a handkerchief. While carrying the injured man from the building another portion of the ceiling collapsed and cut a deep gash in Van Houten's leg. The foremen had already carried out the other injured men ("Fatal Explosion on Barren Island", *New York Times*, May 10, 1910).

The company's launch had still not returned from a trip to Canarsie but the crew of Police Boat C had seen the explosion and brought their boat to the company's dock. Carditz, Service, and Carewitch were loaded aboard the launch but the cockpit was so small that Carditz had to be laid on the floor while Carewitch's head rested on one bench, his feet on the other, and his body over Carditz's. The police boat headed for Canarsie at fifteen miles per hour when they met the company's launch coming back. Three doctors from St. Mary's Hospital and one from Kings County Hospital were on the company's launch. The tourniquet on Carditz's leg did not completely stop the bleeding and the doctors put another bandage on the wound. Carditz later died in the hospital ("Fatal Explosion on Barren Island", *New York Times*, May 10, 1910).

The explosion had caused an estimated \$5,000 worth of damage ("Fatal Explosion on

Barren Island”, *New York Times*, May 10, 1910).

At the time the collection of garbage and transportation to scows was handled by the city under the direction of the Commissioner of Street Cleaning. On January 2, 1914 a new contract was signed between the city and John J. Hart of the New York Disposal Corporation. New York Disposal leased the plant on Barren Island belonging to the New York Sanitary Utilization Company. The process used by New York Disposal was largely unchanged except that naphtha was used as a solvent after pressing the tankage to extract the last of the grease (“37th Annual Report of the New York State Dept of Health”, *Report of the Division of Sanitary Engineering*, 1917, vol.2, 751).

The contract provided that the garbage of Manhattan, the Bronx, and Brooklyn be processed by the company. These three boroughs were generating 412,000 tons of garbage annually. On Staten Island and in Queens, garbage was mixed with ashes and rubbish and sent for incineration (“37th Annual Report of the New York State Dept of Health”, *Report of the Division of Sanitary Engineering*, 1917, vol.2, 751).

A separate collection system existed for rubbish (“37th Annual Report of the New York State Dept of Health”, *Report of the Division of Sanitary Engineering*, 1917, vol.2, 751).

The expansion of the garbage processing operations beyond Barren Island and into other portions of Jamaica Bay appeared to be inevitable as the city continued to grow and produce more garbage (“Garbage Plans Menace Property, Summer Residents Alarmed by Proposal to Build Disposal Works on Ruffle Bar Island”, *Greater New York, Bulletin of the Merchants Association of New York*, Sept.15, 1913, vol.2, no.31, 9). In 1913 it was observed that the plants on Barren Island were so long established that all subsequent development was placed in areas that were not (in theory at least) going to be adversely affected by the presence of the plants. However when plans were announced to build new waste processing plants on Ruffle Bar Island opposition swelled (9).

Ruffle Bar Island was near the center of the bay a short distance from Barren Island and about one mile from the residential section of the Rockaway Peninsula. In the Spring of 1912 the city signed a new waste disposal contract. In order to meet its obligations to the city the contractor needed to build a new plant and selected Ruffle Bar Island as the site (“Garbage Plans Menace Property, Summer Residents Alarmed by Proposal to Build Disposal Works on Ruffle Bar Island”, *Greater New York, Bulletin of the Merchants Association of New York*, Sept.15, 1913, vol.2, no.31, 9).

Opposition came from the property owners in Rockaway, Belle Harbor and Neponsit. It

was also noted that the new plant was near a stretch of ocean beach which the city had purchased for \$2,000,000 (“Garbage Plans Menace Property, Summer Residents Alarmed by Proposal to Build Disposal Works on Ruffle Bar Island”, *Greater New York, Bulletin of the Merchants Association of New York*, Sept.15, 1913, vol.2, no.31, 9).

Opponents to the plan argued that instead of using any site in Jamaica Bay the city could construct artificial islands on the Romer Shoals or in Prince's Bay. They noted that Hoffman and Swinburne Islands off the east shore of Staten Island were created for use as quarantine stations (“Garbage Plans Menace Property, Summer Residents Alarmed by Proposal to Build Disposal Works on Ruffle Bar Island”, *Greater New York, Bulletin of the Merchants Association of New York*, Sept.15, 1913, vol.2, no.31, 9).

A new waste processing site of Rikers Island was considered. The island was already home to a smelly and offensive landfill portions of Queens and the Bronx were downwind of the landfill so there was no shortage of political opposition. The city's Board of Estimate next turned its attention to Staten Island.

A number of things were changing the economics as well as the politics of waste processing. With the outbreak of the First World War the demand for the products of

waste reduction might be expected to increase sharply. Glycerine and nitrates could be used to manufacture nitroglycerine. Grease could be used in a number of industries and the worldwide need for fertilizers would increase the value of tankage. Perhaps because the United States was still officially neutral, none of the companies involved in waste reduction came out and declared their intention to become "war industries." It is clear from subsequent events that this was what they became. One of the arguments for moving waste reduction out of Jamaica Bay was that the new operators promised to increase the payments to the city. Politically the negative effects of landfills, waste reduction, and incineration were wearing out the public's patience.

Once plans for a new waste reduction plant on Staten Island were announced, a group of residents promptly sought an injunction against the Board of Estimate. When the courts vacated the injunction the board immediately voted 8 to 3 in favor of building the plant on Staten Island. During the meeting at which the vote was taken, Borough President Calvin Van Name protested strongly but was overruled ("Garbage Disposal Goes to Richmond", *New York Times*, Apr.11, 1916).

Van Name then began a lengthy speech about the project, an action that made a number of persons at the meeting suspicious. Suddenly, Edward W. Brown, identified only as a "Staten Island taxpayer," burst into the meeting waiving a second injunction. Brown

pushed his way to the Mayor Mitchell who was presiding over the meeting. Brown claimed that the injunction forbade the city from proceeding with the plant on Staten Island, Mitchell examined the document and noted that the injunction merely "put a stop to reconsideration of our previous action." With that, he adjourned the meeting. A few minutes later, a contract was signed with the firm of Gaffney, Gahagan, and Van Etten by the Street Cleaning Commissioner. The firm agreed to pay the city \$900,000 over a period of five years for the privilege of processing the city's wastes. At the end of the five years the city would have the option to buy the plant. The company posted a \$250,000 bond to guarantee that the plant was to be operated without generating odors and be ready for operation by January 1917. The contract was expected to save the city \$1,000,000 annually according the mayor("Garbage Disposal Goes to Richmond", *New York Times*, Apr.11, 1916).

A request, to study the impacts such a plant might have, came from Dr. Linsly R. Williams, the Deputy State Commissioner of Health, in July of 1916. Hearings on the matter were held in the Staten Island Borough Hall. The stenographic record of the hearings ran to 1694 typewritten pages but the conclusions could be summarized briefly. First, most of Staten Island would be unaffected by the new plant. Secondly, persons living along the shores of the Kill Van Kull and Arthur Kill would be subjected to odors from the barges bringing garbage from Manhattan, Brooklyn, and the Bronx. Thirdly, there would be a limited number of residents at Linoleumville and Fresh Kills who would

be exposed to nuisance odors on an intermittent basis. The hearing also concluded that the Cobwell process was the best technology then available for the reduction of garbage. Lastly, "from a sanitary standpoint" there were better sites for the reduction plant, especially Rikers Island and Barren Island ("37th Annual Report of the New York State Dept of Health", *Report of the Division of Sanitary Engineering*, 1917, vol.2, 751).

The new was built close to the point where the Little Fresh Kill and Great Fresh Kill met. ("Kill" is a Dutch word for creek and the names of many waterways in the New York region include this word.) The site selected was an island in the kills that was about half a mile east of the Arthur Kill that separates New Jersey from Staten Island. The plant was intended to process the garbage from Manhattan, the Bronx, and Brooklyn. Where garbage from Staten Island and Queens would be processed was not mentioned in the press reports (Tuska 1916, 199).

The plant's designers elected to use the Cobwell Process. The process was invented by chemist Raymond Wells ("37th Annual Report of the New York State Dept of Health", *Report of the Division of Sanitary Engineering*, 1917, vol.2, 751). Unlike the processes used at Barren Island the tank where the garbage was reduced was steam-jacketed so that the steam and garbage would not be mixed. A low-boiling point solvent, usually gasoline, was pumped into the tank and heated by the steam. A water, grease, and

gasoline mixture evaporated from the tank and condensed. Once the water was allowed to separate out by gravity, the grease was separated from the solvent which was then re-used for another batch of garbage (Tuska 1916, 199).

Waste reduction plants using the Cobwell process were more expensive to build but were more efficient. Recovery of valuable by-products was improved by about 25% compared with plants using only steam extraction. Gasoline was a more effective solvent for grease and glycerine so that less of these materials found their way into the driers (where they could burn and sputter) or into the waste water streams (*American Journal of Public Health*, Feb. 1918, 176).

Within a year of the Staten Island plant being opened, the Metropolitan By-Products Company recovered enough grease for 70,000,000 cakes of soap, 1,500 tons of nitrogen, 2,000 tons of phosphoric acid and potash. The Cobwell process was credited with recovering enough material to manufacture 700,000 pounds of high explosives, this material would have been lost using less complex reduction technologies streams (*American Journal of Public Health*, Feb. 1918, 176).

Another advantage of this process was that since the water did not actually touch the

garbage, there would be no odors produced by the chemical degradation of the garbage. In theory at least, the odor causing compounds would be trapped in the solvent. Any ammonia would be neutralized by acids extracted from the garbage. The tankage would be unloaded only after it was dry and so would not produce unpleasant odors. The odor of the tankage was described as being like the "smell of stale gingerbread" (Tuska 1916 199).

Despite assurances from the plant's designers that the Cobwell process would keep odors under control, they were still a concern that the communities of Fresh Kills and Linoleumville would be exposed to at least an occasional nuisance but that most of Staten Island would not be affected. None the less, others still believed that better sites for the works would be on either Barren Island or Rikers Island (Bachmann 1917, 579).

The plant was housed in a one-story building 200 by 330 feet and housing 250 reducers. Each reduced had a capacity of 8 to 10 tons per 24 hours. Garbage would be brought to the site by barge and unloaded by steam powered cranes. Special canvas shields would prevent loose garbage from dropping into the water or being blown away. A boiler house and buildings to process the solvent and tankage were also part of the plant. Total cost of the project was \$3,000,000 and the plant's capacity was \$2,000 tons per 24 hours (Tuska 1916, 199). Metropolitan By-Products signed a contract calling for them to process all

garbage from Manhattan, the Bronx, and Brooklyn for five years for which they would pay the city \$900,000. Garbage was to be delivered to wharves on the Hudson and East Rivers and transported to the plant at night (*American Journal of Public Health*, Feb. 1918, 176).

If certain press reports are to be believed, local opposition to the new plant seems to have abated by July of 1917 when the Metropolitan By-Products Company opened its Staten Island reduction plant. The *New York Times* confidently predicted that the enterprise would be highly profitable since the First World War had created a demand for nitrates and glycerine for munitions manufacture. Opposition to the plant was attributed to deliberate misinformation and the "persistent influence" of those who wanted to see waste reduction continue on Barren Island. Metropolitan By-Products promised to plant trees on the grounds as well as vines and flowers. To avoid the poor living conditions experienced by workers on Barren Island, the company promised to build dormitories and contracted with the Woymar Lumber Company to provide housing. The lumber company was interested in providing housing for the workers at nearby factories ("Model Garbage Plant", *New York Times*, July 22, 1917).

Within a year of the plant being opened, a Staten Island grand jury declared it a nuisance ("Condemn Garbage Plant", *New York Times*, June 22, 1918). But with the United States

now in the First World War the nitrates, glycerine, and fertilizer were considered vital war materials and the government seriously considered taking over the plant (“Confer on Garbage Plant”, *New York Times* July 26, 1918). The Federal Government never took over the plant.

The plant was closed by the end of the war on the orders of the City's Health Commissioner. The commissioner was accused of closing the plant in response to political pressure from Staten Islanders (“Waste in Garbage Disposal Charged”, *New York Times*, June 27, 1920).

Once the plant on Staten Island was in operation, the plants on Barren Island began to close (“Garbage Plant To Remain”, *New York Times* Aug,30, 1918). While the relief as palatable in Brooklyn, the Staten Island plant was experiencing financial difficulties. It had been taken over by the Metropolitan By-Products Company which had operated on Barren Island (“Garbage Contract Upheld; Court Finds City's Agreement for Refuse Disposal Properly Made”, *New York Times*, July 26, 1919). The Metropolitan By-Products Company was soon in receivership. This complicated the city's planning process and made the future of both Barren Island and Fresh Kills uncertain (“Hylan Asks Garbage Facts; Also Tells Brooklynites Staten Island Plant Won't Be Used”, *New York Times*, Nov.2, 1918).

Without a company to operate the plant, the city turned to the New York Sanitary Utilization Company and the people of Brooklyn feared that the odors from Barren Island would once again be wafting their way (“Garbage Contract Upheld; Court Finds City's Agreement for Refuse Disposal Properly Made”, *New York Times*, July 26, 1919).

Despite earlier bad experiences, during the administration of Mayor Hylan the city returned to the practice of ocean dumping. Both waste reduction and incineration had bad reputations that prevented their widespread re-adoption. As a result, by 1925, 80% of the 10,000,000 cubic yards of waste materials generated annually was dumped in the ocean and only 20% percent was being incinerated. At the time the waste consisted of ashes (50%), garbage (10%), and rubbish (40%), the volume of waste was growing at an average rate of 6% a year but with an increase in construction activity the increase was expected to be 12 to 15% (“New Ways are Sought to Keep City Clean; New York Authorities Harassed by Problem Now Met by Dumping Most of Garbage Into Sea, an Unsanitary Method Abandoned Elsewhere” *New York Times*, Feb.1, 1925).

In a statement to the press in the summer of 1924 the Navy Supervisor of New York Harbor reported that the city's garbage was being dumped at a point 18 miles south of Long Island and 21.5 miles east of New Jersey. The distant dump site, combined with a

reduction of volume, reduced the amount of trash reaching the beaches. However an anonymous editorial writer in the *New York Times* pointed out that this was no time for complacency. Sewage pollution was still a problem and it was hoped that all of the waters around the city would soon be safe for swimming and fishing. The long term solution to ocean dumping pollution was the construction of modern incineration facilities. There was no mention of revitalizing the waste reduction industries ("Cleansing the Waters" *New York Times*, Sep.12, 1924).

In 1925, Frank D. Waterman, a Republican candidate for mayor, reminded members of a Republican club that under Democratic mayor John Frances Hylan the city began dumping its garbage at sea. (Figure 15) Under previous administrations, especially Mayor Mitchell's the city sold its waste products for a profit. Mitchell was a Fusion candidate, nominated by a coalition of Republicans and progressive reformers. He was in office from 1914 to 1917. Waterman pointed out that disposal at sea was supposed to be a temporary expedient during the First World War, the Tamminy-backed Hylan administration promised to solve the garbage problem in 1917 and 1921 ("Waterman Assails City Garbage Plan", *New York Times*, Sep.5, 1925).

Waterman went on to say that from 1896 to 1914 the garbage of Manhattan, Brooklyn, and the Bronx was processed on Barren Island for which the city paid an average of

\$208,000 a year. When the city signed the contracts with John J. Hart in 1914, the city was not obliged to pay anything to Hart. Instead it would receive \$262,500 a year for three years. In 1916 the city signed a contract with the Metropolitan By-Products Company for five years. Metropolitan By-Products agreed to pay the city \$900,000 annually and it built a new reduction plant on Staten Island. Between 1917 and the early part of 1918 the company paid the city \$182,500 but by October of 1918 Metropolitan By-Products was in receivership. Waterman blamed Mayor Hylan who had taken office in January of 1918. Hylan was opposed to the contract with Metropolitan By-Products and Waterman attributed the company's plight to Hylan's opposition although he did not actually explain what Hylan did or did not do to cause it ("Waterman Assails City Garbage Plan", *New York Times*, Sep.5, 1925).

Mayor Hylan never made a secret of his opposition to private companies handling the city's waste. In an address to the Engineer's Club of Philadelphia he stated that municipal control of waste collection, street cleaning, and garbage processing operations insured consistent, quality, public service. He feared that contractors would be tempted to cut corners and that their employees were not responsible to the city government. He went on to state that if there were any aspects of waste management not under the city's control he would change them without a day's delay (*The Journal of the Engineers Club of Philadelphia* 1920, 329).

Hylan was a Democratic mayor with ties to the infamous Tammany Hall so it may be that city also placed control of lucrative patronage in the hands of politicians. To determine what extent this may be true is beyond the scope of this work but Fiorello H. La Guardia, who served as Alderman in the Hylan administration and later as New York's most popular mayor and whose integrity has never been questioned, shared Hylan's viewpoint(*The Journal of the Engineers Club of Philadelphia* 1920, 329).

During the hearings on the Staten Island reduction plant conducted by the New York State Department of Health, Dr. G.C. Whipple a professor of sanitary engineering at Harvard and an engineering consultant was the expert retained by the department. In commenting on the advantages of municipal ownership Whipple wrote that a contractor might not keep up with repairs, "to secure the greatest possible profit before the contract expired." Because a city owned plant did not have to generate a profit, it might be kept cleaner, and lastly if combined with an incinerator to burn rubbish, the waste heat might power the reduction plant ("37th Annual Report of the New York State Dept of Health", *Report of the Division of Sanitary Engineering*, 1917, vol.2, 751).

By the beginning of the twentieth century, it became clear that no site in New York City was sufficiently removed from population centers to make it suited for waste disposal. The construction of the waste reduction plant on Staten Island marked a turning point

where public opinion and political considerations would play a greater role in waste management decisions. The insistence on municipal control would mean that for Jamaica Bay the city would dictate all future waste management decisions.

For all the problems they created and neighbors they annoyed, the waste reduction plants on Barren Island were a far-sighted solution to the perennial problem faced by all cities, what to do with the garbage. In a marshy environment and at a time when very few people appreciated the ecological services of estuaries, landfills along Jamaica Bay's shorelines seemed like another far-sighted approach to the waste management problem. This was because as populations increased landfills were seen as a good way to create land for housing, industry, and infrastructure.

But putting landfills in a populated area was bound to create problems. In 1900 ex-Fire Marshall Robert E. Rice, who managed the Colonial Hotel at Harway and Surf Avenues, Coney Island, blamed the stench from a landfill on Coney Island Creek for driving guests away from the hotel. Contractor Charles Hart was filling 21 acres of marsh along Coney Island Creek with what he claimed was "street sweepings and ashes." Hart claimed that the fill material was approved by city inspectors. He had twice been brought to court for violating the city Sanitary Code but on both occasions the cases were dismissed. None-the-less accusations persisted, hotel keepers on Surf Avenue sought an injunction to stop

the work and several physicians attributed a number of illnesses to odors coming off the landfill (“Odors at Coney Island”, *New York Times*, Sep.25, 1900).

Hart blamed the odors on the scows of the Brooklyn Sanitary Company that were loaded at a site at the foot of 21st Street. Not surprisingly, the Brooklyn Sanitary Company denied their scows were the source of the odors (“Odors at Coney Island”, *New York Times*, Sep.25, 1900).

The spread of landfills along the shores of Jamaica Bay began around 1900 and can be traced to two waste streams that defied all attempts at recycling and re-use, street sweepings and ashes. Street sweepings contained dirt, miscellaneous rubbish, discarded food refuse, and horse manure. It was already hard enough to find farmers who wanted manure and the admixture of these other waste streams rendered it completely unfit for fertilizer application. Ashes from coal burning stoves, furnaces, and fireplaces were another waste stream that was both plentiful and hard to dispose of. The practice of combining street sweepings with ashes and using it to fill in marshes was already well established when Dock Commissioner Murray Hulbert announced in 1921 that the main interior channel at Jamaica Bay, between Barren Island and Mill Basin, was selected for filling with material from the Street Cleaning Department. Hulbert went on to say that Rear Admiral Usher, Commandant of the Third Naval District, approved of the idea

because it was an alternative to dumping ashes at sea. By filling in the marsh with such material, about 1,100 acres of water front would be created (“11 Improvement Programmes For The Port Of New York, Dock Commissioner Murray Hulbert Outlines a Schedule of Progressive Investment Calling for an Outlay of \$20,000,000 Up to the Year 1921”, *Greater New York., Bulletin of the Merchants Association of New York*, Nov.4, 1918).

The scale of earlier landfills along the bay’s shore pales in comparison to the three modern landfills were operated until the 1980s and 1990s. (Figures 16 and 17) The Pennsylvania Avenue and Fountain Avenue landfills were located on the northern shore of the bay immediately west of Howard Beach. The Edgemere Landfill was on the eastern end of the Rockaway Peninsula.

The 110-acre Pennsylvania Avenue Landfill was opened in 1956. Originally intended to accept residential and commercial wastes the site has also received sewage sludge and demolition debris. At the time that the landfill was closed in 1979, it was receiving 1000 to 2000 tons of trash each day. Investigators estimate that there are between 6 and 12 million gallons of waste oil buried on the site. Oily leachate has been observed leaking into Jamaica Bay (Goldstein and Izeman n.d., 13). The 287-acre Fountain Avenue landfill operated between 1961 and 1985. It took in commercial and residential trash,

asbestos, and incinerator ash. During its last year of operation, the Fountain Avenue Landfill received 8,200 tons of trash per day (13).

The 173-acre Edgemere Landfill forms a peninsula extending northwards into Jamaica Bay. It is located between the Norton Basin and the Somerville Basin. Between its opening in 1938 and closing in June of 1991, the landfill received more than 9 million cubic yards of waste. In 1982 more than 3,000 buried chemical drums were discovered in the landfill (Goldstein and Izeman n.d., 13) (Rhoads n.d., 36).

Even though Jamaica Bay was by this time a city park, there was still pressure on the city's landfills. As one former New York sanitation commissioner observed, garbage has its own imperative, "Unlike polluted air and fouled water, which can be talked about endlessly, garbage must be put somewhere..." (Keating, "The Politics of Garbage," *New York Magazine*, April 13, 1970) Parkland or not, the Department of Sanitation seriously considered filling Jamaica Bay with garbage once Fresh Kills reached capacity. (It should be mentioned that the Department of Sanitation planned to wait until Robert Moses was dead, see chapter 11.) As of 1970, the city was required to dispose of 22,000 tons of refuse daily and waste volumes were growing 4% each year. The non-partisan Citizens Budget Commission urged the city to drop its \$1-billion dollar plan to build waste incinerators in favor of increasing the capacity of existing landfills, the

development of new landfills on Prall Island (in the Arthur Kill), and consider novel waste processing technologies such as shredding and baling prior to pyrolysis (destruction of refuse under anaerobic conditions), composting, or incineration in a new generation of high temperature incinerators. The new super incinerators would be located in the Brooklyn Navy Yard, Hunts Point, Fresh Kills, and two units at Broad Channel (Kihss, "City Is Urged to Get Rid of Waste in New Ways", *New York Times*, Nov.30, 1970).

Although not nearly as ambitious as the waste reduction industry on Barren Island, proposals to use methane from landfills and the nearby sewage treatment plant to generate electricity for the Starrett City housing project was first advanced in May of 1977 when the city sought a federal grant for a feasibility study and preliminary design ("Starrett City Energy Plan Sought", *New York Times*, May 28, 1977). Located near Canarsie, Starrett City was established in 1974 and housed 20,000 tenants in 5,881 apartments in 46 high rise buildings (Prial, "Starrett City: 20,000 Tenants, Few Complaints; Starrett City Wins Praise of Residents", *New York Times*, Dec.10, 1984). The city signed a contract with RSF (Reserve Synthetic Fuels) of Signal Hill, California, in November of 1979. The contract gave RSF gas extraction rights on 400 acres within the 3,000 acres of the Fresh Kills landfill. The gas would be distributed by Brooklyn Union Gas. It was estimated at the time that 7 million cubic feet of gas would be produced at the landfill, enough to heat 16,000 homes. The contract called for RSF to

pay the city \$1,000,000 annually and the city was to furnish a million tons of refuse a year at Fresh Kills. Brooklyn Union Gas was scheduled to sink four exploratory wells at the Fountain Avenue Landfill from which it was estimated that 12,000 homes could be heated for 15 years. A similar project was considered for a landfill near Pelham Bay that would provide Co-op City with enough gas for about a quarter of its energy needs (Kihss, “City to Get Methane from Refuse”, *New York Times*, Nov.27, 1979).

Eugene H. Luntz, President of Brooklyn Union Gas told the *New York Times* that methane from landfills could ultimately provide 10% of the gas needed in Brooklyn, Queens, and Staten Island. An experimental membrane-filter process was tried at the Fresh Kills and Fountain Avenue landfills (Kihss, “State Studying Use of 38 Landfills for Getting Power from Garbage; Called Largest Such Landfill to Test Filter Process”, *New York Times*, Apr.27, 1981).

By 1982 the National Park Service was in control of Jamaica Bay so that federal approval was required for entering into contracts with private entities for recovering the methane from the landfills. Congress passed the necessary legislation in early August of 1982. The methane recovery plant for the 300-acre Fountain Avenue site was to be a joint venture of the Methane Development Corporation, a subsidiary of Brooklyn Union Gas, and Getty Synthetic Fuel. The Fountain Avenue landfill was producing enough methane

to heat 15,000 for a year. The city was required to pay half of its revenues from the site to the federal government. The monies would be used to support the Gateway National Recreation Area (“Congress Passes Methane Gas Plan”, *New York Times*, Aug.4, 1982). Although Starrett City was partially powered by methane gas from the sewage plant, it was not clear from later press reports if the landfill also provided gas for the project (Prial, “Starrett City: 20,000 Tenants, Few Complaints; Starrett City Wins Praise Of Residents”, *New York Times*, Dec.10, 1984).

Even after these landfills closed, there were occasional proposals to bring waste processing operations back to Jamaica Bay. Community opposition by the South Canarsie Civic Association and Community Board # 18 defeated a proposed Medical Waste Transfer Station. In response to such proposals, legislation was introduced in both houses of the New York legislature that would restrict the placement of waste transfer station within a mile of residential neighborhoods (*Bergen Beach Community Association*, n.d.).

Chapter Five

The Tourism Infrastructure

Traveling for recreation in the modern sense of a vacation was non-existent in the late 1700s and early 1800s but travel for health was becoming increasingly common. Americans adapted a well-established European tradition of gathering at spas to drink the waters, bathe, and enjoy a variety of amusements in congenial company. Americans who could afford to leave the cities in the hot summers or during disease outbreaks patronized resorts in ever-larger numbers. Among the first reported vacationers in the Rockaways were Philip Hone and his family. The Hones were one of New York City's elite families. They ventured to Rockaway to escape the 1832 cholera outbreak (Aron, 2001, 17). If the Hones' experience was typical, it would not be an exaggeration to say that Jamaica Bay's two main industries, waste processing and tourism, were born in the same cholera outbreak.

During the 1700s there were two roads to the Rockaways, one to Jamaica and the other to Hempstead. The Marine Pavilion was the first resort built at Far Rockaway in 1834. This prompted the building of a turnpike road from Brooklyn in the same year. A year earlier there was a proposal for a railroad but no progress was made until the 1860s (Bellot 1917, 34).

One of the first sportsmen's clubs active in Jamaica Bay was the Olympic founded in 1841. During its first year a party of half a dozen young men arranged to spend a week

on Barren Island, which was at the time reported to be less odiferous than in later years. Their camp equipment consisted of an old sail to use as a tent, a few knives and forks, a kettle, and a frying pan. There was no floor on their improvised tent but sleeping was made somewhat more comfortable by the grass over which it was erected (Knox July 1880, 206-219). (Figure 18)

The budget for the trip was extremely small. It was reported that the one dollar collected from each member for expenses almost bankrupted the club. The club members brought tea and sugar and remainder of their diet consisted of the fish they caught. They quickly learned to keep a bushel of clams handy for times that the fishing was poor (Knox July 1880, 206-219).

Despite the hardships the club members returned in 1842, this time with a camp chest new cooking utensils, and a borrowed military tent. They set up camp on the shore of Sheepshead Bay and returned each summer for the next two years. The club then moved to the Shrewsbury River, hired a cook, and raised the dues to ten dollars. After 1854 the club moved to a new location on Long Island's south shore near the Great South Bay, eventually purchasing 17.5 acres and erecting a permanent bunkhouse (Knox July 1880, 206-219).

Making the transition between an adventure ground and an established summer resort sometimes began with a few shacks and a hand full of either full or part-time fishermen, hunters, or baymen.

The Hotel Howard was the brainchild of William J. Howard. Howard's family was in the leather business. He had come to the shores of Jamaica Bay in 1897 with a herd of Mexican Angora goats. The goats were kept in pens made from mounds of the marshy soil. The goatskins were used by the family firm for the production of gloves and footballs. But around 1903 a storm flooded his property and swept away the goats. By that time, Howard had already opened a popular hotel.

Howard Beach is today a residential neighborhood with over 28,000 residents according to the 2000 census. It began as a group of shacks along Haw Tree Creek at the point where the New York Woodhaven and Rockaway Beach Railroad trestle left the Queens shore. The group of shacks, later known as Ramblersville, grew as the vacation cottages of the more affluent joined the original squatters' shacks. The community was linked by crude boardwalks that were covered at high tide. Although there was also a flag-stop of the New York, Woodhaven, and Rockaway Beach Railroad, the area had only a handful of residents at the start of the 20th century. (Figure 19)

In 1907, the Hotel Howard was located at the end of a 2,000 foot long pier extending out from the entrance to Haw Tree Creek. The hotel three stories tall and featured electric lights. It boasted panoramic views all the way to the Atlantic. There was also a large dancehall and a few private cottages. The isolated location proved fatal when the Hotel Howard caught fire in October of 1907. Fire equipment could not reach the structure and all that the firefighters could do was chop down the walkway linking the hotel to the railroad trestle so that the fire would not spread (Petrulis, "Ramblersville", March 13, 2010). Howard's real estate activities and the conversion of Ramblersville to a year-round residential community are described in the next chapter.

Recreation facilities Jamaica Bay consisted of small hotels, fishing camps, boathouses, and small businesses but there were two important exceptions, Bergen Beach amusement park (1894-1925), and the Golden City Amusement Park (1907-1938). The latter was described as the "big new amusement park" at Canarsie at the time of its sale by the Golden City Construction Company to the Canarsie Amusement Company in August of 1907. The site had been located at the end of a rapid transit line and been leased from the Canarsie Amusement Company which owned a large tract of land on the adjacent waterfront ("Golden City Changes Hands", *New York Times*, Aug. 1, 1907). The President of the Canarsie Amusement Company, William J. Warner, said that the company hoped to make Golden City one of the largest amusement resorts in the world and that once expansion plans had been completed, the park would cover more than fifty acres. Golden

City featured among its other attractions a "journey over the Rockies" and "daring circus acts" ("Free Tickets", *New York Times*, June 20, 1908).

Two years after the park was completed and only a few days before it was scheduled to be opened for the season, a fire broke out in the park's restaurant. By the time that the first company arrived the south side of the park was engulfed in flames. Second and third alarm calls went out. William Warner Jr., president of the Canarsie Amusement Company, was able to grab the weekly payroll and escape from the spreading fire. The flames spread to the hotel owned by Lawrence Messenger, and the Sunset Hotel, owned by John Plunkett. Both of the hotels were on the waterfront and adjacent to the park. The hotels might have been saved if the iron entrance to the park had not toppled over and destroyed the hose being used to fight the flames. The total damage to the park was estimated to be \$200,000 and the damage to the hotels another \$50,000. The entire park had cost over \$300,000 to build ("\$250,000 Canarsie Fire; Golden City Park Resort and Two Hotels Destroyed", *New York Times*, n.d.). Golden City was sold to a real estate company in July of 1926 but continued in operation. The last remnants of the park were destroyed to make room for the construction of the Belt Parkway ("Amusement Park Figures In Deal; National City Bank, as Trustee, Sells Golden City to Realty Company", *New York Times*, July 18, 1926).

Recreational fishing was a far more consistent means of bringing tourists into Jamaica Bay. Several factors made the bay attractive for anglers. The first factor was the well-developed public transportation systems. The calm waters of the bay made fishing from a rented rowboat practical. Numerous boat rental businesses and charter fishing boats made the entire bay easily accessible at a small cost. Jamaica Bay also featured a variety of habitats that were home to numerous fish species.

To reach Jamaica Bay the angler could use the Brooklyn trolley lines to Canarsie and Bergen Beach. The railroad line crossing the trestle over the bay was by this time operated by the Long Island Railroad and provided access to the islands where there were now passenger stops. Trains stopped at Howard's Landing, Goose Creek, The Raunt, Broad Channel, Beach Channel, and Rockaway Park. Steamboats ran between Canarsie and the Rockaway Peninsula during the summer months (Knowlson and Muller 1902, 14). Hoteliers on The Raunt advertising their hotels were only 40 minutes from New York by rail (45).

Hotels along the cross-bay trestle advertised their boat rentals as 50 cents on weekdays and 75 cents on Sundays and holidays, these prices being the average for boat rentals at the time (Knowlson and Muller 1902, 45). Grassy Point, a noted spot for weakfish was advertised as being only a "few minutes row" from Broad Channel (57).

Other sites including Barren Island and the Silver Hole (a deep area in Jamaica Bay east of the railroad trestle) could be reached by rowboat from the stations along the railroad line, Canarsie, or Sheepshead Bay (57).

While most of the liveries rented rowboats, in the 1902 guidebook, Louis C. Ott of Broad Channel advertised motor boats for \$3.00 a day. Fishing guides could also be hired at Broad Channel for \$3.00 a day. Guides were available to hotel guests staying at Messenger's Hotel and the Hanemy House (Knowlson and Muller 1902, 47). (Figure 20)

Jamaica Bay and the surrounding waters had a number of diverse habitats including some that were man made. Dredging operations created several areas of deep water which became home to a number of game-fish species. Wrecks, pilings, and submerged structures furnished homes for other species.

The principle deep water channels were the Island and Steamboat channels on the west side of the bay (good for weakfish, fluke, sea bass, porgies and flounder). The center of the bay had the Fishkill and Pumpkin Patch channels (noted for weakfish and fluke) and the eastern end had the Raunt, Broad and Beach channels. These were noted for

weakfish, fluke, blackfish, sea bass, porgies, Lafayettes, flounders and occasionally for striped bass (Knowlson and Muller 1902, 14).

Irish Creek running behind Barren Island and separating it from Flatlands was noted for blackfish and sea bass where the banks shelved abruptly into deep water. Striped bass could be caught in the sedges lining the creek (Knowlson and Muller 1902, 14).

The muddy Flatlands Bay was reported to be the best fishing spot for big flounders, especially in the curves and bends of Island channel (Knowlson and Muller 1902, 14).

Far from being described as an odiferous and polluted place that fishermen should avoid, the eastern side of Barren Island was described as the site of deep water where blackfish, fluke, weakfish, and snappers could be caught. Dead Horse Bay, on the opposite side of the island, was famous for the fluke fishing (Knowlson and Muller 1902, 57).

Charter and party boats sailed into the Atlantic from Canarsie, Bergen Beach, stations along the railroad trestle, and Sheepshead Bay. Off the Rockaway Beach, the wreck of the *Black Warrior* was a good spot for blackfish, sea bass and porgies, and the occasional

sheepshead. It is necessary to fish right on wreck. The grimly named Cholera Banks were a year-round fishing spot located about 14 miles southeast of Rockaway Beach. In the summer anglers could catch humpbacked sea bass and fluke. Blackfish were caught until November and cod, ling, hake, and sometimes whiting and pollock could be caught from November to April. The steamboat *Taurus* of New York's Iron Steamboat Company made daily trips during the season (Knowlson and Muller 1902, 14).

The wreck of the *Iberia* off Long Beach could be reached by sail and motor boats from points on the Long Island shore, Sheepshead Bay, Canarsie, and stations on Jamaica Bay trestle. The *Taurus* was also an occasional visitor. The wreck was home to blackfish, sea bass, porgies, fluke, cod, and "large silver eels" (Knowlson and Muller 1902, 15).

Morson's Dock at Sheepshead Bay advertised itself as the "Headquarters of the Fishing Fraternity of New York and Vicinity." They advertised "Open Boats for Deep Sea Fishing—\$1.00 per head, including bait." A photograph in the advertisement shows what appears to be a sailboat with a party of both men and women (Knowlson and Muller 1902, 48).

What is significant about these fishing guidebooks is the amazing extent of the

information. Just about every location in and around Jamaica Bay was listed along with detailed information about what type of fish could be found and the best way to reach it. It speaks to the popularity of the sport fishing in the bay.

A number of hotels were established to cater to the anglers. The East Side Hotel on The Raunt advertised itself as being "Most Central Spot on Jamaica Bay." "Bay Dinners" were a specialty of its "First Class" dining room and the hotel was open year round (Knowlson and Muller 1902, 45) Charles Noehren's Fishing Station Goose Creek advertised itself as being located at the "First Station on Jamaica Bay Trestle" and being within "easy rowing distance of most of the famous fishing spots" (Knowlson and Muller 1902, 48).

Messenger's Hotel at Canarsie advertised guides for weakfishing and having the latest in communications technology, a "Telephone Connection" (Knowlson and Muller 1902, 45). Messenger's could be reached via the "El" trains or the Hamburg Avenue Streetcar line. The Hanemy House was also located at Canarsie. Boats were available for rent for fishing on the Bay and "Auxiliary Yachts" (most likely a sailboat with a small engine) for deep sea fishing. The hotel also had launches for fishing in the bay. All of these hotels claimed that their bar and restaurant were first class. Period photographs show them to be modest, two-story frame buildings (Knowlson and Muller 1902, 48).

During the Progressive Era a number of reformers became interested in bringing poor or underprivileged children into the outdoors for fresh air, healthy exercise, and to learn an appreciation of nature. Children from the Astral Settlement House in Brooklyn were taken to the various resorts around Jamaica Bay. About a dozen girls, aged about twelve and thirteen were taken once a week to Prospect Park, The New York Aquarium, and Bergen Beach. The boys were taken separately to North Beach where they learned to swim and were taken out rowing. With the resorts of Coney Island and Jamaica Bay only a short trolley ride away, they were easy to reach but all the cheap amusements, side shows, Penny Arcades, fortune tellers, shooting galleries, and assorted carnival rides were located near the trolley lines. Such amusements, according to the *Pratt Institute Monthly*, "tempt the pennies out of the boys' pockets" and waste the time that should have been spent playing on the beach or swimming. They were "a great barrier in teaching the children to care for the beautiful things in nature, or simple, out-of-door play." A one W.E. Davenport, a student at the Union Theological Seminary, worked with the boys at the settlement house and chaperoned many of their excursions. His solution was to march to boys past the amusements and directly to a quiet bay for swimming. Later they hired a rowboat and rowed until they were too tired to row more. While some were reported to have had a good time, others complained that they did not have any fun because they were not allowed to go to the shows ("Summer at the Astal", *Pratt Institute Monthly*, vol.6, no.1, Oct.1897, 29-35).

A few years later an unidentified writer in the magazine *Charities* despaired of the lack of public access to beaches within the borders of New York City. The first city in the United States to take public control of its beaches was Atlantic City, New Jersey, in 1870 and would go on to spend another quarter of a million dollars on its iconic boardwalk. In 1904, the population of New York was 3.7 million while the city owned just less than ten acres of beach. This worked out to 1.4 square inches of sand per resident. Even the city's 752,000 children under ten years of age would have overwhelmed this small area.

Clearly, the city would need to acquire land on the Rockaway Peninsula if more New Yorkers were to have access to "the open and the God-given." While the area of the peninsula between Far Rockaway and Belle Harbor was home to cottages, resort hotels, and tent camps, the western end of the Rockaway Peninsula was described at the time as having a gently sloping beach one side, "rolling sand hummocks" making up the interior, and small beaches between the marsh grasses on the bay side. The land was the size of Central Park but largely unused as it was in the hands of two absentee owners. The beaches were largely deserted except for occasional strollers, a United States Life Saving station, and the occasional tent or improvised wind shelter.

If the city were able to acquire the land for a park, some means of providing better transportation was going to be required. The trip over existing train lines took more than an hour but a bridge or ferryboat might be possible from Sheepshead Bay. Such a public

beach would be vastly different from the then current system of private ownership. High board fences were erected between beachfront properties and sometimes barbed wire was used instead. The boundaries between properties were regularly patrolled. In one extreme case, two adjacent hotels on Coney Island erected a high fence and beach patrols to keep their beaches separated so that anyone wishing to travel to the other hotel was obliged to take a train. Places like Coney Island's Luna Park were well developed and if the trend were to continue, New Yorkers would soon have to pay 10 cents just to look at the ocean (“The Ocean Front and its Opportunities, Charities”, *A Review of Local and General Philanthropy*, Vol.7, no.32, Aug.6, 1904, 801-813).

These and other press reports from the 1890 - 1910 period draw contrasts between the less intensely developed resorts such as Canarsie, Bergen Beach, the Raunt, and Ramblersville and the crowded resort of Coney Island with its many "catchpenny" amusements (“To Improve Canarsie”, *Brooklyn Daily Eagle*, Mar.29, 1891). Newspaper and magazines regularly noted with amazement that these communities were so close to New York City and their stories featured pictures of happy children splashing in the bay and smiling adults with fishing tackle. The smaller resort communities did not appear to be defining themselves specifically as an alternative to Coney Island nor did it seem that they were advertising themselves as offering more healthier and wholesome activities such as swimming, fishing, and boating. (Figures 21, 22, and 23)

Press reports about the club-houses on Jamaica Bay describe them as small frame buildings. The boat shop of George Schwindt at the Raunt was two stories and measured 20 X 40 feet. This was about twice the size of the nearby Vigilant Yacht Club (20 X 25 feet). A club house on the Raunt owned by a man named Morgan was two stories but press reports do not say what kind of club was housed there. (“Fire Destroys Boathouses,” *New York Times*, Mar. 7, 1904)

A reputation for the healthy and wholesome was no protection from increasing commercialization as the development of a major amusement park at Bergen Beach demonstrated.

At the turn of the twentieth century, protection for many of the beaches and boating in and around Jamaica Bay was provided by members of the United States Volunteer Lifesaving Corps. This was an all-volunteer organization that was founded in 1870 as an auxiliary to the United States Lifesaving Service. The government-sponsored Lifesaving Service patrolled the coastlines and rescued victims of shipwrecks but unlike the modern Coast Guard had no law-enforcement responsibilities. This service eventually became part of the Coast Guard and its volunteer counterpart was absorbed into the Coast Guard Auxiliary (O’Connor, “They Never Left Their Posts”, *New York Times*, Jan.28, 1996). While it was in operation, it provided lifeguards for beaches along with search and rescue

boats in places like Jamaica Bay and the Hudson River. In 1906 the Corps had 1,900 stations and 22,000 members throughout the United States. In the greater New York region it had 577 stations, 4,500 members, 1,100 boats at its disposal, and was credited with saving 6,557 lives between 1894 and 1906. There were stations at Manhattan Beach, Coney Island, Canarsie, Bergen Beach, Sheepshead Bay, Barren Island, Howard Beach, Rockaway, Broad Channel, Plum Island, and Coney Island Creek. Very little is known about the service because its lifeguard operations were absorbed by the Red Cross and its boat service by the Coast Guard Auxiliary. Some of the stations were little more than a shed holding rescue equipment while on the beaches the corps members assumed the role of lifeguards (*The World Almanac & Book of Facts* 1906, 549).

The transfer of Jamaica Bay to the city's Parks Department, construction of the Belt Parkway, and the opening of the Cross Bay Bridge in 1925 followed by the Marine Parkway Bridge in 1937 would forever change the recreational landscape of Jamaica Bay. But before this happened, the older tourist infrastructure would have one last burst of prosperity. During Prohibition Broad Channel was the only inhabited island in Jamaica Bay and its population was still large, as high as 4,000 persons according to Thelma E. Smith, a deputy librarian the Municipal Reference Library who was interviewed by the *New York Times* in 1962. Broad Channel and the other islands were known as Little Cuba with yacht clubs, night clubs, and rum running (“54 Islands of City Traced In Study”, *New York Times*, July 8, 1962). The quantities of liquor brought into

Jamaica Bay were not small; in one incident 435 sacks of liquor each containing 12 bottles were confiscated at a dock on Shad Creek Road, Broad Channel. Although the liquor was seized the boat that brought it in escaped and shortly afterwards another 445 sacks of the same type of liquor were seized at Averte and 17 persons were arrested. Again, the boat escaped capture so there was no information in the press reports about it (“17 Men Arrested as Rum Boat Flees”, *New York Times*, Aug.7, 1931). During Memorial Day Weekend of 1927 while an estimated 200,000 people thronged the Rockaways, two prohibition raids on Broad Channel netted 3,600 bottles of liquor (“Holiday Exodus Stills New York”, *New York Times*, May 30, 1927).

Although there were reports of heavy ridership on many railroads, the Memorial Day weekend of 1927 was also notable for the large number of visitors who came to the beaches by automobile. The Queensboro Bridge was reported to have been busy from dawn to late-night; an extra 75 policemen were on duty to direct traffic on Coney Island where an estimated 500,000 people spent the day. Eight ferryboats were assigned to the Staten Island Ferry service and handled 5,000 automobiles (“Holiday Exodus Stills New York”, *New York Times*, May 30, 1927).

The era of tourist hotels finally came to a close when the bay became a city park. The Raunt was still a community when the residents and the three hotels that catered to

summer visitors (Johnny Pasky's Hotel, Smith's Run, and Brorstrom's Hotel) were ordered off the island by Moses (Barlow 1971, 113).

Chapter Six

Homes on the Bay

In a pattern that would be repeated many times in the coming years, Manhattan's building boom and rapid economic growth of the early 1800s spilled over into Brooklyn. An act to incorporate Brooklyn as a city passed the State Legislature in 1834 (Burrows and Wallace 1998, 581). A large building boom in Brooklyn soon followed. Only a few months after incorporation as a city a movement began to build a new city hall that would rival Manhattan's. The neighborhoods of Williamsburg, Green Point, Prospect Hill, and Red Hook all experienced rapid growth around this time. A shortage of burial plots on Manhattan prompted Henry E. Pierrepont to propose building the rural, non-sectarian cemetery in 1832. Pierrepont's cemetery would one day become known as the Greenwood Cemetery (583).

The building boom of the 1830s did not reach south of the Heights of the Gowanus. With the exception of the construction of Fort Hamilton between 1825 and 1832, the farms and rural lanes remained large untouched. A community of construction workers and support services for the fort rose around the site. By 1835 the fort was connected to New Utrecht by a stage line (Burrows and Wallace 1998, 583).

In 1835 a Connecticut merchant named John R. Pitkin began buying up tracts of land from the Dutch farmers of New Lots (today the area is Brooklyn's New Lots Avenue). His plans called for houses, factories, schools, and parks with a centralized transportation

hub on Jamaica Bay. It would be many more years before the area would grow to anywhere near the size Pitkin envisioned but that may have mattered little to him. Within a year, Pitkin had already moved west into Queens where he established the village of Woodside (today Woodhaven). Like New Lots, the country would remain largely unchanged until the arrival of the railroads (Burrows and Wallace 1998, 583).

Brooklyn's industrial development in the years after the Civil War was largely centered on the East River waterfront and the inlets such as Newtown Creek and the Gowanus Canal. Despite being limited to the western edge of the borough, the size of the growth was staggering, 500 factories in 1865 grew to 1,000 just five years later, and to 5,000 by 1880. Residential development also prospered nearer to the East River but developments farther east languished (Burrows and Wallace 1998, 933).

In 1865, Charles S. Brown, a developer who bought land north of Canarsie, built frame houses for working class people, and then modestly named the area Brownsville. According to *Gotham*, the development failed in part because it was downwind of the odors coming off Jamaica Bay and Barren Island (Burrows and Wallace 1998, 934). The area remained largely agricultural until 1887 when a Jewish real estate agent named Aaron Kaplan purchased property for tenement housing. The tenements became popular with Jewish people eager to flee crowding on the Lower East Side. The population

bloomed with the opening of the Fulton Street elevated railway in 1889 and then the Williamsburg Bridge in 1903 (New York City Department of Parks and Recreation). A branch of the Long Island Railroad now forms one border of Brownsville.

A complete description of how even a portion of the boroughs of Brooklyn or Queens developed is far beyond the scope of a single dissertation, or even a single lifetime. The important issues in environmental management are how Jamaica Bay's shorelines were impacted by development and how their physical geography shaped development. Generally speaking, on the shores of Jamaica Bay, residential development was dependent on two things, railroad transportation and dry land. Jamaica Bay's residential development was also linked to its character as a resort.

Even as late as the 1890s the shores of Jamaica Bay were still relatively isolated and despite both its popularity as a resort and the population growth in the rest of the city, residential buyers were not easy to find. Thomas Adams, Jr., (his father was the inventor of Tutti Frutti chewing gum) and Percy G. Williams, of Brooklyn discovered this in 1893 (Grey, Aug.23, 1899, 32). The partners had purchased the home and farm of the Bergen Family who had lived on the site near Canarsie since buying the land from the Indians. They had originally purchased the 300-acre property in 1853 including the family's farmhouse that was said to have been built in 1850. (The 1853 purchase date seems to be

a mistake propagated through numerous press reports. A date of 1893 is more likely since that is when the land was originally subdivided.) Eight generations of Bergens farmed the land but there was no reason given in the press reports as to why they sold it ("At Bergen Beach", *Brooklyn Daily Eagle*, June 16, 1895).

Portions of the land property were described as a "sandy waste" but another section was considered more suited for development, if it had not been located too far from the railroads or rapid transit lines to attract more than a few purchasers (Grey, August 23, 1899, 32). Transportation to the area was via the Flatbush Avenue Trolley and a stage line from the trolley line terminal. A channel was being dredged and bulkheads created so that excursion steamers could reach the area from the Rockaway Inlet. Negotiations were also underway to extend the trolley line as far as the beach where a new hotel was planned. (Figure 2) Several cottages were already erected on the beach and there was a "pretty little club house." Press reports at the time listed the activities available for recreation. Canarsie, Coney Island, and Rockaway Beach were all a short sail away. Jamaica Bay abounded in fish and offered opportunities for fishermen and sportsmen. Bergen Beach was a good place to own a horse and the shady, shell-packed roads were well-suited for bicycles. The Bergen's original farmhouse was converted to the Bergen Beach Inn ("At Bergen Beach", *Brooklyn Daily Eagle*, June 16, 1895).

Lots were advertised at \$150 and up. Advertisements claimed that a lot could be purchased at \$1 a week and a house for \$5 a week. The community had two miles of waterfront, its own park, bathing, boating, and fishing. But because the streetcar line still did not actually extend all the way to the new community, the advertisements promised that free stages met the Flatbush Avenue Cars at the line's terminal. The advertisements claimed that real estate values would double within the year ("Beautiful Bergen Beach", *Brooklyn Daily Eagle*, Oct.22, 1893). It should be noted that the partners did not build the streetcar line and therefore had no control over its route. This was not the pattern on Coney Island, Manhattan Beach, and portions of the Rockaways where railroad promoters also owned hotels and resorts.

By 1895 a few houses had been built and the conversion of the original farmhouse to an inn was complete. A clubhouse had also been erected for use by the residents. A bulkhead was built along the water front and an "immense dredge" was at work filling in behind it ("At Bergen Beach", *Brooklyn Daily Eagle*, June 16, 1895).

Two years after its founding, Bergen Beach however, did not actually have a beach. It was reported that over a half a million yards of marshland had to be reclaimed and covered by a boardwalk before it was ready for visitors. A single trolley line linked it to the outside world. With sales still slow, the partners decided to promote the location as a

new summer resort (Grey, August 23, 1899, 32).

Adams and Williams decided to adopt the business model of the Chicago World's Fair. They obtained the best attractions and retained ownership of everything, from the beach, boat rentals, beer sales, candy stores, and even sales of peanuts. Concessions were rented strictly on a percentage of profits basis and all cashiers were employed by Adams and Williams and not the concessionaires. Williams explained that "nobody can make any profit here without sharing it with us" (Grey, August 23, 1899, 32).

The Bergen Beach Branch of the Brooklyn Heights Trolley System linked Bergen Beach to the rest of Brooklyn. It was opened on Saturday, May 23rd, 1896. Press reports announced that the line would operate cars on two-minute headway. The park at Bergen Beach was set to open for the season on Friday, May 29 ("Cars to Bergen Beach", *Brooklyn Daily Eagle*, May 24, 1896).

At the time that the streetcar line opened, the Boardwalk stretched a mile and new attractions for the season included a large grand stand for viewing Paul Boyton's Water Circus featuring "fancy" swimming and high diving exhibitions. The circus also featured a miniature boat race in which trained monkeys were contestants, a walrus hunt was

reenacted, and a mock naval engagement featured a ship blown up by dynamite. Press reports stated that while performing in London, the show was seen by every member of the Royal Family, except the queen (“Cars to Bergen Beach”, *Brooklyn Daily Eagle*, May 24, 1896).

The Casino at Bergen Beach was almost completed. It housed a theatre that would be lighted by electricity and feature vaudeville productions. Comedians, magicians, sketch comedy, monologue artists, and dancers were to perform (“Cars to Bergen Beach”, *Brooklyn Daily Eagle*, May 24, 1896).

In 1896 advertisements began appearing touting the location. More than \$25,000 was spent advertising the resort in newspapers, with large colored posters, and on trolley cars. In only one or two seasons the resort took its place among the popular watering places (Grey, Aug.23, 1899, 32).

The Phoenix Iron Works of Phoenixville Pennsylvania constructed several large Ferris wheels including one at Bergen Beach that was similar to Ferris wheels at Coney Island, the Columbian Exposition, and the Atlanta Exposition. This was no small installation but a major piece of tourist infrastructure. It was 100 feet in diameter, stood on eighteen

piles each 8 inches in diameter and sunk twenty feet deep. A fifteen horsepower steam engine drove the wheel at a sedate 2 feet per second, or one revolution every 2.5 minutes. The wheel had 12 passenger cars measuring 7 X 10 feet and capable of holding 14 passengers. The press reports do no mention the cost of this attraction but it is clear that the installation represents a serious attempt to create a major attraction (“A Steel Framed Wheel 100 Feet in Diameter”, *Engineering News*, July 30, 1896, vol.36, no.5, 70).

By 1899, it was claimed that more than 80,000 visitors came on a typical Sunday or Holiday. The average daily attendance was reported at 30,000. Since the streetcar lines charged a ten-cent fare, a conservative estimate for their revenues generated by Bergen Beach was \$200,000 for the season.

Bergen Beach was never as popular as Coney Island and the resort area closed in 1920. In 1925 The Manhattan real estate developers Max Natanson and Mandlebaum & Levine purchased the resort area for two million dollars and announced plans to build a residential community featuring a bathing beach, recreation pavilion and new amusement park. The plan never materialized and the land was sold off as small parcels. Much of the land remained undeveloped until the mid-century. The Bergen House itself was demolished during construction of the Belt Parkway. The remnants of the boardwalk and amusement park were torn down in 1939 (New York City Department of Parks and

Recreation).

The Howard Beach section of Queens followed a similar history. Originally it was a collection of shacks and summer cottages known as Ramblersville. It was located on the north shore of the bay at the point where the New York, Woodhaven, and Rockaway Beach railroad's trestle touched the shore. Residential development began with William J. Howard's Mexican Angora goat farm that was established to provide goatskins for the Howard family leather business. The farm was washed away in a storm sometime around 1903. The agricultural operations were moved upstate and Howard's focus shifted to real estate (Petrulis, 2010).

In 1908 Ramblersville was a collection of two-story houses on both sides of a tidal creek, all built on piles and clustered so close together that there was only room for a narrow boardwalk between them. There were no streets as the houses all fronted on the creek. A four-foot wide boardwalk ran from the shoreline out along the backs of the houses. The front of each house featured a veranda and at least one flat-bottomed rowboat but some houses had sailboats or motorboats. The community boasted a post office, three or four hotels, and a few grocery stores. The fire department consisted of a small pump mounted on a hand-barrow, a pikes, axes, and buckets. The population was mostly seasonal but there were a few year-round residents (Rewey 1908, 149).

Residents could swim off their front porches, but they had to watch the tides. At high tide, the water was clean but at low tide the water coming out of the creek was contaminated with sewage (Rewey 1908, 149).

The Howard Estates Development Company was founded in 1909 and began constructing vacation homes on the newly filled ground next to Ramblersville. The dredged sand from Howard's channel improvement projects was used in this project. By 1912 there were fourteen bungalows available at \$2,000 each, a casino, a sandy beach, ornamental trees and a cobblestone bicycle path (Petrulis 2010).

After Howard Estates expanded west beyond Ramblersville a railroad station officially named Howard Beach was built in 1916. By this time pollution was credited with destroying the area's potential as a resort and thus led to the construction of more year round homes. Shellbank Basin was dredged for the construction of a submarine base in 1920 and while this was never built, there was now more sand available for landfills. More waterfront homes followed. Subsequent housing developments on the east bank of Hawtree Basin became Hamilton Beach. Finally, the construction of Cross Bay Boulevard ensured automobile access for all of these areas (Petrulis 2010).

Howard himself did profit greatly from these efforts. The city's plans for a new seaport (see chapter 9) caused real estate prices to rise and Howard sold his development company for a profit. He moved to Ardonia, New York, to grow alfalfa and it is thought that this decision came because he anticipated a need for animal feed with the First World War looming in Europe (Petruilis 2010).

As properties such as Ramblersville were improved around the bay, land values rose and created new incentives for corruption. Ruffle Bar was a 60-acre sand bar near Canarsie in the western half of Jamaica Bay. The bar was often submerged and as of 1892 was home to a few small hotels built on piles and a handful of small frame houses owned by fishermen and oystermen. Ruffle Bar was popular with anglers and the largest of the hotels that catered to them was owned by a Henry Schmeelke of Canarsie. The hotel was located on a 29-acre plot and as he owned almost half the island, Schmeelke was very concerned about which township actually has jurisdiction over it. For most of its history, the exact boundary line between Kings County and Queens County was not settled in many places and especially under the waters of Jamaica Bay. In 1876 a commission was appointed by the state legislature to settle the matter and they decided that it should pass through Ruffle Bar. At the time, both the towns of Flatlands and New Lots claimed the island and frequently both towns taxed the residents. Finally the boundary was fixed so that the majority of the island became part of Flatlands. Schmeelke had for some time

opposed to being part of Flatlands and an anti-Flatlands faction grew up around him. The settlement of the boundary line resolved the question of jurisdiction but did not erase years of fighting and animosity (“Strictly on the Quiet, the "Development" of Jamaica Bay Real Estate”, *Brooklyn Daily Eagle*, Sep.29, 1892).

When the boundary was settled a number of smaller islands came to be owned by the town of Flatlands. The smallest were just sandbars but the largest were up to ten acres in size. With the growing tourist industry however, all of them were becoming increasingly valuable. On Ruffle Bar itself there were rumors that there would soon be a new large hotel, regular ferry service from Canarsie, and the establishment of a large fishing club. Flatlands officials did their best to downplay these stories. Meanwhile Schmeelke faced new problems. The title of his land was granted by the state and it was not clear if the town of Flatlands was going to honor it. The town also claimed that Schmeelke owed it for twenty years of back taxes and the total amount of these was more than the value of the hotel and the land. Flatlands officials began selling off smaller parcels for \$25 for each building lot. Most of the purchasers were fishermen and boatmen, few of whom had enough money for the purchase price (\$25 in 1892 was equivalent to \$?? in 2010) but all of them were somehow associated with Flatlands officials. To further suspicions were aroused by the fact that most of the sales were made without any publicity. Constable George Hendrickson of Canarsie bought a six acre island for \$10 an acre but refused to answer questions from reporters about how he obtained the property or what he intended

to do with it ("Strictly on the Quiet, the "Development" of Jamaica Bay Real Estate", *Brooklyn Daily Eagle*, Sep.29, 1892).

There are no press reports about what happened in the subsequent weeks and months.

There were additional mentions of Schmeelkes in the *Brooklyn Daily Eagle* but none of pertained to the real estate sales ("Strictly on the Quiet, the "Development" of Jamaica Bay Real Estate", *Brooklyn Daily Eagle*, Sep.29, 1892).

Not all real estate plans worked out well. Frederick W. Dunton was a well-known real estate promoter, Queens County Commissioner, and promoter of a steam-powered monorail that was known as the "bicycle railway." In April of 1900 Dunton proposed developing housing sites on about 4,000 acres on the islands and along the shorelines of Jamaica Bay. He had already taken out a 99-year lease on the necessary lands from the Jamaica Town Board. Dunton claimed that about 100,000 workingmen and their families could be housed on the reclaimed land. To finance the reclamation Dunton asked that the members of the Central Federated Union for \$1,000 per acre for dredging and improvements. The Central Federated Union was an umbrella organization for a number of craft unions. Affordable housing for its many members would have been an important concern for the organization. Dunton promised that once the land was ready, it would be sold back to union, minus his commission ("F.W. Dunton's Proposition", *Brooklyn Daily*

Eagle, Apr.9, 1900).

Dunton was a well-known public figure although his career was hardly without controversy. Four years earlier had been Dunton had been accused of misappropriating \$10,000 (other press reports place the sum at \$20,000) belonging to the New-York and Brooklyn Suburban Investment Company for his own use (*New York Times*, Mar.9, 1896, 1). Charges were later dropped because of a lack of evidence (“F.W. Dunton Discharged”, *Brooklyn Daily Eagle*, Mar.26, 1896). At about the same time, Dunton was also busy promoting a new resort in Jamaica Bay but like many others, these plans never materialized (“City on Jamaica Bay; Attractive Plans for a Big Summer Resort. Make Waste Meadows Beautiful Scheme of Mr. Eppig and Mr. Dunton To Build a Rival to the Great Sea-side Watering Places”, *New York Times*, Mar.15, 1896).

Plans for seaport expansion (see chapter 9) caused a spike in real estate prices and it was reported in 1910 the last remaining marsh lands on the bay’s shores were being bought up by speculators. The *New York Times* predicted that soon there would be “no meadow land for sale around Jamaica Bay.” Although the plans for the new seaport were announced several years earlier the appropriations by city and state governments convinced investors that the plans would be implemented in the near future (“Buying Meadow Land”, *New York Times*, Apr.3, 1910). It is not clear what became of these

investments when the new seaport failed to materialize. Most would have been sold to the city for the construction of the Belt Parkway (see chapter 11) during the Great Depression when real estate prices were low.

In July of 1924 it was announced that one of the last remaining open tracts of Brooklyn land near Jamaica Bay was to be developed with 1,000 homes. Developer Edmund G. Burke announced the purchase of the Kowenhoven Estate. The 170 acre estate was one of the earliest Dutch land grants. The property lies just outside Flatbush between Ditmas Avenue and Avenue J. The tract straddled the tracks of the Manhattan Beach Railway Company. At the time the Manhattan Beach Railway was to be incorporated into the Interboro Rapid Transit (“One Thousand Small Houses to Be Erected in Brooklyn”, *New York Times*, July 27, 1924).

A map of Queens prepared in 1920 shows only one road along the north shore of Jamaica Bay between Howard Beach and Head of Bay. No side roads extended down to the water's edge and the shoreline remained undeveloped (*Queens Borough New York City, the Borough of Homes and Industry* 1920, 120). (Figure 24)

One unexpected source of population pressure on Jamaica Bay was the growth of

industry within the borough of Queens. The borough's chamber of commerce reported that industrial growth often outpaced the availability of housing and that in 1920 about 50% of Queens' industrial workforce lived outside the borough. The Queens Chamber of Commerce estimated that for every dollar spent on industrial construction, four dollars would have to be spent on housing (*Queens Borough New York City, the Borough of Homes and Industry 1920*, 116 - 118). (Figure 25)

Although the city was growing outwards and around Jamaica Bay the shores of the bay remained largely undeveloped. The shoreline marshes appear to have been preserved because developers could not afford to dredge and fill, not because they were valued for ecosystem services or natural beauty. Protection of the shoreline for recreational purposes, fishing, hunting, and boating seems not to have been a priority even though most of the real estate developments advertised these things as amenities. Creating sufficient land for waterfront development required the resources of the city and federal governments.

Chapter Seven

A Yachting Mecca

Noting the popularity of canoeing was on the rise, the *New York Times* in August of 1872 described canoe trips that were possible within the metropolitan region. While fishermen would want to cruise to good fishing spots and lovers of picturesque scenery would prefer to find dramatic scenery, the canoe traveler who sought exercise by paddling or excitement in sailing had a number of longer cruises available. One trip suggested began in Manhattan and passed through the Narrows. Hugging the Brooklyn Shore the canoe entered Coney Island Creek, and then Jamaica Bay. At this point the traveler had the choice of going out the Rockaway Inlet and sailing along the southern shore of the island. If the route through Jamaica Bay was taken, the canoe would have to be portaged over the neck of land between Jamaica Bay and Great South Bay. The route required another portage to Shinnecock Bay followed by a ten-mile sail to the Long Island Railroad station. The canoeist could then catch a train back to New York (“A Canoe Trip”, *New York Times*, Aug.8, 1872).

The total distance was about 130 miles and a sailing canoe could cover 30 miles a day. The *New York Times* suggested fish, eggs, and milk could be purchased from the farms along the route. The total cost of the trip would be about ten dollars including train fare and baggage fees for shipping the canoe (“A Canoe Trip”, *New York Times*, Aug.8, 1872).

A trip like the one described by the *New York Times* was for the adventurous solo traveler. In contrast, yachting on Jamaica Bay in the last years of the 1800s was dominated by established clubs, organized races, and formal events. It would appear from the press reports about the activities and races organized that the catboat was the dominant type of recreational craft on the bay. (Figures 26 and 27) This type of boat was so popular that it was the only type of sailboat allowed to compete under the auspices of the Windward Club. Press reports of the period describe the first class catboats of the late 1880s as ranging from 19'11" to 22'2.5". Second class catboats are described in the same press reports as ranging from 16' to 18'11" ("Catboats Compete; The First of a Series of Races Under the Windward Club Auspices", *New York Times*, Aug.12, 1889). Other press reports of the period mention first class boats as being between 17 and 23 feet and second class boats being less than 17 feet. The reports also mention a boat builder named Rigby in Canarsie who constructed both first and second class catboats, but do not provide any additional details ("With Plenty of Wind", *New York Times*, Aug.15, 1887). A later report in the magazine *Outing* mentions that H.T Rigby and Son of Canarsie had constructed ten identically designed "half raters" (sailing canoes) for use in the open waters of the lower New York Bay and racing with member of the New York Canoe Club ("Yachting", *Outing*, Vol.28, 1896, 35). Henry T. Rigby was one of two yacht builders listed in an 1890 Brooklyn business directory; he was also listed as a liquor dealer. The other builder was Richard Youman (Lain & Co. 1890, 354).

The final race in the 1888 season for the Windward Cup, awarded by the Windward Club of Ruffle Bar, was described as a, "dozen pretty cat-rigged yachts, manned by jolly crews from Brooklyn, Canarsie and Ruffle Bar" (*Outing* Vol.13, no.2, Nov.1888, 190). The final race in a series was held on Saturday, September 23, 1888, and was won by the *Julita*, built three years earlier by Dick Wallin, of South Brooklyn (190) An important race might involve boats from several clubs and watched by hundreds of people. A steam tug might be chartered to carry the race judges ("Catboats Compete; The First of a Series of Races Under the Windward Club Auspices", *New York Times*, Aug.12, 1889).

Many of the details about boating and recreation on the bay went unrecorded until something went wrong. The capsizing of the sloop yacht *Mystery* in July of 1887 is one such instance. The *Mystery* and the *Christina* were chartered by the Crescent Yacht Club for a Sunday day trip from Canarsie to Ruffle Bar. The Crescent Yacht Club owned no boats nor did any of its members. They chartered boats like the *Mystery* for outings. On this particular day they went to Ruffle Bar for a "chowder party" which included several kegs of beer. The press reports state that the captains of the *Christina* and *Mystery* both knew the bay. The trip to Ruffle Bar was 3 miles at high tide but 4.5 at low tide but the captains of the two boats appeared to have made the trip without difficulty.

The *Mystery* was described as being sloop-rigged, 30 feet long, with a fifteen foot boom,

and drawing about six feet of water with her centerboard down. The *Mystery* was owned and skippered by David Hendrickson. Hendrickson's nine year old son was on board the day of the accident.

When the time came to return to Canarsie the members of the club decided that the men should take the *Christina* while the women and children should board the *Mystery*. When the *Mystery* left Ruffle Bar she was carrying 35 passengers. She was under jib and double-reefed main sail but Hendrickson took out the reefs shortly after departure. Some of the passengers were concerned that the boat was so low in the water but Hendrickson joked that he would give the passengers a swim before returning. With the wind blowing directly from the west, the two boats would have to beat back into it. The passengers gathered on the windward side of the *Mystery* when Hendrickson tacked without giving any warning. The weight of the passengers was now on the leeward side of the boat and combined with the stiff winds capsized the *Mystery*. The jib sheets also jammed at this critical moment and if they could have been released at least some of the pressure on the sails would have been relieved. The *Christina* was only two hundred yards away but in a moment of panic an unidentified passenger lowered her main sail and the *Christina* could only move slowly under jib alone. Some of the *Christina's* passengers were able to swim to the *Mystery* and help some of those struggling in the water. Assistance also came from Andrew Robinson, a crew member of a schooner unloading coal at Barren Island. Robinson brought a rowboat out to the *Mystery* and several passengers were able to save

themselves by clinging to the rowboat's gunwale. Robinson attempted to claim no credit for the rescue but left with the schooner when she departed for Perth Amboy the next day. In a strange irony the schooner was named *Reaper*.

At least one steamboat approached the *Mystery* earlier during the trip and the captain offered a tow, which Hendrickson refused. The tugboat *J.C. Deane* under Captain Henry William Rohde also followed the *Mystery* briefly in hopes of getting a tow. The two boats were only a half-mile apart when Rohde saw the *Mystery* capsize and turned to help. However to reach the *Mystery*, Rohde had to make a detour of two miles around the sandbars. Steaming at full speed, it still took the *J.C. Deane* about ten minutes to reach the site of the accident.

In total, 12 passengers were rescued, 13 were drowned, and at least another 10 were missing including Hendrickson and his son. An inquest ruled that the *Mystery* was dangerously overloaded, was carrying too much sail in heavy winds, and should have had at least one additional adult crew-member. Although there was a keg of beer aboard the *Mystery*, Hendrickson was reported not have drunk more than two glasses during the picnic and not to have drunk anything else either before departure or en route (“Only Twelve Rescued”, *New York Times*, July 12, 1887).

Sloops like the *Mystery* did not have deep, fixed keels. Such boats with shallow hulls, broad beams, and somewhat flattened bottoms and were known in some circles as the "skimming dish" type. The *Mystery* only drew 2 feet, 5 inches with her centerboard raised. Between 1884 and 1887 an average of ten lives per year were lost among British yachtsmen. However, because of the English preference for deeper keels, none of these incidents involved a capsizing. In the period between 1887-1888 there were two serious capsizes in the United States in addition to the loss of the *Mystery*. The *Gracie*, 70 feet long, 21 feet wide and drawing 6 feet capsized with a loss of one life and the *Olivette* capsized in Newark Bay with the loss of six lives (Beynon, *Knowledge an Illustrated Magazine of Science*, Oct.1, 1891, 181-182).

Because the sailboats lacked auxiliary engines, it seems that tugboats regularly solicited towing jobs from sailboats operating in the bay. The events surrounding the *Mystery's* capsizing also dramatically demonstrated how shallow and difficult to navigate Jamaica Bay was. It is easy to understand the enthusiasm for dredging projects. It also serves as a reminder of how little regulation governed passenger-carrying boats of that period. The passengers of the two boats were working class people, entirely from Brooklyn, and all young families. Twelve of the reported 23 drowned or missing passengers were under 12-years old, several of these were infants or toddlers, and the oldest reported age of any of the passengers was 42-years. It is unfortunately not clear how typical these people were of the thousands of city dwellers who recreated on Jamaica Bay. Andrew Robinson

was described as a "coloured man" but nothing more was known about him. His quick response to the capsizing clearly saved many lives and every witness gives him credit. However there is also a sense that much was made of his being "coloured" by a society that was still struggling with the birth of the modern multicultural world. Press reports of the period often sound slightly surprised that any non-white person was capable of performing a feat of heroism or achieving anything of note.

A happier account of a short cruise was reported for July, 1896 in which members of the Rockaway Yacht Club were going to sail 26 of their members' yachts from their anchorage near Rockaway around Coney Island to the Gravesend Bay Yacht Club. Of the boats reported to be making the six-mile trip, most were described as sloops and only one as a catboat, the *Pathfinder* belonging to Fleet Captain Ben Daly. The non-sailing members of the club, dubbed the "Rocking Chair Fleet" were also reported to be making the visit ("To Visit Brother Yachtsmen", *Brooklyn Daily Eagle*, July 24, 1896).

Jamaica Bay did not have a standardized one-design racing boat until shortly after the end of the First World War. Proposals for a one design were drawn up by the Yacht Racing Association of Jamaica Bay. The association had been formed by representatives of five yacht clubs in 1901 ("Match Yacht Race On Jamaica Bay; Lilly S. Wins the Inter-Club Event for Catboats. Boats Covered a Ten-Mile Course -- Jamaica Bay Yacht Racing

Association May Be Formed”, *New York Times*, Aug.19, 1901). Having a single class of racing sailboats had been a goal of the organization for some time but a decision was not made until the spring of 1919. A committee made up of representatives from the Canarsie Yacht Club, the Rockaway Park Yacht Club, and the Motor Boat Club of Jamaica Bay selected the Sea Mew as the class design. The design of the Sea Mew was by Fred Goeller and plans were published in *The Rudder* in November of 1917 (“Sea Mews on Jamaica Bay”, *The Rudder*, May 1919, 241).

The Sea Mew was named for a type of gull, the black-backed gull (*Larus Marinus*). The boat design was for a cat-rigged, 14 feet long, and 6.5 feet wide boat drawing 15 inches of water with the centerboard raised and 2.5 feet with it lowered. The Sea Mew was said to be large enough to fit six adults comfortably (“Sea Mews on Jamaica Bay”, *The Rudder*, May 1919, 241). In reporting on this decision, *The Rudder* praised the association for its appreciation of the needs of yacht racing and for taking the steps needed to keep sailboat racing on the bay. The same article also listed some of the yacht clubs represented in the association and the officers elected to the association:

Louis Weld, Canarsie YC, President

G.H Norris, Rockaway Point YC, First Vice President

John E. Linstrom, Bergen Beach Yacht Club, Second Vice President

F.E. Williams Tamaqua YC, Secretary

Samual Lauderbach, Rockaway Park YC, Treasurer

Charles Green, Motor Boat Club of Jamaica Bay, Measurer

("Sea Mews on Jamaica Bay", *The Rudder*, May 1919, 241)

Boat builders Rider & Suydam of Old Mill Creek were commissioned to build the boats which were expected to be ready by the start of the summer. Advertisements for Rider & Suydam list their offices at 353 West 37th Street in New York. The firm also produced an 18-foot long, vee-bottom motor boat designed to be run with a 2.5 horsepower motor (*Field and Stream*, June 1919, Vol.89, 305).

In a report on the postwar revival of yachting throughout the greater New York area, the *Rudder* of July 1919 reported on the progress of the Sea Mews. The magazine stated that during the early part of the 1919 season; most of the racing on the bay was in powerboats. During a regatta of the Old Mill Yacht Club, out of a fleet of twenty starters, there were only four sailboats. The first twelve Sea Mews were nearing completion and expected to be raced during the season ("The Revival of Yachting", *The Rudder*, July 1919, vol.35).

Three years later *The Rudder* reported that the Sea Mews were "giving their owners a great amount of fun in the Jamaica Bay section." A one J. Oppenheim (no first name or affiliation given) was credited with giving both his time and money to get the class

established (Young, "Jamaica Bay Yachting News", *The Rudder*, August 1922, Vol.38, no.8, 40). The author has been unable to locate any additional information on the class or the fate of the fleet sailing in Jamaica Bay.

With its easy access to Coney Island, Manhattan Beach, and the Rockaway Inlet, Sheepshead Bay would also grow into a center for recreational boating. In 1920 there were three yacht clubs in Sheepshead Bay, the Sheepshead Bay Yacht Club, Varuna, and the Tamaqua, which was well known for its annual races and regattas. The bay was also home to two repair yards, Olson's and Lindquist's. There was a dredged basin separating Sheepshead Bay from Manhattan Beach that was popular with canoes, skiffs, racing shells, and commercial fishing boats (Loomis, "The Motor Boat Pathfinder, Part III - South Shore of Long Island", *Country Life*, vol.38, no.2, June 1920, 116). In 1936 the city constructed a series of concrete piers as an improvement for recreational boating.

At the start of the 1920s, facilities for yachtsmen were abundant in Jamaica Bay. Resident baymen boasted that there were about 102 boat, canoe, rowing, and yacht clubs in the area (Loomis, "The Motor Boat Pathfinder, Part III - South Shore of Long Island", *Country Life*, vol.38, no.2, June 1920, 116). The channel from the Rockaway Inlet to Canarsie was dredged to a depth of six feet and was well marked with stakes. Two barges were docked off the site that sold gasoline and local repair yards could

accommodate boats up to 40 feet. The channel past Barren Island into Mill Basin was dredged to a depth of 18 feet. The Briggs Engineering Corporation of Mill Basin specialized in modernizing coal-burning steam yachts and could also perform other types of yacht repairs. The Rockaway Peninsula was home to the Belle Harbor, Rockaway, Neponsit, and Bayswater yacht clubs. The Broad Channel Yacht Club and the Raunt Motor Boat Club were located on nearby islands (116).

The wider availability of internal combustion engines after the First World War made motorboat racing become increasingly popular. On Saturday, July 12th, 1919, seventeen power boats raced from the Rockaway Park Yacht Club to Poughkeepsie, New York. The next day they returned by the same route, covering a total distance of 180 miles. The boats were divided into two classes and timed for the northward trip. The first boat to arrive was the *Bedouin* owned by L.H Strauss. She made the trip in 8 hours and 43 minutes. The sailors had a night's rest while the race committee computed their handicaps and corrected the running times accordingly ("Poughkeepsie and Back", *The Rudder*, Aug.1919, Vol.35, no.8, 383).

The next day the boats returned to Jamaica Bay, the *Miamada*, owned by J. Freidenberg was the first to depart at 5 am returned by 3:48 pm. The *Bedouin* won the race on corrected time in the A class and the *Virginia*, owned by A. Benkamp, won in the B class

(“Poughkeepsie and Back”, *The Rudder*, Aug.1919, Vol.35, no.8, 383).

Of the seventeen boats to start the race, two in the A class did not finish. The *Siren*, owned by Westfall-Kruger, was disabled. The *Terrybell*, owned by M. Schiff, withdrew. In the B class, the *Viola*, owned by G. Adolph, was disqualified (“Poughkeepsie and Back”, *The Rudder*, Aug.1919, Vol.35, no.8, 383).

The names of the boats and owners are interesting in that most of the owners' surnames appear to be German, Strauss, Hamblen, Ullman, Schiff, with a few English names, Benkamp, Simmers, Growne. The boats names do not have any particular ethnic identity, *Bedouin*, *Ciro*, *Ruthie II*, *Miamada*, *Smarty II*. One boat name reflected the owner, the *Fannie U.*, owned by A. Ullman.

The problem facing organizers of motorboat racers is that all things being equal a larger boat will generally be faster than a smaller one. But a small boat fitted with a large engine will be faster than a larger boat fitted out for cruising in comfort. Fairness can only be maintained by restricting the design of the boats and the allowed horsepower.

This problem did not stop race organizers who used racing rules developed by the American Power Boat Association (APBA). The Yacht Racing Association of Jamaica Bay received so many complaints about these rules that a committee led by John F. Young was appointed to work out a new approach. The committee decided that the APBA rules would be in force for the first two races of the season. Afterwards boats would receive handicaps based on their performance in earlier races. This was reported to be the system used for sailboat racing by the Long Island Sound Handicap Class (“Yachting Items From Near and Far”, *The Rudder*, May 1922, vol.38 no.5, 46).

Not all boats of Jamaica Bay used power or sails. Many houseboats were anchored or moored in the bay. These were mostly unpowered and used as vacation cabins. The New York Times observed in June of 1900 that; “To those who have a taste for outdoor life, yet do not care to assume the cares and expenses of a country seat, the houseboat offers particular inducements.” The low-end houseboats were little more than shanties on a scow-shaped hull. They were usually of crude construction and prone to leaks. At the other end of the scale were boats like the unpowered *Nirodha*. This boat was kept on Jamaica Bay by Remington Vernon around 1900. Vernon was the developer of the Averno section of Queens. His \$10,000 boat was 107’ long, had ten staterooms, a 16 X 10’ reception room, baths and toilets, (hot or cold, fresh or salt water), her tanks could hold 1000 gallons of fresh water and 5 tons of ice (“Houseboats and How to Run Them,” *New York Times*, Jun. 10, 1900).

Power boating continued in popularity after the Second World War and Jamaica Bay became a center for the sport. The postwar plans for park development included dredged channels, launch ramps, marinas, and other amenities for boaters. On August 10th, 1947 a crowd of 400,000 persons lined the shores of Jamaica Bay to watch the International Gold Cup races. The Gold Cup was considered the top prize in speedboat racing. Guy Lombardo, the famous bandleader, was one of the contestants that day. Lombardo's boat, the *Tempo IV*, was stove by an unidentified floating object (trash maybe?) and he lost the second 30-mile heat. The *Tempo IV* was unable to complete the third heat. The day's races were won by ex-fighter pilot Danny Foster in the *Miss Peps V* ("Speedboat Race", *Life*, Vol.23, no.9, Aug.25, 1947).

Despite the water quality problems, Jamaica Bay continued to attract a number of boaters, some of who were using specialized small craft. Olympic hopeful Alexandra Harbold was the daughter of Sandor Bernhart, a champion rower from Hungary. He had qualified for spot on the country's Olympic team but was ousted for political reasons, his family having opposed the communist takeover. Alexandra began Olympic style kayaking at the age of 11 and trained in Canarsie's Paerdegat Basin. Teased by her schoolmates for carrying a canoe around Brooklyn and missing time on the Rockaway beach, Alexandra nonetheless continued training only to drop out of the sport to pursue a degree in government from Georgetown University. She re-entered competitive

kayaking after marrying Michael Bernhard, a member of the US Olympic kayaking team (“Kayaking to Barcelona”, *New York Magazine*, July 27, 1992, vol.25, no.29, 21).

Alexandra did eventually compete in the 1992 and 1996 Olympic games but did not win a medal.

Few yacht clubs survived the construction of the Belt Parkway in 1934. The parkway ran along the shores of the bay and its construction required the demolition of many of the older club buildings. The Belt Parkway also cut off access to the bay from most of the nearby neighborhoods. Although there was some protest from the clubs, it never represented a serious challenge to parkway construction. Spared from the Belt Parkway’s path, the Mill Basin and Marine Park neighborhoods of Brooklyn became the postwar centers of recreational boating activities. They are still recommended for prospective home-buyers who want to also own a boat.

Boat owners today have become involved in the bay as environmental advocates but this was not always the case. For all of their popularity yachting and sailing clubs of the late 1800s and early 1900s are conspicuously absent from debates over the future of the bay or its protection. The clubs organized regattas and races, created a one-design class, and drew up motorboat racing rules but seemed to have nothing to say about the waters they would sail upon. This stands in stark contrast to the activities of recreational fishermen,

hoteliers, oystermen, and numerous public park advocates. There is no clear reason why these groups stayed out of the controversies or if they did become involved why so no evidence of their activities remains.

Chapter 8

Jamaica Bay's Fisheries, Their Management and Mismanagement

Writers in the 1600s and 1700s often noted the abundance of both fin and shellfish in and around the waters of Long Island. As early as 1660 the area around Canarsie Point was known as Vischers Hook (fishers Hook) after a Dutch fisherman named Hoorn who built a home there (Black 1981, 22).

The earliest recorded efforts to regulate fishing in the bay date to the early 1700s when the town of Jamaica began to assert its title to the bay. In May of 1704 “fishermen of Flatlands” were arrested for fishing with nets and without authorization (Black 1981, 22). Controversies over when and how to regulate net fishing within the bay would continue through the late 1800s.

The *New York Mercury* for January 27, 1754, reported that a period of unseasonably warm weather brought many people in “canoes and pettyaugers” to Jamaica Bay for “oysters, clams, etc. . .” (Black 1981, 22). Among the canoes fishing the bay were some from Newtown. This fact has suggested to historian Frederick Black that the town of Jamaica was unable to “keep non-townsmen off the bay and also revealing that parties from communities not immediately adjacent to the bay fished the bay” (22).

In July of 1763 the Jamaica town government declared that: “Whereas divers persons,

without any right or license so to do, have of late, with sloops, boats and other craft, presumed to come into Jamaica Bay and taken, destroyed and carried away quantities of clams, mussels and other fish to the great damage of the said town, this is to give warning to all persons who have no right or liberty that they do forbear to limit any such trespass in the bay for the future. . .” (Black 1981, 22).

Only a month later the town government held a special town meeting to address the problem of continued trespass into “the Bay belonging to this town.” Several men were designated to prepare a legal defense of the town’s title (Black 1981, 22) Challenges to the title continued and by 1791 the town of Jamaica resolved that: “all persons be precluded from coming with boats and pettiaugers in the bay of this town for the purpose of getting clams or oysters without paying the sum of one shilling for every thousand so taken. . . .” (22).

At the same town meeting the voters decided that "no person or persons other than inhabitants of the township and paying taxes within the same presume to cut any sedge on the marshes in the bay of this township, on the penalty of 40s. for each offence" (*History of Queens County, with illustrations, Portraits & Sketches of Prominent Families and Individuals*, 1882, 193-257).

The township's restrictions on fishing were re-adapted several times over the subsequent years. Voters at the town meeting of 1869 voted to exclude non-residents from fishing in the bay. Two years later the voters instructed the trustees to remove "all stakes or other obstructions illegally standing in the waters of the bay, or in the marshes thereof."

Presumably these were the stakes and other obstructions placed by fishermen who were not residents of the town. Stakes were usually driven into the bottom of the bay to hold nets (*History of Queens County, with illustrations, Portraits & Sketches of Prominent Families and Individuals*, 1882, 193-257).

By the 1850s the demand for seafood in New York made oyster raising a major business. In 1854 it was estimated that some 50,000 persons were engaged in the industry, either directly or indirectly. There was money to be made in oyster saloons, restaurants, and fish markets (Spann n.d., 122).

During 1860s, planting oysters began when in 1863 the trustees of the town granted to D.H. Waters "the privilege of planting oysters under the waters of Jamaica Bay to the extent of one hundred square yards, under said waters known as Hell Gate Marsh" (*History of Queens County, with illustrations, Portraits & Sketches of Prominent Families and Individuals*, 1882, 193-257). The question of planted oysters soon became part of the long standing disputes over fishing rights.

The position long held by the Township of Jamaica was supported by an act of the legislature in 1871. It authorized the leasing of underwater lands for planting oysters only to persons who were residents of the town. It also permitted penalties for any trespassing on the leased lands. Given the town's longstanding claims to control fishing in the bay, a vote in 1875 on the question of these leases resoundingly was against the practice. Exclusive privileges were supported by only 167 voters while 808 voters rejected them. It is not clear whether the voters were dissatisfied. It might be that they feared the leasing arrangement would have a negative impact on the nascent tourism industry. Another possibility is that they felt the lease arrangements had been mishandled by the community's elected officials. Despite the vote, the leases stood and further debate on the matter was not recorded (*History of Queens County, with illustrations, Portraits & Sketches of Prominent Families and Individuals*, 1882, 193-257).

Despite the abundance of fish, it appears that prior to the middle part of the 1800s the majority of the people living near the bay were primarily engaged in farming or other trades and only fished occasionally for either recreation or to supplement their food supply (Black 1981, 22). Of 221 eighteenth and nineteenth century wills surveyed by historians, there are only three mentions of any possessions connected with fishing. One of the wills was from William Van Dyn of Newtown, who in 1769 bequeathed two canoes, the smaller one with rigging and fishing gear. Two wills dated from the 1770s

included fishing nets and in the estate of Abraham Emans, also included a canoe. An examination of wills from Gravesend, Flatlands, Flatbush, New Lots, and Jamaica finds that no person listed their occupation as fishing prior to 1801 (Black 1981, 23).

Some idea of the abundance of fish from the late 1800s and early 1900s comes from the diarist John Baxter of Flatlands: “August 4, 1792--Went for eels had 150 very large. . . . September 9, 1792--I fished along the meadows at the Island got 9 bars and one Drum Fish. Went to Rockaway along with R. Voorhees and Peter Voorhees had 900 eels and 200 large snipes. . . . April 13, 1801--Went out afishing with Peter G. Wyckoff and Joseph White - Garret Wychoff and Elias Hubbard—got 36 shad . . . the same day was caught 613 shads in Lots Creek” (Black 1981, 23).

As recreational fishing expanded in the second half of the 1800s the traditional fishing methods came increasingly under attack.

There was a large menhaden fishery in the New York region and during the previous decades a number of fish oil processing plants had been established on Barren Island. (Figure 28) This was seen as an ideal place for them as their odors would not be noticed next to those of the waste processing operations. The menhaden fish oil plants were one

the major buyers for the commercial fish catch. To supply these operations, the use of nets by commercial fishermen was increasingly seen as a wasteful practice. The Cromwell Bill that was intended to prevent net fishing in Raritan Bay was in the legislature during the 1888 session, State Senator Hawkins, Brooklyn Tax collector Alden S. Swan, and Henry A. Reeves, an attorney at Greenport, all brought their objections to the state legislature at Albany. Reeves was the spokesman for the trio and in his testimony claimed that during the 1886 fishing season there were eleven fish oil factories operating in Suffolk County. They rendered an estimated 140,300,000 menhaden and produced 10,660 tons of dry fish-scrap fertilizer, 701,500 gallons of oil. As with the Stadler Bill that would later be introduced as a conservation measure in Jamaica Bay, the principle legal objection was that this bill would regulate one type of fishing in only one location. Additionally, according to the state's 1873 constitution and a subsequent 1875 law, local affairs were to be regulated by local officials as far as it were "practical and proper." One provision of the bill specifically allowed county officials to regulate fisheries within their local waters. By this standard, any attempt to regulate fishing in Raritan Bay was the responsibility of Richmond County, and not the state. Reeves pointed out that Suffolk County was one of only a handful of New York Counties that was on the sea coast and that it had, at the suggestion of the legislature, already passed about 30 laws regulating its fisheries. Counting all of the bays and creeks, Suffolk County had about 500 miles of coastline and its county supervisors were in a better position to administer its affairs than the legislature in Albany. ("Menhaden The Fishers' Side of the Mossbunker Case," *Brooklyn Daily Eagle*, May 4, 1888, page 2)

The Honorable George Cromwell was the Republican Congressional Representative from Richmond County although from press reports of the era it appears that his district also included parts of Queens County. It is not clear how a bill before the state legislature had his name attached to it unless he was serving in both bodies or his supporters in Albany named the bill in his honor. In either case in October of 1888 Cromwell made a startling announcement at a meeting of the Republican Committee at Long Island City. With only three weeks before the general election Cromwell admitted that he was not likely to carry Richmond County and in the face of opposition from Reeves, was not likely to have much support in Queens. Many of the accusations that would later dog the Stadler Bill were also made against the Cromwell Bill including the charge that the working people would be deprived on thier livlihoods in favor of affluent recreational anglers (“Cromwell Sure to be Beaten,” *Brooklyn Eagle*, Monday, Oct. 22, 1888).

By April of 1890 the Committee on Game and Fish Laws in the New York State Legislature had drafted a bill that would ban commercial net fishing in Jamaica Bay. Opponents of the bill claimed that the local fish markets would be deprived of an important source of supply. Proponents countered that the three fish markets at Rockaway Beach were being supplied from dealers in Manhattan (“Jamaica Bay Netters”, *New York Times*, Apr.5, 1890).

What became known as the Stadler Bill was introduced in March of 1890 and it prohibited fishing anywhere in Jamaica Bay except by "rod, hook, and line." At that time, one of the preferred methods of net fishing was to wait until predators (sharks and porpoises) chased smaller fish up the side creeks where nets would be stretched across them. Another method of using nets was to wait until low tides forced fish out of the bay's side creeks and into deeper water or "sinks" and then draw nets through the sinks, into the side creeks, and finally up onto land. (Figure 29) Both of these methods were used during the winter or the spring spawning season. Although laws regulated the size of the mesh of nets, it was reported that these laws were widely ignored. Although the main target of the seine nets was the Menhaden the by-catch included a number of other species. By the summer when an estimated 500 to 1,000 recreational anglers arrived at Jamaica Bay every day, seasonal catches of sheepshead, bass, and weakfish were reported to be as small as 100 individuals ("Jamaica Bay Fishermen", *New York Times*, Mar.12, 1890).

In 1889 it was still possible for fishermen to net eight to ten tons of fish per day with fish prices ranging from 8 to 10 cents per pound. Any fish not sold for human consumption went to the fertilizer manufacturers. However overall catches in Jamaica Bay had been decreasing for the previous five years ("Jamaica Bay Fishermen", *New York Times*, Mar.12, 1890). (Figure 30)

It must be noted that there was no disagreement as to the conservation science during the debate. The bay's role as a nursery and refuge for breeding fish was fully appreciated. Proponents of the bill seemed willing to accept a compromise position where the commercial netters might have been possible if the commercial netters were willing to accept conservation restrictions (“Jamaica Bay Fishermen”, *New York Times*, Mar.12, 1890).

At a hearing on the Stadler Bill in June, opponents would argue that the law that would only help the hoteliers and their privileged guests at the expense of ordinary people. It was also argued that if fishing in one part of New York State was restricted to hook and line, then the restriction had to be applied to the entire state and its \$4,000,000 commercial coastal fisheries. The issue of exactly how many persons were working the seine fisheries also arose during the debate. Opponents claimed that 300 men in Flatlands worked in the fishery while supporters claimed that not more than fifty men worked the fishery and the total value of the catch was a mere \$3,000 a year (“Net Fishing in Jamaica Bay”, *New York Times*, June 4, 1890). New York Governor David Hill signed the measure on June 7th, 1890. In a memorandum to the Governor attached to the bill when it was signed, the Fish and Game Law Codification Commission noted that the bill did have flaws. In principle the commission was in favor of net fishing in any of New York's tidal waters and that it had no interest in discriminating against net

fishermen in favor of recreational anglers. The commissioners however noted the proximity of the bay to population centers and because many of the anglers were poor people in need of recreation, the commissioners were willing to approve the bill for one year (“Jamaica Bay for Anglers”, *New York Times*, June 8, 1890).

The bill, signed by the governor on June 7, would only last one year and provide a test of the principle (“Jamaica Bay for Anglers”, *New York Times*, June 8, 1890). According to data compiled by Black for his National Park Service cultural resource study, in 1890 there were approximately 130 commercial fishermen in Flatlands, which was down from a peak of approximately 200 in 1870 – 1880. By 1892 there would be fewer than 50 fishermen in Flatlands. Oystermen were also in decline. The numbers of men engaged in that work began climbing after 1870 and peaked at about 75 individuals in 1880. By 1892 there were almost none (Black 1981).

The most vocal opponent of the law was State Senator Hawkins known locally as "Mossbunker" Hawkins because of his connections to the Menhaden fishery. The supporters of the ban noted that the by-catch of the seine netting was destroying the game fish and pointed out that the state had recently created the Adirondack Park to save the northern fish and wildlife. The bill's supporters decried the destruction of Jamaica Bay for the sake of a few tons of fish that would only be ground into fertilizer (“Fighting for

the Fish; Jamaica Bay for Anglers Is the Cry. Rockaway Hook - and - Line Fishermen Much Encouraged at the Progress of the Stadler Bill”, *New York Times*, Mar.17, 1890).

The law prohibiting the use of seine nets in Jamaica Bay was signed by Governor Hill in place by late June of 1890. The commercial net fishers at first seemed to be following the law but by late July appeared to be ignoring it. They also pointed out that Jamaica Township had a colonial era patent granting them ownership of the bay and had traditionally controlled its waters. Therefore, they argued, the State Legislature had no jurisdiction over the bay. Observers agreed that this argument was not likely to stand up in court and predicted a confrontation between the recreational and commercial anglers before the end of the summer (“It makes the Seine Men Angry”, *New York Times*, July 28, 1890).

Meanwhile the organization that had lobbied hardest for the law, the Association for the Protection of Jamaica Bay, was busy documenting violations of the law and appointing three special constables who would enforce the law. The association also announced a reward of \$50 for the arrest of the net law violators (“It makes the Seine Men Angry”, *New York Times*, July 28, 1890). Immediately after the law was passed the Association for the Protection of Jamaica Bay promised to hire five special constables to monitor compliance and even proposed to fit out a gunboat for patrol duties. One commercial

fisherman responded to these announcements by claiming to have a loaded shotgun ready for any persons enforcing the law (“Fishing in Jamaica Bay”, *New York Times*, June 23, 1890).

The commercial fishermen struck back at the hoteliers, boat livery operators, and operators of fishing resorts. Noting that selling bottled beers and liquors on Sunday was unlawful, they threatened that the excise laws would be immediately enforced if any one of their number was arrested for using nets (“It makes the Seine Men Angry”, *New York Times*, July 28, 1890).

But public opinion had long favored the recreational anglers. The previous summer an unidentified party of "some Rockaway Boys" raided the commercial fishing camps and burned several hundred yards of nets (“Fishing in Jamaica Bay”, *New York Times*, June 23, 1890). In March while the bill was first being debated over 15,000 signatures supporting it had been collected from Rockaway Beach and nearby communities. It was estimated that the value of the hotels, boat liveries, tackle shops, and other infrastructure supporting recreational fishing exceeded \$200,000 (“Jamaica Bay Fishermen”, *New York Times*, Mar.12, 1890). A local banker at Far Rockaway was known as a supporter of the commercial fishermen but changed his views after depositors began withdrawing their funds in protest (“Fishing in Jamaica Bay”, *New York Times*, June 23, 1890). Observers

noted that the fishing in the bay had improved since the net law went into effect (“It makes the Seine Men Angry”, *New York Times*, July 28, 1890).

Apparently the net ban was extended past the one year trial period. In September of 1891 five fishermen from Canarsie were arrested for using nets. A constable Ward and his party are credited with making the arrest but it is not clear if Ward was the special constable hired by the Association for the Protection of Jamaica Bay and who comprised his party. Ward's full name was not mentioned in the press reports. As the constables descended on the men's boat, Ward drew his revolver. The captain jumped overboard leaving the rest of the men. The press reports that the commercial netters were growing increasingly bold. They were said to have taken several tons of weakfish and assorted game fish and this was reported to have led to a decline in fish stocks during the summer of 1891 (“Net Men Captures”, *New York Times*, Sept.8, 1891).

Examining the occupations in Flatlands shows that as the numbers of men engaged in fin-fishing would peak in 1870 – 1880 but the number of men working in the shellfish industry would begin to rise in 1870, peak at about 75 individuals in 1880 and then decline to almost none by 1892.(Black, 62)

By October of 1900, the Protective League lobbied the state senate for two new bills. Together the bills called for limits on the size of commercial fish nets and the removal of any fixed nets Saturday at noon and Monday. Taking any type of food fish in tidal waters with purse nets, such as those used for Menhaden, would be prohibited. An exception would be made for fishermen taking fish for their own consumption. The bills also called for a halt to the extraction of oils from food fishes. ("New Fishing Laws," *Brooklyn Daily Eagle*, Oct. 31, 1900) The election of a new governor in the fall of 1900 prompted the league to call for more game and fish protectors. League President Biedenger claimed that commercial fishing interests were coming to share their views. He cited the fact that commercial fishermen working in the Hudson River removed their nets three days each week and that the menhaden industry, "will not fight us."("Salt Water Fishermen," *Brooklyn Daily Eagle*, Dec. 8, 1900.) At the time the American Fisheries Company had experienced a dramatic decline in Menhaden stocks and was in bankruptcy and voluntary reorganization. ("Discharges in Bankruptcy," *New York Times*, Mar. 8, 1900)

Pushback came from Republican state Assemblyman Joseph N. Hallock (1861 - ?) representing the First District of Suffolk, Long Island and member of the Assembly's Fish and Game Committee. Hallock told a reporter for the Brooklyn Daily Eagle that he was opposed to the measures called for in the two bills. Although he confessed to not having had the opportunity to read them, Hallock stated that he would most likely oppose them as he had "learned to view any with suspicion any bill that emanates from the

Protective League of Salt Water Fishermen.” (“Will Stand by Fishermen,” *Brooklyn Daily Eagle*, Dec. 15, 1900) Hollock claimed that when he killed two earlier bills proposed by the Protective League, he was accused of being a lobbyist for the commercial net fishermen. Hollock promised to support the commercial fishermen of his district regardless of the league’s wishes. He characterized the league members as being “hook and line fishermen and city sportsmen who fish for pleasure.” (“Will Stand by Fishermen,” *Brooklyn Daily Eagle*, Dec. 15, 1900)

Finally in May of 1904 the Governor of New York signed a bill formally delineating Jamaica Bay and its adjacent waters. A line drawn between Rockaway Point and Coney Island defined the entrance of the bay. Jamaica, Flatlands, Grassy, Sheepshead, and all other bays and inlets were specifically designated as part of Jamaica Bay. As with the earlier bills, fish could only be taken by angling. Two additional game protectors were appointed for Jamaica Bay with authority to enforce the fishing regulations although their salaries were not actually approved for another two years. (C. J. Mullen, "Will Prosecute Net Fishermen," *Shield's Magazine* 4 (1907)

Shield’s Magazine gleefully reported in its February 1907 issue that the new laws were finally having the desired effect. The Brooklyn Branch of the Protective League of Saltwater Fishermen was able to work with the new wardens on enforcement and the

magazine credited Gus Christman, president of the league's Brooklyn Branch, with much of the organization's success. The magazine noted that the situation was complicated because the commercial fishermen started working at night. Dick Wanzer, of Canarsie, who had escaped prosecution under the previous law, was arrested and fined \$60. (Mullen, n.d.)

The magazine did note that another problem arose, that some of the hoteliers, boat livery operators, and even some fishermen seemed to be afraid of the reprisals from the net fishermen. The Protective League offered to reimburse anyone who suffered a monetary loss as a result of reporting illegal net fishing. (Mullen, n.d.)

At the time that the commercial fin fishing industry was in decline, harvesting shellfish became a major industry along the east coast and Jamaica Bay was a major beneficiary of its growth. (Figure 31) As before there were conflicts over who should control the resource.

The case of Calvin Huffmire gives a glimpse into how oyster beds were regulated by the individual towns lining the shores of Jamaica Bay. Permits for planting oysters on underwater lands controlled by Flatlands were granted by a Justice of the Peace and the

Town Supervisor. The law that authorized them to grant the permit provided that any person who had been an inhabitant of the town for at least six months prior to the application. Huffmire obtained his first permit in December of 1882. There was an annual rent of \$10 a year. Each year the permit had to be renewed (Desty, Rich, Farnham and Smith 1915, 422).

James A. Bailey came to control a piece of underwater land measuring 6.4 acres starting in 1898. He obtained the land from Smith Watts, who had leased the land from the Fisheries Commission of the State of New York in 1895. It is not clear if Bailey had obtained control over Watts' lease or had come to own the lands outright. Press reports at the time referred to him as owning the lands but did not explain what happened to the state's lease arrangement ("Sewer Spoiled Oyster Beds", *Brooklyn Daily Eagle*, Mar.6, 1902).

The shellfish and hospitality industries lead the first attempts to ban sewage disposal in the bay. By 1885 the number of hotels and associated sewers was beginning to trouble local landowners. E.A. Mason, who owned the St. Elmo Villa at Sheepshead Bay, wrote to the State Board of Health in June of that year to complain about the growing amount of waste in the bay and its effect on both his own business and that of the neighboring hotels. A person who worked for the New York Herald newspaper had reservations the

St. Elmo but canceled them after seeing the state of Sheepshead Bay. Mason reported that the Manhattan Beach Hotel's artesian well was surrounded by outhouses and kitchen drains. These were also close to the pumping station that supplied both the Manhattan Beach and Orient Hotels. Mason also complained about the local board of health. He stated that the board was powerless to act, they seemed only to consider the construction of sewers within their purview and in the absence of sewers wastes could be discharged into the Sheepshead Bay. Any complaints could be referred to them (Mason 1886).

The complaint was investigated by a R.L. Van Kleek, who is only identified in the reports as a "health officer" but there is no mention of who employed him or what his qualifications were. Van Kleek inspected the wells and noted that all of the cess-pools and privy vaults were in good condition and met all of the health code requirements then in effect. All of the cesspools were more than 100 feet from the wells although one of the water closets was a mere 50 feet from the nearest well head. The wells were designed to provide pure water to the town and the hotels and at a depth of 30 feet; they were thought to be safe from contamination. There was one note of caution in the report, although the area around the hotels' wellheads was undeveloped when the wells were drilled, but 25 buildings were erected in the area during the previous three years. This situation called for careful monitoring and in the future an adequate supply of water would be required to flush wastes out into the bay. As for the allegations that Sheepshead Bay was being filled with human wastes, the sewer outfalls were inspected and while the flows were normal,

no solids were being discharged into the bay. A sample of the well water was taken and sent for testing. It was found to be pure although at the time bacterial tests were unavailable so ammonia, nitrates, and volatile organic content were used as proxy measurements for sewage contamination (Mason 1886).

The State Board of Health was meeting in New York's Everett House to consider sewerage plans in Tarrytown and Kingston. Watkins W. Jones and James Harper, city commissioners from Far Rockaway attended the September 1889 meeting and asked the commissioners if it were possible for the town to run its sewers directly into Jamaica Bay without any disinfection. The commissioners referred the men to a statute intended for the protection of oyster beds that prohibited this action (“Discussing Sewerage”, *New York Times*, Sept.29, 1889).

Harper and Jones apparently did not like that answer because two year later in May of 1891, they would again appear before the State Board of Health at a hearing on sewer plan in which Far Rockaway would discharge its effluent into Norton Creek. The creek connected to Norton Basin and then into Jamaica Bay. A delegation from Far Rockaway testified before the Board of Health that the proposed sewer would contaminate the waters, render Far Rockaway Beach unfit for bathing, affect the sea food in the bay, and reduce property values. Another protest was raised by the "owners" of the oyster beds.

A petition against the sewer was signed by eighty-three members of the Oystermen's Association and presented by the president of the association, George H. Schaffer. Another city commissioner, Robert McCafferty was also at the hearing. The three commissioners had developed the plan and were there to defend it. They claimed that the creek was deep and the flow was sufficient to "dispose of the sewage without injury to the health of the locality." The Board of Health rejected the plan on the grounds that the discharge would not be into either deep running water or another system of sewage disposal ("Sewerage Plans Rejected", *New York Times*, May 28, 1891).

At the same time a similar case was proceeding on the other side of the bay. An 1889 act permitted empowered commissioners at Flatbush to construct a sewer to tidewater. The 15,000 persons of Flatbush were expected to generate 1.5 tons of sewage per day which would be carried through a new, 66-inch diameter, brick-lined sewer to an existing line that discharged into Mill Creek ("Fear a Sewer", *Brooklyn Daily Eagle*, July 31, 1891).

A petition was circulated in Flatlands and presented to the Board of Health. The petitioners retained the law firm of Evarts, Choate, and Beaman of New York to represent them before the Board of Health. The petition claimed that there was insufficient current at the proposed outlet to carry the wastes out to sea. Mill Creek was only four feet deep. It ran through coastal marshes and emptied into Garritson's Creek that in turn emptied

into Dead Horse Bay between Barren Island and Coney Island. They foresaw sewage piled up on the marshes, endangering the health of their community, and ending up on the beaches of Coney Island. They based their claims on the argument that the 1889 act only allowed for the construction of the sewer and did not grant Flatbush's commissioners the authority to route it any way they chose ("Fear a Sewer", *Brooklyn Daily Eagle*, July 31, 1891).

The case against the sewer was presented to the State Board of Health in 1894. A sanitary engineer named W.M. Paul Gerhard was asked to prepare a report for the board which was read at the hearing. His report repeated many of the claims made in the original petition and noted that the creek was only four feet deep, had shallow banks, and was bordered on either side by low lying land or salt water marshes covered with thick sea grass. The channel was slow moving, circuitous, and obstructed by sandbars in several places. The report also noted that discharging untreated sewage, a practice called "crude disposal" was common but that in order to be acceptable (i.e. sanitary) the discharge had to be into a large body of water, a running stream, a tidal estuary, or into the ocean. In any case the volume of water had to be large enough to "render sewage innocuous by dilution." Alternatively, if the current was rapid and strong, the sewage could be carried off to a large body of water like the ocean. None of these conditions were present at Mill Creek. There was, according to Gerhard, a strong possibility that the sewage would be deposited on the tidal flats, decompose and create noxious gasses. The

problem would be especially acute in the hot summer months. The report also claimed that this would "endanger the health of the occupants of summer residences along the shore." Property values would fall and recreational use of the area for boaters and swimmers would be diminished. A small bathing beach at the foot of the long pier would have to be closed. The extensive oyster beds along Mill and Garretson's creeks would be destroyed. The report makes sheds some light on what was believed at the time about fishing and sewage. Fish were thought to thrive in "fresh" sewage discharges but could not survive if the discharge was "putrid." The report did not explain why this was the case (New York State Department of Health 1894, 149).

Gerhard believed suitable alternatives included land disposal after suitable purification, position the outfall to carry sewage out to sea, or to construct a reservoir from which sewage could be discharged only during the first hours or the middle third of the outgoing tide. This last option was only practical if the discharge point were located farther downstream where current flows were greater (New York State Department of Health 1894, 149). The sewer was built and as its opponents predicted the oyster beds were damaged.

Calvin Huffmire was one of the first ones affected. Shortly after the sewer was opened Huffmire discovered his oysters were ruined by a coating of tar and "sludge acid." These

were by-products of gas manufacturing and were discharged into the sewer (Desty, Rich, Farnham and Smith 1915, 422). Huffmire won his suit in September of 1894. He was awarded \$1,000 plus costs. ("Brooklyn", *New York Times*, Sept.15, 1894).

The decision was appealed and dragged through the courts until reaching the New York Court of Appeals ten years later. Huffmire's essential argument was that while the sewer was legally constructed, dumping a town's sewage on the oysters essential was a government "taking" of private property without compensation. By the time the case came to trial Flatbush had already been absorbed into the City of Brooklyn. The city's attorneys argued that the city was therefore not liable for damages. The Court of Appeals rejected this argument noting that the City of Brooklyn absorbed the tax revenues of Flatbush; they also absorbed its debts and liabilities (Desty, Rich, Farnham and Smith 1915, 422).

The City of Brooklyn also argued that as the sewer was built with the state's authorization there was no fault that could be ascribed to the city. In ruling for Huffmire, the court noted that while legislation that authorized a "public improvement may protect a municipality from liability for consequential injuries, it does not protect it from liability for the direct, actual, and physical taking of property" (Desty, Rich, Farnham and Smith 1915, 422).

Huffmire had legal title to the oysters and while the oyster beds may have been under the town's waters, dumping wastes on them was essentially no different than if he was growing a "crop" on land. He had suffered an "invasion of a private right that had no legislative sanction (Desty, Rich, Farnham and Smith 1915, 422).

In 1894 New York Governor Flower issued an order directing that the nuisances created by the sewer be abated. The order contained five major points. Firstly, gas house sludge (the tarry by-product of the conversion of coal into gas) and other injurious substances had to be cleaned out of the pipes. Secondly, leaks in the wooden conduit had to be repaired. Thirdly, plans for a new sewage treatment facility had to be submitted to the Board of Health. And lastly, all future sewers from Flatbush, if they discharged into similar locations, would have to be properly treated ("A Nuisance In Flatlands.; Gov. Flower Makes an Order Concerning the Sewage of Flatbush", *New York Times*, July 17, 1894).

It was not clear how Flatbush was supposed to comply with the fourth requirement. This specified that no sewage from Flatbush was to be discharged into Mill Creek that was in "such a condition or in such as manner as will create a nuisance" ("A Nuisance In Flatlands.; Gov. Flower Makes an Order Concerning the Sewage of Flatbush", *New York*

Times, July 17, 1894).

Shortly after he took possession of his underwater lands James A. Bailey discovered that the Flatbush sewer had been damaged at a point well above its mouth. Although it was repaired somehow the flow patterns were changed and sewage now flowed over Bailey's oyster beds. He sued the city and in 1902 was awarded \$8,676 ("Sewer Spoiled Oyster Beds", *Brooklyn Daily Eagle*, Mar.6, 1902).

The court ruled that Bailey was entitled to an injunction that restrained the operation of the sewer but that the injunction would be postponed until 1903 because the city is "endeavoring to remove the cause of the damage." to compensate Bailey until the sewer was completely repaired, the city was ordered to pay him \$500 ("Sewer Spoiled Oyster Beds", *Brooklyn Daily Eagle*, Mar.6, 1902).

Some people did not seem to care that their oysters were contaminated with sewage. Residents of Rockaway complained to the Board of Health in 1902 that clam diggers working off Rockaway at low tide were harvesting oysters from areas adjacent to sewer outfalls. (Figure 32) At each low tide up to about a dozen men and boys could be seen digging at the sewer outfalls. It was noted that soft shell clams seemed to thrive in the

sewage and it was easy to dig a large quantity in a short period of time. The complaint was not only did this expose consumers, many of whom lived in Rockaway, to contaminated shellfish but that digging in the sewage released noxious gasses (“Want Clam Digging Stopped”, *Brooklyn Daily Eagle*, Nov.28, 1902).

Writing for the New York State Journal of Medicine in 1913, Dr. Linsly R. Williams noted that the major dangers presented to the public from exposure to polluted harbor waters came from eating shellfish and swimming. Williams noted that in 1910 there were 3,499 cases of typhoid fever of which about half were treated in the homes of the patients. While the sewage coming from an hospital might be disinfected to prevent further spread of disease, there was no such provision for private homes whose sewage would eventually find its way into the harbor (Williams, “Pollution of Harbor Waters of New York, Especially Referring to Bearing on Health”, *New York State Journal of Medicine*, Vol.13, no.1, Jan.1913, 19).

Williams cites several disturbing findings. The typhoid bacilli could survive for two weeks in sewage and up to a month in sea water. It was impossible to know how many of the pathogens entered the harbor each year and found their way into shellfish (Williams, “Pollution of Harbor Waters of New York, Especially Referring to Bearing on Health”, *New York State Journal of Medicine*, Vol.13, no.1, Jan.1913, 19).

By 1908 it was illegal to place, or allow to be run into waters in the vicinity of oyster beds any sewage, sludge, acid, refuse, or materials injurious to oyster culture. But with the five boroughs of New York City discharging an estimated 500,000,000 gallons of wastewater every twenty four hours, it seems that no oyster taken anywhere in the harbor was going to be safe for human consumption (Williams, "Pollution of Harbor Waters of New York, Especially Referring to Bearing on Health", *New York State Journal of Medicine*, Vol.13, no.1, Jan.1913, 19).

By this time, oyster culture was only permitted at sites approved by the New York State Bureau of Marine Fisheries. Oyster harvesting was prohibited in any part of the inner harbor although the limits of this area seem not to have been clearly defined. Even where clear limits were in place, unlawful harvesting continued to occur. In Jamaica Bay a number of persons dug soft shell clams in contaminated areas but these were primarily for home consumption. During the summer months this was a popular activity with tourists. An outbreak of typhoid at Lawrence was traced back to oysters harvested from the Grass Hassock Channel. The channel was contaminated by sewage from Averne and the oysters from it were sold at Inwood and Lawrence (Williams, "Pollution of Harbor Waters of New York, Especially Referring to Bearing on Health", *New York State Journal of Medicine*, Vol.13, no.1, Jan.1913, 19).

Williams noted that the planned improvements to Jamaica Bay included expanded sewage treatment capacity but he despaired of the waters ever being entirely free of pathogens and predicted that oyster harvesting in the bay would have to be abandoned before long (Williams, "Pollution of Harbor Waters of New York, Especially Referring to Bearing on Health", *New York State Journal of Medicine*, Vol.13, no.1, Jan.1913, 19).

George W. Stiles of the US Department of Agriculture cited three factors causing concerns about gastrointestinal illnesses caused by contaminated oysters. An epidemic of typhoid at Wesleyan University in 1884 was traced to contaminated oysters; there was a similar incident in Lawrence, Nassau County, New York, in 1905; and the passage of the Pure Food and Drug Act of 1906. In the case of the Lawrence, New York, outbreak 21 out of 31 cases were traced to eating oysters and clams that had been floated or grown in the waters of eastern Jamaica Bay near the town of Inwood. In the wake of this incident the George A. Sopor recommended banning the sale in Lawrence of any shellfish taken from locations within Jamaica Bay that were "within the influence of the Averno sewers or from the cove at Inwood, which receives the sewage of Far Rockaway" (Sopor, "Report of a Sporadic Outbreak of Typhoid Fever at Lawrence, NY, due to Oysters", *Medical News*, Feb.11, 1905, 241-253). Starting in 1908 the Bureau of Chemistry began examining oysters and completed 2,000 bacterial analyses of oysters and clams by 1912 (Stiles, *Sewage Polluted Oysters as a Cause of Typhoid and Other Gastrointestinal*

Disturbances, 1912, bn. no.156).

The Bureau's attention was focused on Jamaica Bay by an outbreak of 83 cases of typhoid and diarrhea after a banquet at The Music Hall of Goshen, the seat of Orange County, New York, on October 5, 1911. Individual cases were reported at Rochester, and Newburgh, New York. All of the oysters consumed by the victims of these outbreaks were traced to a single oyster dealer on Indian Creek in Canarsie. These outbreaks were not unforeseen, the New York State Board of Health had documented the contamination of Jamaica Bay and the subsequent contamination of shellfish grounds in 1908 (Stiles, *Sewage Polluted Oysters as a Cause of Typhoid and Other Gastrointestinal Disturbances*, 1912, bn. no.156).

In 1904, Jamaica Bay were the largest single source of oysters in New York State. The oyster beds of Jamaica Bay were leased by the state. The bay produced between 500,000 and 1,000,000 bushels annually (Stiles, *Sewage Polluted Oysters as a Cause of Typhoid and Other Gastrointestinal Disturbances*, 1912, bn. no.156). Although many oyster schooners went directly from Jamaica Bay to New York the principle shipment points were Canarsie (where there were 9 oyster houses as of 1911), Inwood, and Flatbush Bay. (Stiles 1912).

By 1904 public health officials had identified both point and non-point sources of sewage contamination. The latter were principally the summer bungalow colonies at Sand Bay (127 cottages), Old Mill Creek (176 cottages), Ramblersville (220 cottages), Bergen Creek (50 cottages), Bergen Creek (50 cottages), Cornell Creek (53 cottages), and another 200 or more cottages along the line of the New York Woodhaven, and Rockaway Beach Railroad. All of these buildings had privies that discharged into the water or onto marshes subject to tidal overflow (Stiles, *Sewage Polluted Oysters as a Cause of Typhoid and Other Gastrointestinal Disturbances*, 1912, bn. no.156).

While there were several sewage plants on the bay that were recognized as point sources of pollution but the huge number of summer visitors stressed their capacity to the point where effective treatment entirely ceased. The Sheepshead Bay Disposal Plant used a method of chemical precipitation and during the winter months treated the sewage of 2,000 persons. On the busiest summer days (most probably race days at the Sheepshead Bay horse racing track) the wastes of between 40,000 and 50,000 people were sent to the overburdened plant. Bergen Beach was visited by between 50,000 and 60,000 persons a week during the summer. The wastes of an estimated 8,000 persons a day was sent into the bay every day during the summer.

A similar situation existed at Canarsie where 16,000 persons visited the town every day

in the summer, the number of visitors rose to about 30,000 on Sundays. "Practically" all of the sewage from these persons was discharged untreated into the bay. A permanent population of 50,000 residents sent their sewage into the New Lotts (or East New York) Disposal Plant. This plant handled 10,000,000 gallons of sewage and storm water every day and a "relief by-pass" was in operation between 11:00 and midnight every day. The sewage that was actually processed received less than 20 minutes of treatment before discharge. The Jamaica disposal plant handled the sewage of 18,000 persons and discharged into Bergen Basin (the total population of Jamaica at the time was 25,000 persons.) This plant also used chemical precipitation but at best, was only capable of reducing bacteria and organic matter by only 50%. In Far Rockaway the permanent population was only 6,500 but rose to 30,000 in the summer. Not surprisingly, the sewer plant was thought to be overloaded during the summer.

The population of Rockaway Beach rose from a winter low of 6,000 to an estimated average daily population of 55,000 to 60,000 persons but the population went up to between 125,000 and 150,000 on the busiest summer days. Twenty nine sewers carried the sewage of these persons into Jamaica Bay. The Hendrix Street disposal plant was built in 1892-93 and was designed to treat 3,000,000 gallons of sewage each day. By 1912 the plant was attempting to treat 10,000,000 gallons every day but the total sewage flow was 18,000,000 on dry days! The sewage plume into Jamaica Bay was said to be 1 mile long. Bacteriological tests at the plant revealed that the sewage was essentially

untreated (Stiles, *Sewage Polluted Oysters as a Cause of Typhoid and Other Gastrointestinal Disturbances*, 1912, bn. no.156). In the words of the Bureau of Chemistry, "Jamaica Bay is located dangerously near a large city and into it many millions gallons of sewage empty daily" (Stiles 1912).

In reporting on the typhoid outbreak on the Rockaway Peninsula, Dr. George Soper, President of the Metropolitan Sewerage Commission told meeting of the New York Academy of Sciences that "immense quantities" of sewage floated in the East River, the upper Hudson, near bathing establishments, and the Oyster beds of Jamaica Bay. Bacteria counts per milliliter of water were 5,800 compared to only 120 in the open ocean. The worst bacterial contamination was in the Upper Bay at 14,500. Coney Island had counts of 4,500. Speaking specifically about the Rockaway outbreak, Soper said that the oyster dealer had promised the oystermen that their catch would be placed in pure water before being sold but that it was not known if this promise was kept. At the time, Jamaica Bay was supplying New York city with 1,000,000 oysters a year ("Sewage Polluting the Oyster Beds; Dr. Soper Tells of Discoveries of Sewerage Commission in City Waters. New York Behind London. Typhoid and Outbreaks of Other Diseases Traced to Evil Conditions in the Rivers and Harbor", *New York Times*, Mar.14, 1911).

On September 19, 1912, Soper submitted a paper to the Washington, DC, meeting of the

American Public Health Association. Soper was not present and the paper was read by Dr. H.D. Pease of New York. The paper summarized the expert opinions as to the limits that should be set on sewage pollution in New York. Among the recommendations was that the waters of the lower bay might be kept clean enough for shellfish cultivation and bathing but that keeping the waters of the inner harbor equally clean would be impracticable. The opinions from different disciplines were reported; sanitary engineers, hygienists, and health officers all agreed that the value of the oyster industry was not worth the costs of building the sewer plants that would be needed to keep the waters clean. All of the experts consulted agreed that the waters of New York Harbor posed no immediate health risk but that work was needed to prevent further degradation (“Must Clean Waters Around New York; Symposium of Experts Finds the Inner Harbor to be Polluted by Sewage. (No Serious Health Menace: But Report of National Commission Makes Several Important Recommendations for Protection”, *New York Times*, Sep.20, 1912).

During the 1910s both the New York State and Federal governments undertook the first systematic surveys of sewage pollution in coastal waters with a view to understanding the impact on the fishing industry.

Nine oyster dealers "floated" their oysters near Indian Creek. The creek was just east of

the Paerdegat Sewer where 2,000,000 gallons of sewage were discharged every day and to the west of the Hendrix Street Sewer with its 18,000,000 gallons of daily sewer discharge (Stiles, *Sewage Polluted Oysters as a Cause of Typhoid and Other Gastrointestinal Disturbances*, 1912, bn. no.156). A sewage pumping station at that site would not be constructed until the mid-1930s (Rankin 1936).

The practice of "floating" oysters was to place them in the cellar of a bay-side storage building. (Figures 33 and 34) Sometimes a cellar would be created by enclosing the pilings that supported the building with walls made out of wooden planks. A door in the side of the cellar would allow transfer of oysters directly from boats. At low tide the doors to the storage cellar would be closed and fresh water was allowed to enter from an underground spring. The oysters would plump up from osmosis. Even a 1% drop in salinity would cause the oysters to plump. Observers from the Department of Agriculture noted that the creeks where the oyster houses were located frequently contained visible amounts of floating fecal matter. Observers also noted a three-compartment privy over Indian Creek not far from the dealer that provided the oysters for the banquet at Goshen (Stiles, *Sewage Polluted Oysters as a Cause of Typhoid and Other Gastrointestinal Disturbances*, 1912, bn. no.156).

In response to Dr. Stiles' report, the New York City Health Commissioner, Dr. Ernst

Lederle, announced a ban on floating oysters or other shell fish in polluted waters in the City of New York and that no oysters that have been floated or otherwise treated with polluted waters shall be brought into the City of New York or offered for sale in the city (“Dr. Lederle Denies It”, *New York Times*, Sep.19, 1912).

The New York Times later told its readers that oysters that had been plumped were the most likely to carry typhoid (“Thin Oysters the Safest; Board of Health Goes Into the Theory That They Carry Typhoid”, *New York Times*, Feb.7, 1914).

The American Public Health Association created a scoring method for determining the safety of oysters. The scores were based on the smallest amount of liquid from the inside of the oyster that contained B.coli (*Balantidium coli*). If for example, 0.1 milliliter of fluid did not test positive for B.coli but 1 milliliter did, then the oysters had a score of 1. If 0.01 milliliters of water did not test positive for the pathogen, but 0.1 did, then the score was 10. This progression continued, a score of 100 meant that 0.01 milliliters tested positive, but 0.001 milliliters tested negative. A "satisfactory" score was 23 or less. Most oysters tested had a score ranging from 3 to 4, but oysters from Jamaica Bay tested from a low around 90 to a high of 250. In other words, the B. coli pathogen could be detected in as little as 0.025 milliliters of water from inside a Jamaica Bay oyster. Between September 28 and December 15, 1911, only three oyster samples had a score of

23 and none scored less. Oysters from other locations on the east coast, from Long Island's Great South Bay to Norfolk, Virginia, averaged 3.31. Bacterial tests on Jamaica Bay water samples confirmed the presence of sewage throughout the bay.

It would not be long before such discoveries would lead city's Board of Health to ban the sale of shellfish that had been raised in Jamaica Bay. Shortly after a ban went into effect, a group of oystermen sued for damages. George A. Carman of Canarsie claimed in a suit against the city that he made \$50,000 annually from the oyster beds. The total claims against the city by oystermen amounted to \$1,000,000 ("Asks \$100,000 For Oysters, Board of Health Closes Bed - Grower Seeks Damages", *New York Times*, Oct.6, 1914).

By December 1924, Dr. Frank J. Monaghan, commissioner of the Department of Health, announced that there were 300 cases of typhoid in New York City. This number of cases was larger than normal but the mortality rate from the disease was lower. According to the Commissioner, there was no danger of an epidemic and no occasion for panic. The water and milk supplies in the city were believed to be pure and attention focused on shellfish. The Health Department Laboratory began examining shellfish but press reports did not include the results of those tests ("Typhoid Increases; Warning is Issued; 300 Cases in City, but Dr. Monaghan Sees No Cause to 'Get Excited.'" Shellfish are Suspected; Health Department Advises All Persons Leaving Here to Have Themselves

Inoculated”, *New York Times*, Dec.12, 1924). By the 17th of December the number of cases climbed to 331 and intensive investigations failed to detect a link between oysters and the typhoid cases (“31 New Typhoid Cases”, *New York Times*, Dec.17, 1924). Commissioner Monaghan issued a ban on shellfish on the 17th. The ban covered Lower New York Bay, Raritan Bay, Sandy Hook Bay, and the entrance to the Shrewsbury River. Other waters near the city were covered by the ban but it was not specifically announced if Jamaica Bay was included in the ban. The public was advised not to eat uncooked shellfish and the Health Department promised that its inspectors would insure that fish dealers would obey the ban (“Ban Put on Oysters from Near-by Waters”, *New York Times*, Dec.17, 1924). The New Jersey Department of Health denied that shellfish from the state posed any danger (“Jersey Denies Any Infection”, *New York Times*, Dec.18, 1924).

Another 23 cases of typhoid were reported by the 21st but the mortality rate remained low (“Typhoid Here Mild, Says Dr. Monaghan”, *New York Times*, Dec.21, 1924). There were 400 people under treatment by the 23rd but the rate of new cases was dropping with only 9 new cases reported (“New Typhoid Cases In City Decrease; Only 9 Reported to the Health Department Sunday and Six Yesterday. 400 Now Under Treatment; Commissioner Monaghan Obtains Federal Aid in Investigating Shellfish Beds Along the Coast”, *New York Times*, Dec.23, 1924). Oyster dealers in Bayport, and West Sayville, Long Island reported their sales fell by 75% since the ban. They cited reports that the

Great South Bay at least, had been found free of infection (“New Typhoid Cases Decrease For Week; Long Island Oyster Shippers Complain Against Alleged Discrimination in Embargoes. Product Clean, They Say Point to Health Department Tests to Show Shellfish Are Free From Contamination”, *New York Times*, Dec.28, 1924). Health and conservation officials met at Albany on January 21st, 1925, announced that an extensive survey of shellfish grounds in New York State would soon start and that any polluted areas would be closed to shellfish harvesting (“Oyster Bed Survey To Be Made By State; Conservation and Health Officials at Albany Conference Decide on Action”, *New York Times*, Jan.22, 1925).

The Surgeon General established the National Shellfish Sanitation Program in 1925, one year after a typhoid outbreak was traced to oysters from Raritan Bay. Fifteen hundred illnesses and five hundred deaths resulted. The program would classify shellfish waters on the basis of cleanliness (Steinberg, Suszkowski, Clark and Way 2004).

Even after the implementation of a shell-fishing ban, illegal harvesting would continue. As late as 1932 people were being prosecuted for removing soft clams from Dead Horse Bay without permits and in violation of the statutes (New York Supplement Volume 255 1932, 625).

Shortly after the closure of all commercial shell-fishing in Jamaica Bay the world's second-largest sewage screening plant opened on Queens in 1927. The plant's outfall was to Bergen Creek. It provided primary and secondary treatment with a maximum chlorination capacity of 80 million gallons per day. Capable of processing the sewage from a 24,000 acre area, the new plant was the first unit completed in what was intended to be a group of three. When finished the three plants would have a combined capacity of 240 million gallons per day ("The Jamaica Sewage Plant, the Second Largest Sewage Screening Plant in the World", *American City*, Vol.36, No.3, March 1927, 331-334). Whether these plants would have been sufficient to reverse the tide of sewage pollution washing over the shellfish industry is impossible to say but the answer is probably not. Sewage pollution would continue to bedevil plans for the bay even to the present day.

Even before the new game wardens were appointed, public health officials were becoming concerned about sewage pollution in Jamaica Bay. The shellfish industries were the first to suffer from pollution and by the mid-1920s all commercial shellfish harvesting in the bay would be banned. Both recreational and commercial fishermen would soon be facing widespread habitat loss as developers filled the marshes along the bay's shore to create new room for housing and industries. They would also face the problems of sewage and industrial pollution.

In one sense the anti-net fishing laws were far-sighted attempts to promote conservation and were enacted at a time when national parks, national forests, and forest preserves were all being created. On the other hand the law did not go far enough to protect fish in that it did nothing to preserve tidal wetlands. Laws against the discharge of sewage and industrial wastes were also passed at this time and were intended to protect the shellfish industry but these laws did not prevent the loss of wetlands either. Both recreational and commercial fishing would ultimately be hampered by this loss and had the two factions joined forces the shape of marine conservation might well have taken a different course. Full protection for the salt marshes along the shoreline would only come with the 1973 passage of the New York Tidal Wetlands Act, Article 25 of the Environmental Conservation Law.

The commercial fishing industry would continue to operate out of Sheepshead Bay and Jamaica Bay would continue to be popular with recreational anglers. The demands of a growing city pitted the two groups against each other but ultimately both would be subsumed under the same urban growth. In 1973 much of the undeveloped shoreline and almost all of the island marshes would come under the control of the National Park Service. Jamaica Bay National Wildlife Refuge and Gateway National Recreation Area would become one of the most-visited national parks in the country but never again would it have the same prominent role in the city's economic and recreational landscape.

At this point it would be appropriate to mention that as of 2007, six water pollution control plants (WPCP) operate in the Jamaica Bay watershed. These are the Jamaica WPCP (adjacent to Bergen Basin), Rockaway WPCP (Beach Channel Drive in Park), 26th Ward WPCP (Flatlands Ave in the Spring Creek section of Brooklyn), Coney Island WPCP (Adjacent to Shell Bank Creek near Sheepshead Bay), Spring Creek Auxiliary WPCP (located at the head end of Old Mill Creek providing hold overflow for the 26th Ward WPCP), and Cedarhurst WPCP (located at Peninsula Boulevard, Cedarhurst, discharges into Mott Creek). (Watershed Protection Plan, p. 40) New York City's secondary WPCPs are the major source of freshwater for Jamaica Bay, discharging approximately 258 million gallons per day (MGD).

Six smaller, privately operated WPCPs also operate in the watershed. These are the JFK Airport (discharges to Bergen Basin), Lefferts Oil Terminal, Queens (discharges to Bergen Basin), Keyspan Generation (Far Rockaway Power Station, discharges to Motts Basin), Carbo Industries (Nassau County, discharges into Jamaica Bay), Exxon Mobile (Inwood, Nassau County, discharges into Head of Bay.) (Watershed Protection Plan, p. 40) Some researchers consider the private WPCPs as only a minor source of wastewater. (Benotti, Abbene and Terracciano 2007) CSO discharge points into Jamaica Bay have floating booms that are supposed to channel wet weather discharges into the bay. Nearby signs instruct people to report dry weather discharges to 311 the city's non-emergency hotline. (Rose George, the Big necessity page 31) New York City's sewers are designed

to handle a maximum of 1.75 inches of rainwater per hour (George 2008, 32).

Chapter Nine

A New Seaport

On January 1, 1898 five separate counties were consolidated into New York City, Richmond County, Manhattan, The Bronx, Queens, and Brooklyn became one city. A few years after its creation, the consolidated city faced a crisis on its waterfront. The defunct French Panama canal project was acquired by the United States in 1904. With opening of the canal just a few years away, the amount of world shipping was projected to increase. Ships were also growing larger and the docks along New York's shorelines were not. Expanding the seaport into Jamaica Bay seemed like the obvious solution. (Figure 35) Planning for the port began in 1906 when Mayor McClellan appointed a commission to study the possibility of creating the port. The commission approved the idea in 1907 ("Jamaica Bay Seaport as City Envisions It", *New York Times*, May 3, 1931).

In 1909 the state ceded title to under-water lands of the bay to the city and one year later the city government and congress made initial appropriations for the work. The federal government began dredging 30-foot channels around the northern and western shores of the bay ("Jamaica Bay Seaport as City Envisions It", *New York Times*, May 3, 1931).

In an encyclopedia article published in 1911 C.M. Keys wrote assessed the situation in New York. According to Keys, on an annual basis about half of the foreign commerce of the United States flowed through the port and the annual volume of manufactured goods

in New York was approximately equal to the volume of goods produced in any two of the nation's industrial centers. Keys claims that according to a government report (the title was not provided), in the previous five years 2,000 new manufacturing establishments opened in the New York region and the total for the entire country was 2,863 (Keys 1911, 13658).

Keys believed that the crux of the problem was that New York's port had to expand not just to keep pace with the volume of foreign commerce but also to accommodate the city's own manufacturing businesses. The resulting congestion was "the excuse of the railroads for poor service; it is the complaint of the ship owner; it is the catch-word of the municipal-ownership advocate; it is the cry that has driven the city onward through the last few years in a campaign that has already cost the millions of dollars and will certainly cost many millions more" (Keys 1911, 13665).

Unlike others who analyzed the problem, Keys did not see a need to expand into Jamaica Bay or to the marshlands of northern New Jersey. He argued that the real problem was the "jobbing commerce of Manhattan" (Keys 1911, 13668). As he saw it, the problem was that warehouses were spread throughout the island's commercial centers. Every ship docking on Manhattan discharged hundreds of truck-loads of goods onto the streets. Between the warehouse and the factory, or railroad freight terminal, the same goods went

back onto the streets. If warehousing were moved from Manhattan and more efficient cargo handling methods implemented, especially if good rail connections were built directly on the docks, the existing waterfront, including port facilities in Brooklyn and New Jersey, could accommodate both the existing and anticipated seagoing traffic. The as yet undeveloped lands inland of Jamaica and Newark Bays would become the site of new warehouses and manufacturing sites. The shores of the bays would remain undeveloped (13670).

At the time that Keys was writing, plans for the new seaport were already well underway. Keys predicted that if enough businesses located near the bay, the new seaport would be built whether or not it was actually needed. But, Keys noted that the freight railroads were not building to the bay (Keys 1911, 13670).

After Mayor McClellan had appointed a commission to explore the potential of Jamaica Bay for a new seaport there appeared to be little consideration given for recreational use of the bay. An exception to this general trend came in 1908 when The Architectural Record reported that the New York landscape architect Harold A. Caparn was proposing to combine port development and recreation. Noting it would take years to build the full 25 miles of new docks in the port development plan and while that was happening thousands of cubic yards of sediment would be piled up on the 4,200 city-owned acres

that were exposed only at low tide. Caparn noted that these islands could become places for swimming, boating, fishing, and camping. Topsoil for planting could be created from a mixture of organic-rich muck and street-sweepings that in 1908 were still rich in horse-manure. He also suggested native trees and shrubs that would not grow too tall. This would preserve the sense of flatness and openness that gave the bay its unique charm (*The Architectural Record*, vol.34, no.2, Aug.1908, 155-156).

Although not acted upon at the time, these are some of the same ideas that would be employed decades later with the use of bio-solids for building up Canarsie Pol and sand from the Ambrose Channel maintenance dredging for restoring some of the vanishing marsh islands. The call for the use of native plants is also notable and anticipates the use of native plants in ecological restoration decades later.

Contracts of dredging an access channel, dredging within the basins and placing material behind bulkheads were prepared by the city's Dock Department in December of 1911. The work was to take place at Fresh Creek, Paerdegat Creek, and near Canarsie ("Jamaica Bay Improvement", *New York Times*, Dec.10, 1911).

Once work on the main ship channel began, Mill Creek and Mill Basin were dredged to a

depth of 15 feet in 1912. (Mill Creek was originally named Kimball Basin.) (Hendricks page 61) This was the only place in Jamaica Bay where there was significant industrial development not related to the waste industry. Shipbuilding was one of the industries located in Mill Basin and the dredging project may have enhanced its ability to construct large vessels such as the 140-foot, diesel-electric, double-ended ferry boat for the Poughkeepsie & Highland Ferry Company of Poughkeepsie, New York. She was constructed at Mill Basin at a yard owned by the Atlantic, Gulf, and Pacific Company (“Enterprise in Ferryboat Construction”, *Shipping*, Sept.1922).

The use of the one side of the main interior channel at Jamaica Bay, between Barren Island and Mill Basin, is recommended for the unloading of material from the Street Cleaning Department for filling in the salt marsh behind the existing bulkhead. Mr. Hulbert says that Rear Admiral Usher, Commandant of the Third Naval District, has pointed out the desirability of finding a place for disposing of ashes without dumping them at sea. By filling in the marsh with such material, about 1,100 acres of water front would be created (“11 Improvement Programme For The Port Of New York, Dock Commissioner Murray Hulbert Outlines a Schedule of Progressive Investment Calling for an Outlay of \$20,000,000 Up to the Year 1921, *Greater New York, Bulletin of the Merchants Association of New York, Bulletin of the Merchants Association of New York*, Nov.4, 1918).

By 1918 the US Coast Survey described Jamaica Bay as, "... formed by numerous marshy islands and shoals with narrow channels between. The shoals and channels, especially those nearest Rockaway Inlet, are subject to change, and the shoaling is generally abrupt on the sides of the channels. The principal traffic is to the large refuse factories on Barren Island and through Beach Channel to the summer resort of Rockaway Beach and those farther eastward. These channels are well marked, and with the aid of the chart vessels should have no difficulty, when inside the dredged channel of Rockaway Inlet, in proceeding to an anchorage in Beach Channel below the horizontally striped buoy marking the lower end of Long Bar. Otherwise the channels of Jamaica Bay require local knowledge..." (U.S. Coast and Geodetic Survey, *United States Coast Pilot: Atlantic Coast. Cape Cod to Sandy Hook*, 1918, 256).

The entrance to Jamaica Bay through the Rockaway Inlet as being obstructed by a shifting sandbar but a marked channel about 200 feet wide with a depth of 12 to 14 feet lead over the bar. Because the channel was so close to the shifting shoals of the Rockaway Inlet the Coast Survey advised mariners not familiar with the area, even those in small vessels, not to attempt the passage except on a rising tide and smooth sea. The draft of deepest vessels that could safely pass into the bay was about 14 feet (U.S. Coast and Geodetic Survey, *United States Coast Pilot: Atlantic Coast. Cape Cod to Sandy Hook*, 1918, 256).

Inside the bay, a channel on the west side had been improved by increasing its depth from 16 to 18 feet as far as the northwest side of Mill Island. Sheepshead Bay could be reached via a dredged channel 100 feet wide and 6 feet deep that was marked on its east side with two lights. A new 18 foot channel was being dredged to a wharf on the north side of Ruffle Bar. The railroad bridges over Beach and Broad Channels had openings of 48 and 50 feet wide, respectively (U.S. Coast and Geodetic Survey, *United States Coast Pilot: Atlantic Coast. Cape Cod to Sandy Hook*, 1918, 256).

In an unsigned editorial published in December of 1919, *The Rudder* said that the port development was progressing "slowly in a listless sort of way, and while they dream of haggles, they are costing (ship owners) thousands of dollars a day" ("Piers, New York's Great Need", *The Rudder*, Dec.1919, Vol.35, no.12, 590). According to the Coast Survey, in 1918, it was not possible for large vessels to move much farther than Mill Creek. A channel from Rockaway Inlet and around the east end of Barren Island northward to Bergen Beach, and then northeastward and eastward along the north shore to the mouth of Cornell Creek was still in the planning stages. Ice generally closed the bay during the January and February (U.S. Coast and Geodetic Survey, *United States Coast Pilot: Atlantic Coast. Cape Cod to Sandy Hook*, 1918, 256).

The Rudder's editorial went on to explain that new port facilities construction in Jamaica

Bay was contingent on Congress appropriating sufficient funds to replace the existing 18 foot channel with one that was 30-feet deep, 1,500 hundred feet wide and leading to a 30-foot interior channel that was 1,000 feet wide into Mill Basin. Aside from the usual delays associated with getting appropriations for such a large project, *The Rudder* also identified political pressures on the Congress that were making the appropriation difficult (“Piers, New York's Great Need”, *The Rudder*, Dec.1919, Vol.35, no.12, 590).

According to *The Rudder*, ships engaged in overseas shipping received priority at the limited number of berths in New York. Vessels belonging to the United States Shipping Board were given a lower priority. The United States Shipping Board and the Merchant Fleet Corporation were government agencies responsible for operating supply and troop ships during the First World War, afterwards the agencies were charged with rebuilding America's merchant fleets and so continued to operate vessels in overseas trade. Only an expansion of the port facilities would solve this problem and that, in the opinion of the editorial writer, was the crux of the matter. Anything that would assist the government-owned vessels could be construed as a subsidy. Private ship owners would have been happy to see the government vessels sitting idle and become available at bargain prices. Shippers, on the other hand, feared such a development since there would then be no check on the prices that could be charged for overseas transport (“Piers, New York's Great Need”, *The Rudder*, Dec.1919, Vol.35, no.12, 590).

In 1921 proponents of the port plan received abundant proof that the bay could accommodate ocean-going ships. The U.S. Shipping Board's Emergency Fleet Corporation used Jamaica Bay for temporary storage of more than 100 merchant ships idled at the end of the First World War. The first two ships in the bay were the *S.S. Vinton County* and the *S.S. Kootenia* (Hendricks n.d., 62).

Mill Basin continued to be the only industrialized portion of Jamaica Bay with four major industries as of 1922 but what is significant is that 3 of the 4 were recent arrivals. (Figure 36) To what extent this reflected hopes that the new seaport would soon be operational is not clear. It may simply be that other sites were unavailable. Even the industries that relied on water transportation would have found the lack of direct rail connections to be a serious handicap. The Mill Basin Shipyard founded in 1916 and occupying 18 acres, seems to have been the exception to this rule. During peak production up to 1100 men were employed on the site. Originally conceived as a yard for the construction of lighters, barges, and tugboats, with the entry of the United States into the First World War, the shipyard began building these types of vessels for the armed forces. After the war, the yard turned 13 million board feet of lumber and 3,000 tons of fastenings into 3, 10,000-ton floating dry docks. At the start of the 1920s, the yard was making a transition from wooden to steel vessels such as the ferryboat *Poughkeepsie*.

The shipyard's management considered them-selves well-placed to take advantage of the business of docking, repairing, and even building ships once the new seaport with its many piers and deeper channels was operational. The Gulf Refining Company operated a distribution terminal for oil, kerosene, and gasoline. These products were brought to the terminal by ship and distributed to local retailers by truck. The Williams-Harvey Company was a firm of tin smelters originally located in Wales. During the First World War shipments of tin ore from the United States and South America were interrupted leading the company to set up a plant at Mill Basin in 1918. The oldest and the industries at Mill Basin was the National Lead Company. The works at Jamaica Bay were originally owned by a smaller firm and expanded after being acquired by National Lead. By 1922 the works covered eight acres and employed 300 to 500 people. The publicists working for the Port of New York in 1922 predicted that soon "hundreds" of industrial firms would be moving into Jamaica Bay with the new seaport ("The Mill Basin Section of Jamaica Bay", *The Port of New York Harbor and Marine Review*, May 1922, vol.1, no.5, 24-25).

The shipyard at Mill Basin was eventually acquired by Dekom Shipbuilding Corporation. During the Second World War the yard launched two 150-foot long, all-steel seagoing repair ships for the US Navy. Designated YR-26 these vessels did not have their own engines and were designed to be towed out to sea where they would service damaged vessels ("Floating Workshop For Navy Launched: Second Such Craft in 3 Weeks Glides

Down Ways”, *New York Times*, Dec.28, 1941).

As late as December 1925 there were still marshes near Paerdegat Basin (“Another Body in Swamp”, *New York Times*, Dec.21, 1925). The contract for dredging a channel in Jamaica Bay between the Paerdegat Basin and a point 550 feet east of the Rockaway Parkway was announced in late July of 1924. The \$252,955 contract was let to the Arundel Corporation of Baltimore. The existing city park at Canarsie would be enlarged with the dredge spoils. Enlarging the park would require filling in marsh land. Other improvements included a city terminal market, a Canarsie - Rockaway Beach Municipal Ferry and a 1,200 foot long, 400 foot wide pier at Rockaway Parkway at Canarsie that would be equipped with "all modern facilities" (“Channel For Jamaica Bay”, *New York Times*, July 27, 1924).

The City's Board of Estimate announced that \$499,000 had been allocated for the construction of Canarsie Pier. Dock Commissioner Michael Cosgrove stated that bidding would be opened immediately. The city hoped that construction would be underway before the summer. Land for projects associated with the pier construction was acquired by the city between East 102nd street and the Fresh Creek Basin. The press reports did not give details of these projects but did state that a number of manufacturers hoped to locate sites on this land (“City to Rush Bids For Canarsie Pier”, *New York Times*, May

17, 1925).

In early June of 1925, the contract for the pier construction was awarded to the A.M. Hazell Corporation who submitted the willing bid of \$487,261 (“Canarsie Pier Contract Awarded”, *New York Times*, June 9, 1925). The Canarsie Pier was already completed and the federal government had completed much of its dredging work when city approved an additional \$26,000,000 for port development in the spring of 1931 (“Jamaica Bay Seaport as City Envisions It”, *New York Times*, May 3, 1931). The next stage of the work called for improving the Brooklyn shoreline around Barren Island and creating seven principle ship docking basins. Mill Basin had already been developed and served the industries located there. The Board of Estimate approved work on Paerdegat Basin. The Canarsie Pier was officially open and the Federal government completed much of the necessary dredging work (“Jamaica Bay Seaport as City Envisions It”, *New York Times*, May 3, 1931).

To serve the new port, city planners contemplated a new railroad connecting a contemplated an outer belt line at a point northwest of Canarsie and along the west side of Paerdegat Basin and south to Mill Basin. This would serve existing and proposed port and industrial areas on the westerly side of Jamaica Bay. A route similar to this had already been proposed by the Brooklyn Committee as part of the City Plan of 1913

(Johnson 1929, 189).

If city planners had their way, western Long Island would have been crisscrossed with a new network of freight railroad lines. These included lines connecting the Bush Terminal Railroad to a rail network that would serve the State Barge Canal Terminal, Erie Basin, Atlantic Basin, and Brooklyn Navy Yard. In Queens, a new line would link Ridgewood and industrial areas around Newtown Creek, to the Greenpoint section of Brooklyn. Other lines in Queens were needed to provide freight service to Long Island City, Bowery Bay, and Flushing Creek. Yet another proposal was for a new railroad in the southerly part of the borough of Queens along the Rockaway and Far Rockaway Branches of the Long Island Railroad from the Rockaway Beach terminus to Cedarhurst; thence via the Cedarhurst cut-off to the outer belt line near Rosedale. Colonel William J. Wilgus, the engineer who designed the New York Central Railroad's Grand Central Terminal, even suggested a connection between the Rockaway Beach terminus of the Long Island Railroad and Atlantic Highlands on the Central Railroad of New Jersey via a causeway across the Lower Bay (with a tunnel under a widened Ambrose Channel) between Rockaway Point and Sandy Hook (Johnson 1929, 189).

Even as all of this planning was still going on, the new seaport was already a lost cause. It had been a lost cause from January 30, 1923. Samuel Rea, President of the

Pennsylvania Railroad, sent a letter to New York Mayor Hylan stating that he and a committee of executives of railroads entering New York concluded that a freight railroad tunnel from Staten Island to Brooklyn was "not in the public interest." The letter was signed by representatives of all of the major railroads serving New York except the Baltimore and Ohio, which already had a substantial presence on Staten Island. A lengthy engineering report accompanied the letter. The report concluded that the traffic projections made by the City of New York were overly optimistic as was the city's estimated cost for the tunnel. The existing system of cross-harbor freight handling system was adequate for the existing traffic and given the traffic volumes, a new tunnel would not pay for itself. Though the city might have pointed out that without a new tunnel, the traffic volumes could never increase (*Engineering News Record* Feb.9, 1923, 88:251.)

Roy MacElwee was a terminal engineer, and an associate member of both the American Association of Port Authorities and the Society of Terminal Engineers. He argued that whole space for berthing transatlantic liners was certainly growing short along Manhattan's waterfront, Jamaica Bay should remain undeveloped until such time as the existing port facilities could no longer accommodate large ocean liners. In MacElwee's view, the plans for a series of narrow piers that were uncoordinated with either industrial needs or specialized cargo handling requirements would only transfer the existing problems to a new location. Passenger liners would still need to dock as close to 42nd

Street or Fifth Avenue as possible. Tramp steamers sailing on short-term charters would dock where they were needed. In his view, the Port of Newark, which was also being developed at this time, was equally misguided in that it would fail to attract ocean-going commerce. The best use of both Jamaica Bay and Newark would be to create industrial sites that had access to lighterage. At the time MacElwee was writing, Jamaica Bay was outside the lighterage limits and unable to take advantage of cheap water transportation (MacElwee 1918).

The lighterage system in the Port Of New York was a unique solution to a problem faced by the railroads. Multiple railroads reached the New Jersey and Staten Island side of the harbor and faced the immense problem of transferring both passengers and freight onto Manhattan Island, Long Island, and the various ships loading or unloading. Passengers could walk to ferry boats, or after 1908, take the Hudson and Manhattan Railroad (today this is the PATH system) (“Trolley Tunnel Opens to New Jersey”, New York Times, Feb.26, 1908). Railroad freight cars were transferred to barges and towed over the harbor. The cars were then shunted to small freight terminals in Brooklyn, Manhattan, or the Bronx. Sometimes freight was transferred to small ships called lighters and brought either to a waterfront industrial site or directly to a ship for loading. The whole system was called lighterage and every major railroad had its own fleet of lighters, tugboats, ferries, and car floats. Such an awkward system would normally have scared away a rational shipping company so the railroads offered free lighterage anywhere inside the

"lighterage limits" (MacElwee 1918).

MacElwee argued that this system of intraport freight movement could be expanded to areas such as Mill Basin in Jamaica Bay and also to Newark so manufacturers could receive raw materials and ship finished goods directly to and from ocean-going ships anywhere in the harbor or any of the dozens of railroad terminals in New Jersey, Staten Island, or the Bronx. He correctly foresaw that the terminal requirements for ocean going ships would change and that terminals designed in 1906 might be obsolete in 25 to 50 years. The container revolution, the rise of air transportation, and the increased specialization of cargo ships (automobile carriers, large tankers, bulk carriers, etc.) would all change ocean shipping forever. He was also correct in that Newark's industries would take advantage of water transportation for cargoes such as coal, petroleum products, scrap metal, cement, and lumber even as Port Newark languished for lack of ocean-going trade (MacElwee 1918).

In hindsight, the decision not to build the tunnel that would have enabled the new seaport to function was correct. Port Newark was served by several railroads yet it failed to attract ocean-going trade for many years. Given the slow growth of Port Newark it is hard to credit the claim by the Secretary of the Jamaica Bay Improvement Commission, Nelson Kilmer, that, "New Jersey interests" threatened to block the development if the

Port Authority did not also develop a port in Newark (Hendricks n.d., 60). It was not until the air travel and container revolutions that Newark and Elizabeth took over the majority of ocean trade in greater New York.

In the final analysis, the Great Depression may have finally provided an excuse, as opposed to a reason, for finally terminating the project.

The Historian Stephen Marshall has made an extensive study of the Bush-Goodrich Report. Irving T. Bush (1869 – 1948) was the founder of Bush Terminal in Brooklyn. Bush's idea in founding the terminal was to create a new kind of urban industrial center that would combine warehouses, manufacturing, and ocean terminals. The new facility would not need to compete directly with existing port facilities since the new warehouses and factories would both receive and ship ocean-going cargoes. The Bush-Goodrich Report was a detailed exposition of Bush's ideas and why they were superior to building new terminals in either Jamaica Bay or Newark, New Jersey. (Stephen Marshall, personal communication)

According to Bush, in many ships that arrived from Europe, about 10% of the cargo was considered "high class." These were low volume, high value items that went directly

from the piers to the businesses on Manhattan. They included haute couture fabrics, financial documents, jewelry, precious stones, gold bullion, furs, specialty chemicals, and even bird feathers for trimming ladies hats. These cargoes were so valuable that shipping lines were willing to put up with an inconvenience just to have space on the Manhattan waterfront. The other 90% of the cargoes would be unloaded onto lighters for shipment to the railheads in New Jersey. Jamaica Bay could offer no direct access to Manhattan for these cargoes and no freight railroad connections for the other 90% of the cargo. Marshall has frequently pointed out that the promoters of Jamaica Bay seaport were oblivious to these factors. The 21st century port promoters in Brooklyn also appear to ignore the fact that 90% of ships' cargoes will still have to be further transshipped across Harbor to reach the railroad network. (Stephen Marshall, personal communication)

The seaport proposal raises a number of interesting questions. The most obvious question is certainly not “why did it fail?” There are a number of satisfactory answers to that question. From an environmental management perspective the question is, “why did it take so long to die?” Alternative uses must certainly have presented themselves.

Jamaica Bay had long been a major recreational resource for the city of New York and by the 1920s there was no disputing the importance of parkland in the life of a city. Boaters continued to use the bay. However the bay's marshy shorelines would not have attracted

more than a handful of bird watchers or hunters. It may be assumed that the development of conventional park lands with lawns, play areas, restrooms, waterfront promenades, and food concessions would have required more dredging and filling than the city was willing to pay for. Many parks near the bay were constructed on filled lands while the surrounding communities did not use the accessible marshes for recreation, rather as dumping grounds for old appliances and construction debris.

Another alternative use would have been an expansion of marine aviation. In the 1920s and into the 1930s the world's airports were still largely undeveloped and many aviation experts argued that seaplanes and their larger cousins, flying boats, could provide immediate access to any of the world's seaport cities without the cost of a new airfield. Additionally, having an aircraft that could make a mid-ocean emergency landing was an important safety feature in an era of unreliable engines. The city's official marine aviation terminal was constructed instead of the north shore of Long Island at what is now LaGuardia Airport. Construction began in 1937 only after Jamaica Bay had been turned over to the Parks Department.

As for housing, in an era before large-scale public housing projects neither the city, state, or federal governments would have committed the money needed to fill in the necessary land.

None of these other uses would have been fundamentally incompatible with a new seaport and certainly none of them would have been able to generate comparable revenues. But without connections to the rest of the country's railroad network, it is certain that the new seaport would never have been able to generate sufficient revenues to cover its construction or maintenance costs. As late as 1931 the Queens Planning Commission and the Borough President were still calling for the necessary extension of railroad facilities to make the port scheme a reality. At the same time the Brooklyn Chamber of Commerce was calling for railroad spurs on each side of Paerdegat Basin coming off the New York Connecting Railroad's Ralph Avenue Line ("Would Speed terminals, *New York Times*, Aug. 2, 1931).

The other question that must be asked is whether the planning for the seaport set a precedent for the city to consider some kind of unified plan for the future of Jamaica Bay. While a few-sighted municipal planners might have had a unified vision of the bay's future, Jamaica Bay seems to have become a park because the city had no other use for it.

In the late twentieth century, Jamaica Bay returned to what it once was, a minor maritime center. Three sand, gravel, cement, and stone handling facilities are located on the eastern half of the bay, one in Head of Bay, one in Mott's Basin, and the third on

Rockaway Peninsula. Sewage sludges are loaded onto ships for disposal on the north shore of the Rockaway Peninsula. Ocean-going cargo ships never did call at the Canarsie Pier.

Chapter Ten

Air Travel at the Beach

The dreams of the port planners to make Jamaica Bay a world-class, ocean-shipping port never materialized but Jamaica Bay did emerge as a crossroads of aviation. The high class cargoes and international travelers that were never landed at Jamaica Bay's seaport did eventually begin arriving at Floyd Bennett Field, and John F. Kennedy Airport.

Civilian aviation at Jamaica Bay began as early as 1910 when air meets were held at the Sheepshead Bay Race Course. The course was built by the Coney Island Jockey Club in the 1870s. It was located on Ocean Avenue just north of Emmons Avenue. In 1915 the Sheepshead Bay Speedway Corporation was incorporated for the purpose of converting the horse racing track into a motor speedway it would also serve as a venue for automobile shows and sporting events ("Sheepshead Bay To Be Auto Course: First Race on New Speedway Will Probably Be Held in the Fall", *New York Times*, Mar.9, 1915). After a successful air meet in 1915, a grand scheme was announced to transform the motor speedway into a major center for aviation training, public outreach, and aeronautical research. A series of concrete hangers each measuring between 60 and 100 feet, equipped with steam heat, electric lighting were planned for the site as were weekly aviation meets ("Activities at Sheepshead Bay Speedway", *Aerial Age Weekly*, Nov.15, 1915, vol.2, no.9, 202). No major civil aviation center was built at the site and the Sheepshead Bay Speedway closed in 1919 to be replaced by an apartment complex.

With the entry of the United States into the First World War it became necessary to protect the approaches to New York from submarines. The Rockaway Naval Air Station was one of eleven stations created to defend cities on the east coast. It was commissioned in October of 1917 with facilities for seaplanes and kite balloon training. Kite balloons were tethered to the ground and carried observers.

Obtaining the land for the station was not a simple matter and disputes between the city and the military would plague the station for its entire operational lifetime. The land on Rockaway Point was owned by the Rockaway Pacific Realty Company, which was controlled by the Southern Pacific Railroad. The reality company was prepared to sell the land to the federal government at a reduced price, but only if the city government transferred land to the company that was needed to round out its properties. A bill to do this was approved by the state legislature a year earlier but State Senator Ogden L. Mills introduced a companion measure that would allow the city government to give or sell underwater lands to private real estate companies. Ownership of some of the underwater lands near Rockaway Point was in dispute with both the city and Rockaway Pacific claiming title. Without transfer of some of the underwater lands the necessary access roads to the site could not be constructed. New York Mayor Mitchell stepped into the fray supporting the land transfer but also found himself vigorously denying that there was anything improper. In the course of the negotiations the name of State Senator Reynolds keeps appearing but it is not clear if he had any connection of the Reynolds of the waste

reduction industry. Ultimately the State Legislature threatened to seize the land in February of 1917 (“Threat to Seize Land at Rockaway”, *New York Times*, Feb.15, 1917).

Clearly New York's backyard was no longer big enough for everything the city wanted or needed and some serious thinking about land use decisions was in order. The idea for a non-commercial public beach somewhere on the Rockaway Peninsula had been circulating through city agencies and planning committees since the opening of the New York, Woodhaven, & Rockaway Beach Railroad in the 1880s. Now that New York was acting on the idea, it marked the first time that the city was making a major commitment to public beaches instead of leaving waterfront recreation entirely in private hands.

Shortly after the war the air station was the starting point for the first aircraft to fly over the Atlantic. Four Curtis NC-4 type seaplanes left Rockaway on May 8, 1919 for a flight that took them to Cape Cod, Halifax, Newfoundland, the Azores, Lisbon, and Ferrol, Spain, and Plymouth, England, on May 31st. The flight covered 4107 nautical miles. Over the next several years the Navy weighed the difficulties of keeping the station open during peacetime against the threat of the sea-lanes off New York being left without air defenses. The problem was Jacob Riis Seaside Park. The city wanted to establish a park on the Rockaway Peninsula but could not develop the park without obtaining the land where the air station was located. The city suggested that the military take over Barren

Island but this suggestion was not acted upon. The Navy appeared ready to abandon the site but could not leave the city undefended.

Eventually a compromise was negotiated where the Navy would give the city land from Fort Tilden and in exchange the city gave the property occupied by the station to the military (“Navy Hopes To Keep Rockaway Air Station”, *New York Times*, July 19, 1922). Another suggestion was made that the base be closed and its operations be moved to Barren Island was also made in 1922. It came in a letter from Judge Alfred Talley of the general sessions court to the Chief of Naval Aeronautics. Talley was the executor of the estate of Andrew White whose company was still the island's largest land owner (Talley claimed that the company owned the entire island but the author has been unable to corroborate this claim).

By this time the waste reduction business was in steep decline and the Whites' factory was practically idle. The island was also connected to the mainland via an extension of Flatbush Avenue. The buildings owned by the waste reduction company were available for immediate occupancy. The site would have the same proximity to the approaches to New York. As it was inside Jamaica Bay it was protected from the ocean. (Wants Air Station on Barren Island, *Aerial Age*, Sept 1922, vol.25 no 18, page 457) The land exchange did not take place, the station did not move to Barren Island, and the two

parties were still unable to find a compromise as late as 1925 (“Navy Seeks to Keep Rockaway Air Base”, *New York Times*, Aug.7, 1925).

Finally in April of 1929 a severe storm damaged the station and the Navy requested an appropriation of \$250,000 from the city for repairs. Since the State of New York's Naval Militia also used the station as a training site, the request may not have been entirely unreasonable. When the city refused the Navy moved the station to Philadelphia (“Naval Air Station To Quit Rockaway”, *New York Times*, May 23, 1929).

Opinion in the city was divided over the decision to close the station. It would allow the construction of Jacob Riis Park but leave the city without air defenses (“Naval Air Station To Quit Rockaway”, *New York Times*, May 23, 1929). By the end of the 1920s, the station was only being used by the Naval Reserve and the State Naval Militia. In October of 1930, bids were solicited for the demolition of 51 buildings, fences, and runways. Seawalls, roads, and wharves were to be left in place for use in the new city park. Local officials immediately requested an appropriation of \$125,000 for construction of a bathing pavilion (“To Wreck Air Base at Rockaway Beach”, *New York Times*, Oct.12, 1930).

The problems with the Rockaway Naval Air Station were not unique as there was increasing criticism over the cost of maintaining military bases in peacetime. Military air bases were increasingly located at civilian airfields as both a cost savings measure and a means of familiarizing the public with military aviation. A month after Floyd Bennett opened in May of 1931 the US Navy moved into Hanger number one for which they paid \$1.00 a year in rent (Larzelere 2003, 141).

In the mid-1920s New York City's Board of Trade and Transportation's Committee on Landing Places for Commercial Airlines recommended establishing a municipal airport. Discussions about establishing an airport began in 1925 but no action was taken. (Quinn page 43) (Note, the Board of Trade and Transportation was the precursor of the Metropolitan Transportation Agency or MTA.) Two years later the Federal Department of Commerce expressed concern about the city's lack of an airport and identified not one, but six potential sites for primary landing fields, and four potential sites for secondary fields. By this time the Port Authority was recommending that the city have one or more modern airports. The opening of the Newark Municipal Airport in 1928 caught the New York City unprepared to exploit the growing opportunities in air travel. Once Newark emerged as the region's air travel hub, New York City was forced to begin construction on its first municipal airfield (Quinn, 2004).

New York's first municipal airport, Floyd Bennett Field was constructed on Barren Island that had been joined to the mainland by filling in marshland. (see chapter 4) During the 1931 the opening ceremonies, the overcast skies did not deter a crowd of thousands from watching mock air battles and an armada of bombers fly overhead (Strausbaugh, *New York Times*, July 10, 2009). The promise of a new era in air travel seemed to coming to fruition as the field became noted for the many pioneering flights (and a few notable stunt flights) that took off or landed on its runways. Notable women pilots Amelia Earhart and the racing pilot Jacqueline Cochran used the field as did the Brooklyn-born Laura Ingalls. Ingalls 1934 flight in a Lockheed Orion from Mexico to Chile, over the Andes to Rio, and on to Cuba, and finally landing in New York earned her a Harmon Trophy as the year's most outstanding female aviator. The flight set a woman's distance record of 17,000 miles (Strausbaugh, *New York Times*, July 10, 2009).

The first solo around the world flight took off from Floyd Bennett Field when Wiley Post took departed in his *Winnie Mae*, a single-engine Lockheed Vega. He returned a week later. In 1938, Howard Hughes repeated the trip just less than four days (Strausbaugh, *New York Times*, July 10, 2009). Twenty years later another notable record flight was made by Marine Corps pilot John Glenn, who in 1957 made the first cross-country flight during which the average speed of the aircraft exceeded the speed of sound. The flight from Los Angeles to Floyd Bennett field took less than three and a half hours (Strausbaugh, *New York Times*, July 10, 2009).

It was not all pioneering and heroics. In 1938 Douglas Corrigan filed a flight plan for California and landed in Ireland, claiming his compass had shown the wrong heading. Corrigan became a hero and even returned to a ticker-tape parade in Manhattan. The *New York Post* headline read "Hail Wrong Way Corrigan," printed backwards (Strausbaugh, *New York Times*, July 10, 2009).

Although Floyd Bennett Field was New York City's first commercial airport, the facility never lived up to its full commercial potential. (Quinn page 43) The city lost a competition with New Jersey's Newark Airport for a critical airmail contract. This deprived the carriers who operated out of the field with much needed revenues and this contributed to the facility's commercial failure. Floyd Bennett Field suffered the same problem as the new seaport, there were not enough railroad connections or highways to bring passengers and mail quickly into Manhattan (Quinn 2004, 43). Newark Airport was closer to the main post office for New York City and was therefore the preferred airmail handling facility.

Soon after Floyd Bennett Field was created, the Flushing Meadows on the north shore of Long Island were filled for the creation of La Guardia Airport. Floyd Bennett Field was no longer needed and was turned over to the Navy in the Second World War. As they

had in the previous world war, seaplanes now patrolled the waters off New York City for submarines. Hangar B was built by the Navy in 1941 to house seaplanes. Today Kayakers and canoers launch their craft from the old concrete ramp behind the hangar. During World War II "Seaplanes like the PBY Catalina would roll down this ramp and take off from the channel to protect convoys of ships that were leaving New York harbor," according to acting district ranger John Daskalakis. (Strausbaugh, *New York Times*, July 10, 2009).

The facility was sold to the Navy in 1952 (Barlow 1971, 111). It was never again used as a civilian airfield and was used instead by the New York City Police Department's aviation unit. The facility was turned over to the National Park Service and became the headquarters of the Jamaica Bay Unit.

At 550 acres LaGuardia Airport was ten times the size of Floyd Bennett Field but soon became severely congested. In 1942, the Idlewild golf club on the north shore of Jamaica Bay was selected as the site of the next airport (Altshuler and Luberoff, 130).

Construction of Idlewild Airport required 53 million cubic yards of sand and filling 4,527 acres of marshland. The airport was elevated 12 feet above the waters of the Bay and when finished occupied an area eight times the size of La Guardia (Barlow 1971, 111). Bergen Basin was excavated around the airport area to serve as a fuel terminal and sewer

outfall. The city did not have the money to complete the project although Robert Moses did suggest raising airline rental payments at LaGuardia. Faced with protests from the airlines the plan was dropped and the Port Authority of New York and New Jersey had to take over the project and see it to its conclusion in 1948 (Altshuler and Luberoff, 130).

By the 1950s Idlewild had become the main entryway for international air traffic on the east coast. However with the advent of jet aircraft more airport capacity was needed. A complex of terminals arranged in an oval shape replaced the corrugated metals sheds. Each airline was allotted its own 655 acre (265 ha) tract. The most famous buildings of the new terminal complex were those of Pan Am, with its 4 acre steel and concrete roof and Trans World Airlines' building designed by Eero Saarinen (Powell, Anne Elizabeth, "John F Kennedy International Airport," *Civil Engineering Magazine*, Nov. 2002).

In 1963 the airport's name was changed to John F Kennedy International Airport. Two more terminals were added in 1969 and 1970. A total of nine terminals now make up the 880 acre central terminal area. A new light-rail system has been added so that passengers have access to the New York City subway system. In 1949 Idlewild Airport handled 222,620 passengers. By 2002 the number had rises to 30 million annually (Powell, Anne Elizabeth, "John F Kennedy International Airport," *Civil Engineering Magazine*, Nov. 2002).

The growth of air terminals is significant for environmental management not only because of the alterations of the natural shorelines but because they represented an increasing level of control over the bay by the city and the Port Authority. Where the port scheme failed to create a commercial center the airports succeeded. But the task of remaking the bay as a center of commerce proved too large for any one level of government. However, as we have seen in the need to remove the last of the waste processing plants from Barren Island, and in the case of buying the land occupied by the Naval Air Station, there was no longer room for everything that the city wanted or needed. A new era marked by big plans and big projects had come to Jamaica Bay.

Chapter Eleven

Forever Somewhat Wild, Jamaica Bay Becomes a Park

There was no more certain symbol that the seaport plans were a thing of the past and that Jamaica Bay was now a park than what happened on Canarsie Pier on the Fourth of July, 1944. Mayor La Guardia made a six-hour tour of New York City's recreation spots including the Pelham Bay Golf Course, the Astoria Pool, and Prospect Park. The July 4th, 1944 tour covered 103 miles and featured twelve scheduled stops. It was intended to promote parks and recreation sites within the city's borders. Crowds surrounded the mayor at Rockaway Beach and Coney Island. Lunch was served on Canarsie Pier, chicken and ham sandwiches, tomato salad, and apple pie with strawberry ice cream. (The mayor declined the pie as he rarely ate desserts) La Guardia said that lunch on the pier was "The first picnic I've had in a long time." The tour's one unscheduled stop was near Rockaway Beach where a police emergency truck was spotted. The mayor leapt from his car and learned that a 17-year old girl had just been saved from drowning ("City's Play Sites Toured By Mayor", *New York Times*, July 5, 1944).

Upon winning the mayoral election in 1933, Fiorello La Guardia invited Robert Moses to join his administration. As President of the Long Island State Park Commission, Moses had already directed the development of Heckscher State Park, Jones Beach State Park and the Southern Shore Parkway. At its opening in 1929, Jones Beach was described by one visiting Englishman as, "the finest seashore playground ever given to the public anywhere in the world." (Caro p 309) Not only were the bath houses, food service areas, and even utilities architecturally distinguished, the area had "no concessions, no booths,

no bawling hot-dog vendors." It was noted that for the first time in the history of public beaches "this beach is conceived as a spot for recreation, not amusement stimulated by honky-tonk" (Caro 1974, 310).

In staffing Jones Beach and other public parks Moses had further endeared himself to reformers by refusing to use the many jobs they created for political patronage (Caro 1974, 305). Moses would never endear himself to environmentalists because his conception of parks included parkways "so that the public could reach them by car". Driving to the park was intended to be part of the pleasure. The parkways that lead to Jones Beach and other Moses parks had a width of 40 feet, extremely generous by the standards of the late 1920s. The roads passed through a landscaped green space. Grade crossings were separated and while there might be tollbooths, there were no traffic lights. At the time a few critics pointed out that by providing only access to private automobiles the parks Moses created would forever be restricted to the relatively affluent. But the critics were in the minority and the general public regarded Moses as the model of a dedicated public servant.

Mayor La Guardia tapped Moses to run the city's parks which at the time were dirty, inadequate, and suffering from years of political patronage. Moses agreed to accept the job of Parks Commissioner on two conditions. Firstly, the office had to be made city-

wide. Before the La Guardia administration each borough had its own Parks Commissioner. His other condition was that his responsibilities included parkway construction as well (Caro 1974, 360). Moses brought into the new administration not only his reputation for integrity and public service, but his skills at getting state and federal funds for new construction projects.

At the height of the Great Depression the Civil Works Administration (CWA) provided relief workers to the Parks Department but they were poorly organized, had inadequate and even non-existent tools, and were working without any coordinated plans. Parks Department engineers sent to observe work at Brooklyn's Marine Park during the winter of 1934 reported that all but a handful of the 5400 relief workers sat huddled around small fires. Many were drinking from wine bottles wrapped in paper bags, others were playing dice, other workers had burned the wooden handles of their shovels to keep warm. What few who were working did little more than rake the frozen ground or build low stone walls (Caro 1974, 363).

The land for Marine Park had been acquired by the city some twenty years earlier but little had been done with it (Caro 1974, 363). Between the time that La Guardia asked Moses to be his Parks Commissioner and the time the new administration took office, Moses had accumulated a list of some 1,800 urgent parks renovation projects on which

an estimated 80,000 men could be immediately employed (364). By the end of 1934 Moses had increased the number of city parks by 50%, rebuilt the Central Park Zoo, and created Central Park's Great Lawn (378). By the end of the 1930s, the number of playgrounds had increased from 119 to more than 400 and the city had ten new swimming pools, each costing more than \$1,000,000 (Rodgers 1952).

The combination of Parks Commissioner and Parkway Builder allowed Moses to construct a long-awaited "West Side Improvement." For many years railroad tracks along Riverside Drive had separated the Hudson River from Manhattan. These would be covered by an expressway lined with 132 acres of new parks. When completed in 1938, the Henry Hudson Parkway allowed drivers to go from the Wall Street to the northern city line in less than thirty minutes, "stopping only to pay a ten-cent toll at the new double-decked Henry Hudson Bridge over Harlem River" (Rodgers 1952).

Similar projects on the East River and Harlem Rivers would soon result in Manhattan being completely encircled by express highways and "ribbon parks" (Rodgers 1952). By 1938 the Miller Highway (later named the West Side Highway) and the East River Drive had also been completed. In 1934 construction began on the Belt Parkway that began in Brooklyn at 68th Street and Colonial Road. The Belt Parkway begins in Owl's Head Park. This park sits on a hill forming the end of the glacial moraine cutting across

Brooklyn. The land for the park was acquired in 1928 from the estate of the industrialist Eliphalet Bliss. (The park is still known locally as Bliss Park). Less than half of the newly acquired land went for the construction of the park; the rest was swallowed up by the Belt Parkway and various other uses (Morrone n.d.). Lined with green spaces along its entire length, the Belt Parkway swung inland north of Coney Island and Sheepshead Bay before returning to the shoreline and running along the north shore of Jamaica Bay. (Figure 37) It eventually connects with the Long Island Parkways at the Queens - Nassau County border. A driver could turn north and follow the connecting parkways to the Bronx, Westchester, or Connecticut (Rodgers 1952).

Inside the borders of Marine Park, the Marine Parkway leaves the Belt Parkway and extends south over the Marine Park Bridge to connect Brooklyn with the Rockaway Peninsula. This bridge was built in less than a year and gave city dwellers (or at least those with automobiles) direct access to Jacob Riis Park on the Rockaway Peninsula (Rodgers 1952). (Figure 38) An additional mile and a half of ocean beach was reclaimed on the peninsula. The construction of park facilities on the Rockaway Peninsula was only possible because of the merger of the Henry Hudson and Marine Parkway authorities into the New York City Parkway Authority. The new authority floated some \$18,000,000 in bonds, based on the collection of parking fees and bridge tolls (Rodgers 1952). Yet this amount was not enough as costs spiraled. Moses asked the Board of Estimate in 1935 for \$3,600,000 for construction projects at Jacob Riis, Pelham Bay, Fort

Tyron, and two Marine Parks. He promised the board that if they allocated another \$3,500,000 Jacob Riis would be open in 1938. He would later promise that if \$6,000,000 were made available, Marine Park in Brooklyn could be opened but after the money was spent, Moses requested another six million. Even then the park could not be completed (Caro 1974, 476).

A 1938 white paper prepared for the Fine Arts Federation by Albert Bard was one of the first to question the wisdom of combining parks with parkways. Bard observed that the scale of the new highways and the land needed for interchanges had created a situation where "the use of parks for the new roads built for modern traffic presents an unexpected problem." He also wrote that "For the most part what remains of the ostensible park has become simply the embellishment of the drive and this the motorist accepts with composure as he is only concerned with racing through where no traffic lights interfere.

In all fairness, it should be pointed out that many New Yorkers appreciate and use the park facilities along the northern portion of the Belt Parkway where it runs along the upper bay between Brooklyn and Staten Island. The Belt Parkway also provides access to the National Park Service headquarters at Floyd Bennett Field. As a commuter route however, the Belt Parkway was quickly overwhelmed. It connects to the Gowanus Expressway at Owl's Head Park and drivers can then reach Manhattan via the Brooklyn

Battery Tunnel. Within a month of the tunnel's opening in 1950 it was carrying 1,080,000 million cars, about 64% more than its planners had predicted. The four lanes of the Belt Parkway were jammed before the war, they expanded to six in the postwar years, and the Parkway was still jammed (Caro 1974, 912). The situation was repeated on the Van Wyck Expressway which connected Idlewild (later Kennedy) Airport to the rest of Long Island (Caro 1974, 905). The road was planned in 1941 but not built until after the war. Moses rejected the idea of extending the subways to the airport and insisted that all traffic to and from the airport would be via the highway. The Van Wyck quickly became over-crowded, additional marshlands had to be filled in to accommodate the parking lots.

The Belt Parkway did create parkland and open space along the Bay Shore but it also had the effect of cutting off the bay from many of the surrounding neighborhoods including Flatlands, Mill Basin, Canarsie, and East New York. This disconnect would have profound implications for the creation of the National Park in later years because a generation of New Yorkers would have to learn a new connection to Jamaica Bay.

During the 1930s through the efforts of Robert Moses, at that time the city's Parks Commissioner, the city acquired 9,000 acres comprising the water and islands of the bay. The city also acquired another 3,000 acres of shoreline. The stage was set for a dramatic political confrontation that would decide the future of Jamaica Bay. The Department of

Sanitation proposed using the bay's marshes as a convenient dumping ground but Moses countered with a massive public relations campaign. Pamphlets issued by the Parks Commission depicted smoking mounds of garbage in the bay with noxious fumes wafting toward the surrounding communities. As an alternative to this "Civic Nightmare," the pamphlets depicted expanses of blue water ringed with beaches and dotted with sailboats (Barlow 1971, 112).

The state legislature granted the Parks Department jurisdiction over the bay in 1938. One of the first actions Moses took was to rezone the land around the bay. Idlewild and Mill Basin were zoned industrial, areas south of the Belt Parkway were residential, and the remaining land including the beaches were to be parklands. (Hendricks page 66) The plans for recreational development called for six new bathing beaches and waterfront parks, the bay was still unsafe for swimming. Robert Moses predicted that the bay would soon be safe because the city was implementing a harbor purification plan. The purification plan was not enough to clean the bay and all subsequent recreation proposals suffered as a result (Barlow 1971, 112).

Before the Belt parkway was even completed in 1940 a new and grander plan was put forward for converting all of Jamaica Bay into a mix of residential and recreational uses. Since most of the bay and its shores were owned by the city, all that was needed for

the project was additional funding (Rodgers 1952). Despite years of trying, Moses was never able to realize all of his grandiose dreams for Jamaica Bay. It wasn't until 1954 that the city managed to acquire additional land that was combined with existing city property to form Jamaica Bay Park.

Jamaica Bay became a wildlife refuge in 1951. For Robert Moses, a wildlife refuge was a low priority in the planning and development of the park but he still responded forcefully when threatened with encroachment. In 1950 the Long Island Railroad wanted to replace the 1877 era wooden trestle over the bay. The Transit Authority purchased the bridge and planned to convert the line to handle subway trains. Their plans were to replace sections of the trestle with a causeway built from dredged sand. Moses refused to allow this unless the Parks Department received something in return. The Transit Authority agreed to excavate two freshwater ponds, on the east and west sides of the Cross Bay Boulevard. Six million cubic yards of dredged sand were used to create are two impoundments which were then planted with vegetation by New York City Parks Department. The choice of plantings was determined by their ability to thrive in coastal conditions and to provide food and nesting sites to bird populations (Tanacredi 1983, 143-150). Completed by 1953 these two features were the start of the wildlife refuge. Another project undertaken at that time was to pump sludge from the 26th W Sewage Treatment Plant onto Canarsie Pol where it was mixed with sand and planted with beach grasses by Herbert Johnson (Barlow 1971, 112). The use of sewage solids for topsoil

production had been proposed since the first sewage plants were built in Brooklyn and Queens (Scanlon, "Utilization of Sewage Sludge for the Production of Topsoil", *Sewage and Industrial Wastes*, Vol.29, No.8, Aug.1957, 944-950).

Herbert Johnson, Appointed by Moses to be Resident Supervisor of the refuge in 1951. Prior to coming to the refuge he was working at the Parks Department's soil testing laboratory in the Bronx where he experimented with different types of grasses for golf courses. Johnson's father was an estate gardener. Johnson had a fee hand and propagated autumn Olives, *Rosa rugosa*, *Rosa Multiflora*, bayberry, and chokeberry. He established a nursery for Japanese Black Pines and sowed wheat oats, and rye to attract land birds (Barlow 1971, 115).

Announcing plans for post-war park development Robert Moses wrote in the *New York Times* that Marine Park would receive a modern boat basin on Jamaica Bay along with a boat house, parking lots, and a launch service to ferry boaters from the shore to moored boats. Facilities to be built at the Deep Creek Basin would provide dock space, moorings, and row boats for hire. Canarsie Pier had a 100-foot long landing barge adjacent to the pier (its purpose was not explained), a yacht anchorage, row boats for hire, a large parking lot, a concession building, lockers, and comfort stations (Moses, "City Park Commissioner, City Plans to Expand and Improve Boat Basins in Various

Boroughs”, *New York Times*, Jan.12, 1947).

Writing in 1948 Moses reported that the single greatest problem facing future park development on the waterfront was sewage pollution. Moses was unequivocal when he stated that "this threat has been played down, minimized and dismissed by altogether too many agencies and official bodies. Only certain sections of the press have been told the whole truth about it, because the truth hurts our pride and our pockets." In 1948 one-third of the city was served by six sewage treatment plants, Moses called for the construction of an additional seven plants at a total cost of \$57,000,000 (Moses, “New York Reclaims Its Waterfront”, *New York Times*, Mar.7, 1948).

By the late 1960s, 50,000 people were visiting the refuge each year (Barlow 1971, 107). Herbert Johnson, manager of the refuge in the 1960’s is credited with saying that, “I’ll bet I’ve got the only bird sanctuary in the world with a subway running through it” (108).

In 1969 Secretary of the Interior Walter Hinckel proposed the creation of the Gateway National Recreation Area to encompass the entire harbor area from Sandy Hook to the Rockaway Peninsula. An early study for the recreation area recommended inclusion of the Jamaica Bay wildlife refuge (Barlow 1971, 109). Even though the bay was degraded

it was still good wildlife habitat since the islands, sand islands, sandy shore edges and brackish ponds were still available as of 1970 (Taormina, "Environment: Journal on Jamaica Bay", *The Conservationist*, 1970, vol.24, no. 5, 16-20). Jamaica Bay and the city's lands on the Rockaway Peninsula were turned over to the National Park Service in 1972. At the time the city was facing its fiscal crisis and money for all but the most essential city services was not available. The political issues surrounding the creation of urban national parks in New York, San Francisco, and Boston, were complex but can be summarized briefly, the country's major cities were financially strapped, and the urban riots of the late 1960s convinced lawmakers that urban populations needed recreation areas.

As it existed in the mid-1970s the park's Breezy Point Unit on the Rockaway Peninsula exemplified the conflicts and difficulties involved with establishing a national park in the midst of a populated area. The unit consisted of 1,600 acres and four and half miles of ocean beaches (General Management Plan, Sept 1976, 120). The idea of making all of Breezy Point into public parkland was an idea going back to the 1920s (122). The transfer of public lands to the National Park Service proceeded smoothly enough. The unit's popular public beach was conveyed from New York City as it was originally the city's Jacob Riis Park. Other parcels of land were also transferred from the city while the Federal government conveyed Fort Tilden, the surrounding lands, and the fort's facilities (120). Fort Tilden was first constructed in 1917 on land filled by the Army Corps of

Engineers. It was decommissioned in 1967 and transferred to the Park Service in 1972 (Stalter, Byer and Tanacredi 1996, 41-51).

Land acquisition from private sources was somewhat more complicated. A beach abutting the private Breezy Point Cooperative was scheduled to be purchased, but to be successful would require the Department of the Interior to waive all future rights to acquire other lands belonging to the Cooperative. This would allow the community to remain one of single family homes, as indeed it remains to the present day (General Management Plan 1976, 122). The City acquired a complex of half-finished buildings, a remnant of the struggle to preserve the land as a public park, and conveyed them to the Park Service. Two private beach clubs were located on each side of the Breezy Point Cooperative. They were made part of Gateway NRA and allowed to remain operating on a year to year basis. As part of this arrangement they were required to advertise for new members and admit anyone who wanted to join (General Management Plan 1976, 124).

The troubles that the Park Service went through to assemble the Breezy Point Unit paid off handsomely. There were 3.4 million visitors in 1975 with peak usage at 90,000 persons a day or 36,000 people on the beach at any one time (General Management Plan 1976, 124). The Park Service expected that once all of the planned land acquisitions were made, the beaches would be able to accommodate easily twice this number of

visitors, that is, if the people could get to the beach. In 1975 about 15% of the visitors arrived at Breezy Point via public transportation. This was the highest percentage of any unit in Gateway but it was still insufficient. Automobile traffic was already reaching saturation of peak days and the Park Service did not even own the parking lots. The parking lots at Jacob Riis Park were still owned by the Triborough Bridge and Tunnel Authority and would be conveyed to the Park Service once the bonds sold to build it were repaid (General Management Plan 1976, 120).

Even larger numbers of visitors were expected after the land acquisitions were completed. The Park Service expected 8,000,000 annual visitors and 200,000 persons on a peak day. During a peak day, 80,000 persons would be on the beach at any one time (General Management Plan 1976, 126). The Park Service calculated that accommodating this number of persons would require 1,875 bus transits over the Marine Parkway Bridge and another 750 along the Rockaway Peninsula. Some of the buses would be shuttles operated from the railroad terminals while others would be created by extending existing bus lines. Wherever the busses ran from, the Park Service recommended that local transportation planners make designing such a system a high priority (126).

It was one thing to proclaim that Jamaica Bay proper was now a National Wildlife Refuge, it was another to make the shorelines into suitable bird habitat. Fortunately

restoring the bay was a pet project of people like Bernie Blum. For twenty years Blum had been advocating the creation of a park on a point of city land known as Conchs Hole Point. Blum also was a one-man environmental monitoring force, mapping where stolen cars and waste oil were being dumped. Someone had even somebody had dropped a truckload of lawbooks. Otherwise-tidy neighbors were using the point for dumping their rubbish. It was ironic that the neighbors who took pride in the neat appearance of their homes felt no such pride in the nearby land. The city already owned the small peninsula where Blum and his allies wanted to create the park, all that was needed was the political will (Kastner, J. 1990, "The 'Miracle' on Jamaica Bay didn't happen overnight." *Smithsonian*, Jul. 1990).

Blum was pushing for the park from outside the city government and another two individuals were leading the fight from the inside. Marc Matsil was the director of the Division of Natural Resources in the New York City Parks Department. Al Appleton was a former state attorney and volunteer for the New York City Audubon Society. After being appointed the city's environmental commissioner, in 1984 he began working to create the park that Blum had envisioned. The Audubon Society played a critical role in the negotiations. In 1988 the park was created and at the suggestion of Bernie Blum, the land at Conchs Hole Point was renamed Dubos Point Park. Rene Dubos, who died in 1982, was a distinguished microbiologist who made important discoveries in the field of antibiotics but he was also a writer and thinker about environmental issues. He would

eventually win a Pulitzer Prize for his ecological writing (Kastner, J. 1990, “The ‘Miracle’ on Jamaica Bay didn't happen overnight.” *Smithsonian*, Jul. 1990).

At the time the park was created, the land was covered with goldenrod and poison ivy. There were junked cars, old concrete, broken glass, tires, rotted wood and moldy wallboard. But there were also snowy egrets, great blue heron, periwinkles, and blue crabs. Many cleanup efforts by volunteers slowly returned the point to something resembling a clean ecosystem (Kastner, J. 1990, “The ‘Miracle’ on Jamaica Bay didn't happen overnight.” *Smithsonian*, Jul. 1990).

Floyd Bennett Field became one of the most important active recreation areas in the park. The hangers and the original Ryan Terminal building were preserved at the same time that the Park Service seeded an area with grass that was larger than Central Park (Strausbaugh, “Where New Yorkers First Took Flight”, *New York Times*, July 10, 2009).

The range of activities at the former airfield is as diverse as the city it serves. The Field is a mecca for radio-controlled model airplane enthusiasts. One recent model of the Concorde was the size of a small car and powered by an actual jet turbine. Gardeners from all five boroughs tend 600 community garden plots growing herbs, vegetables, and

flowers. The former runways are used for bicycle racing and land sailing. There is also an archery range and a cricket pitch (Strausbaugh, “Where New Yorkers First Took Flight”, *New York Times*, July 10, 2009).

A camping area surrounded by trees and shrubs is open to the public by permit. The nearby Ecology Village is home to a two-day, summer camping program for city schoolchildren between the ages 8 and 14. Many of the children in the program have never slept outdoors (Strausbaugh, “Where New Yorkers First Took Flight”, *New York Times*, July 10, 2009).

Across Flatbush Avenue a park service concessionaire operates the Gateway Marina with an adjacent golf driving range and pro shop (Strausbaugh, “Where New Yorkers First Took Flight”, *New York Times*, July 10, 2009).

The former hangars also serve a number of uses. Housed in four hangars leased from the Park Service and opened by a business consortium in 2006, the Aviator Sports and Recreation complex includes basketball, volleyball, and dodge ball courts, two N.H.L.-size skating rinks, a rock climbing wall, a fitness center, a food court and bar (Strausbaugh, “Where New Yorkers First Took Flight”, *New York Times*, July 10, 2009).

Hanger B was built by the Navy 1941 to house seaplanes. The original concrete ramps used to roll seaplanes into Jamaica Bay are now used by kayakers and canoeists to launch their craft (Strausbaugh, “Where New Yorkers First Took Flight”, *New York Times*, July 10, 2009).

Hanger B is also home to the volunteer Historic Aircraft Restoration Project, a group of aviation enthusiasts who both rebuild vintage aircraft and create full-size replicas. In 2009 projects included several aircraft that flew out of Floyd Bennett field including a PBY Catalina flying boat. During the Second World War, these aircraft flew out of Floyd Bennett Field to guard the Atlantic convoys entering and leaving the Port of New York. Also in the hanger were an A-4 Skyhawk fighter jet, a Lockheed PV2 Neptune, and a Fairchild training plane. Volunteers are also building replicas of a Stearman biplane, widely used for training in the 1930s and 1940s as well as a replica of the Winnie Mae. Hanger B is only open to the public three days a week, Tuesday, Thursday and Saturday (Strausbaugh, “Where New Yorkers First Took Flight”, *New York Times*, July 10, 2009).

Long-necked cormorants, gulls, and harbor seals are seen off Floyd Bennett Field where fishermen catch striped bass and bluefish. Even movie crews are found at Floyd Bennett

Field, one crew recently created a North Korean border checkpoint on one of the runways (Strausbaugh, “Where New Yorkers First Took Flight”, *New York Times*, July 10, 2009).

The current National Recreation Area encompasses the shoreline east and south of the Belt Parkway between Plum Beach and Spring Creek Park, the islands and marshes in the bay and the waters of the bay. The National Recreation Area does not include the communities on Broad Channel Island, most of the mainland in Queens County, Brooklyn, and developed portions of the Rockaway peninsula.

While participating at DredgeFest 2012, Gateway National Park's Chief of Resources, David Avrin stated that one of the most serious problems with operating a National Park in an urban setting is that the Park Service is by nature a very conservative organization. Its rules and operating policies were created for managing remote and undeveloped areas. Despite decades of experience with urban parks, many of its rules are the same for both urban areas and wilderness zones. Decision making in an urban park is complicated by the fact that allowing natural processes to function independently, the default mode of operation in a wilderness, is not always a viable option in areas that are heavily impacted by man.

No where is this problem more visible than in the crisis of the disappearing marshlands in Jamaica Bay. The problem is especially acute on the islands in the center of the bay. Comparisons with historical aerial photographs have shown several islands marshes reduced by 12% since 1959. Low marsh vegetation loss on the islands in Jamaica bay has averaged 38% since 1974 and vegetation the loss on the smaller islands has been as high as 78%. A combination of factors is believed responsible including a reduced sediment input and localized sea level rise accompanied by land subsidence. Water ponding inside the marshes, marsh edge slumping, and widening tidal channels have also been observed in many places in Jamaica Bay. Park managers are particularly concerned that accretion rates will not keep pace with expected sea level rise in the coming decades. (Hartig, "Anthropogenic and climate-change impacts on salt marshes of Jamaica Bay, New York City," *Wetlands*, 2002)

The scale of the necessary restoration processes is illustrated by the work on Elders Island. Originally 132 acres the marshes in the middle of the island eroded down until it was separated into two islands. At least 70 acres of marsh needed to be restored to replace the resulting mudflats with land suited to "low marsh growth." To complete this work, an estimated 270,000 cubic yards of sand would have to be dredged from the various channels and harbor and placed back on the island. The restored land would be replanted with *Spartina alterniflora* (saltmarsh cordgrass), *Spartina patens* (salt hay), and *Distichis spicata* (spike grass) ("Army Corps Stemming Tide of Marsh Loss in Jamaica

Bay”, *Business Wire*, July 6, 2006).

Some of the decisions made about restoring Jamaica Bay's marsh islands provide an example how competing needs complicates working in urban National Parks. As of the fall of 2012 five of the marsh islands in Jamaica Bay were being restored with sands pumped from the navigation dredging operations in the Ambrose Channel. Forty-four acres will be restored on Yellow Bar Hassock alone. Special attention was paid to decisions about the islands' shape, their height above sea level, and goals of habitat restoration. The shorelines of the restored islands will be sculpted to their historic footprints as of 1974. (Figure 39) Projections of localized sea level rise were used to determine the ratio of high marsh to low marsh (Baron, “Dredge and the Anthropocene”, *DredgeFest*, September 2012). This balance is critical in determining biodiversity. Jamaica Bay's position on the Atlantic Flyway makes providing bird habitat a high restoration priority, but this conflicts with its role as the home of John F. Kennedy International Airport. The solution was to make the islands farthest from the airport the best habitats. This has resulted in fewer birds nesting near the airport and a reduced risk of bird strikes. (DredgeFest 2012)

The USACE dredgers move tens of thousands of cubic yards of sediments and its earthmoving equipment shifts tens of cubic yards with every minute. Public buy-in and

support is critical to the success of restoration projects but there would seem to be little opportunity for members of the public to participate in such a heavily mechanized process. Furthermore, National Parks depend on citizen involvement at many levels. The USACE solved this problem by enlisting volunteers to plant marsh grasses once the heavy equipment had finished sculpting the landforms. In the autumn volunteers collected grass seeds from existing stands of marsh grass and in the spring the same volunteers will plant the seeds. There was a precedent for this activity, a similar project took place in Dubos Point Park in the late 1980s when local science teacher, Lou Siegel, and his students collected the seeds of *Spartina alterniflora* for restoration projects (Kastner, J. 1990, "The 'Miracle' on Jamaica Bay didn't happen overnight." *Smithsonian*, Jul. 1990).

It would be interesting to know if any of the volunteers had a distant ancestor who grazed his livestock on the same species of grasses on the same islands before Jamaica Bay was engulfed by the city.

Conclusions

The story of Jamaica Bay makes a complete circle. When the first European settlers arrived the bay was under the control of the central government in the form of the English monarch and his representative, the Royal Governor of New York. At the end of the story, Jamaica Bay is once again under the control of the central government in the form of the National Park Service.

The story of Jamaica Bay is essentially one of increasing centralization of control from local, to city, and finally to national government. The essential question is whether this trend reflects something intrinsic to the estuary or unique to its local conditions or if it is merely the reflection of an increasingly complex society. To answer that question it may be useful to remember that each step upwards seems to have been precipitated by a crisis of the existing control system.

The system of local control over resources lead to a crisis in the fisheries and was unable to protect the shellfishery from sewage pollution. The state of New York was forced to step in with the successful net fishing ban and the ultimately ineffective laws governing sewage discharge. The local communities were also unable to remove the odiferous industries from Barren Island. It was the city that imposed its will on Jamaica Bay, first to maintain the waste processing plants as a public necessity and secondly, with plans to reshape the bay into a new seaport.

The new seaport plan ultimately failed and even as it was proceeding, the city still accepted federal assistance with dredging the bay. The creation of new land around the bay's shores with street sweepings, ashes, and ultimately garbage was a massive undertaking and only possible with the enormous quantities of waste generated by a modern city. It was in the era of city governance that one extraordinary individual, Robert Moses, held all aspects of the bay and its future under his control.

But even Robert Moses and the City of New York could not build the housing it wanted around the bay or construct Idlewild Airport. The bi-state Port of New York Authority had to step in and complete the latter project. The rest of the bay seems to have become a park because the city lacked the money to do anything else.

New Yorkers love to hate Robert Moses but they often forget the other side of the man, the "good Moses," as some historians have called him. Robert Moses insisted on the highest standards of design and the finest quality of construction for all of his projects. If Jamaica Bay was going to be a park, then it was going to be the best park that the city could build. The city park, like the seaport, also failed in the face of the city's fiscal crisis of the 1970s. During the same time period, the city's need for ever more landfill space almost destroyed the bay.

If the National Park Service experiences a severe crisis of management, there is no higher level of government to step in and assume control. Fortunately the country has learned a great deal about estuaries, urban parks, and environmental management. The Park Service is facing a crisis in the form of the vanishing islands of Jamaica Bay but they seem to have at least worked out a solution for the moment. Jamaica Bay also faced a crisis from Hurricane Sandy in the fall of 2012 but the hurricane, its aftermath, and the lessons learned, could easily create several additional dissertations.

Given the circumstances around each of these transfers of control we are forced to conclude that each upward shift was created by the unique geography of the bay. As the city grew out to and then around the bay, it was almost inevitable that existing systems of management would become obsolete. Perhaps an accelerated and often dramatic obsolescence was inevitable given the city's accelerated and dramatic growth.

Each time that the city reached out and touched Jamaica Bay, the demands on the bay shifted. This created the second characteristic of this story, almost constant conflict between competing stakeholders. Jamaica Bay offers but one lesson about these conflicts, times are always changing and both parties may lose when changes come. The best example of this came from the conflict between the net fishermen and the

recreational anglers. Both parties ultimately lost because they did not form an effective coalition to fight their common enemy, the people who filled in the marshes. The same thing is true for the people who fought the waste management industry. The industry left Barren Island primarily in response to technological changes. The problem of waste disposal was moved but did not go away. The same conflict was fought on Staten Island. Even more conflicts erupted over the practice of dumping garbage in the ocean.

Ultimately Jamaica Bay teaches us that estuaries are impermanent places. The plans that humans make for them often prove to be equally impermanent. It may be that the greatest lesson from this story is that even urban estuaries are, after all is said and done, for the birds. (Figure 40)

Finis

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