Keeping Brooklyn Healthy: The Evolution of Our Sewers, Waterways, and Sanitation
Gowanus Canal today.
Photograph by Shirley Brown Alleyne.
Keeping Brooklyn Healthy: The Evolution of Our Sewers, Waterways, and Sanitation
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<td>Jayden Williams</td>
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Acknowledgments

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City Council Member Stephen Levin (PS 307)

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Amy Motzny, Watershed Manager
Coffer dam Gowanus Canal: Outlet for two sewers.
John Farnsworth Hammond Jr., Coffer dam Gowanus Canal: Outlet for two sewers, 180" and 96", 1913-1915, photograph, V1986.242.1.1; Brooklyn Historical Society.
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Dear Reader,

Brooklyn Historical Society’s Young Scholars afterschool program reinforces three valuable lessons: the importance of research, facts and fact-checking, the relevance of historical information to today’s world, and the unstoppable passion of youth as they discover their voice and power.

In late fall and early winter 2019, the over 80 Young Scholars who entered the sixth year of the Young Scholars program had no idea that their research on sewers and sanitation would become so relevant to their understanding of the spread of the Covid19 Virus. They studied archival documents from the earliest recorded history of Brooklyn in 1624 that revealed the impact of germs and viruses and the spread of cholera, yellow fever, and smallpox, to records of the 1918 Spanish Flu. As they dug deeper into information about local sanitation and environmental issues in the neighborhoods surrounding their schools, and visited the Newtown Creek Wastewater Treatment Plant, they continued to deepen their knowledge about the importance of clean water and different strategies for minimizing the spread of germs.

This book represents the combined efforts of second- through fifth-grade students, museum educators and teachers from four schools. Each cohort was at a different stage in their research and writing when NYC, the schools and BHS closed in response to the Covid19 pandemic. While the students never met, we made the decision to combine their efforts—to recognize the overlapping stories they were poised to tell about the history of sewers and sanitation in Brooklyn, and to include the sometimes unedited versions of the unique research they uncovered about their neighborhood. For clarity, you will see notes from teachers and educators about ideas discussed, but that students did not have time to process into their own words.

Congratulations to all the Young Scholars of PS 158, 233, 282 and 307. I met each of them, listened to their conversations and debates about ideas and language, and enjoyed their questions. Through their journals I saw their critical thinking skills grow, and watched them expand their knowledge about sewers, garbage, and water. As they explored their voices as writers, it was also clear that they were finding power in their role as citizens who have something to contribute.

I thank you, the parents, and guardians, for allowing them to participate in the program this year. To the educators, Theresa DeCicco, Ava Prince and James Preimesberger, thank you for all your hard work. I appreciate all of you. Thank you.

Sincerely,

Shirley Brown Alleyne
Manager of Teaching & Learning
Brooklyn Historical Society
“... And did you know that sewers actually help water get clean for us to reuse! If it weren’t for sewers, we would have a lot of polluted waters!”

Simon, 2020 Young Scholar of PS 282
Chapter 1  Life Before Sewers

BEFORE TOILETS

Imagine using toilets that don’t flush! Before sewers came to Brooklyn in the late 1800s, there were different ways Brooklynites used the bathroom. One of the ways they used the bathroom was an outhouse or privy. An outhouse is a bathroom located outside (kind of like a port-a-potty). Under the seat is a little pit that keeps all of the urine and poop or wastewater. An outhouse is non-flushable, meaning there is no running water. Just poop and pee getting dumped over and over again on top of itself. Can you imagine how it smells in an outhouse? Like a port-a-potty but 10x worse! Pee-yew! It stinks very bad. You’d also have to call a Night Soil Scavenger and based on the name, night soil, you can probably figure out what that is.

Backyard outhouses.
Chamber pots were another way to use the bathroom. A chamber pot is a round shaped object with a top and handle like a big bowl that can be used like a toilet. They would usually have designs on the lid, created mostly by paint. The reason people had chamber pots was because if they couldn’t go to the outhouse (like if it were too dark outside), they could just take their chamber pot out from under their bed and do their business. Then, in the morning, they would take the chamber pot outside and dump their poop and urine into the privy, and sometimes onto the ground (or out their windows!) Sometimes, it even fell on people who were walking by.

**DID YOU KNOW**

Night Soil—Could you imagine how hard it was to clean all this stuff? The people of Brooklyn used to have to hire people to clean out the places where they went to the bathroom! They even had their own ads about collecting night soil to sell their services. Most of the time, these workers were Irish or Black people.
This form of waste management was not sanitary. Wastewater from chamber pots and outhouses contaminated the ground and water wells. When people drank the water, they often got sick. Sickness, smells, and death were very common. Because the excrements were in the ground, it would leak into wells causing sicknesses to be spread across town, causing many civilians to die. For example, cholera spread quickly in Brooklyn in 1832 because of water contamination. In the late 1800’s, scientists became aware of the link between untreated wastewater and widespread human diseases.

**THE FIRST SEWER**

The first “sewer” in New York was actually built in the 1660’s, back in the glory days when we were not ruled by the British, we didn’t have major battles all the time, and when we were the people of New Amsterdam. It was just a ditch down the middle of the road, covered with wood planks on Broad Street on Manhattan island. But people mostly did their business in an outhouse or into a chamber pot and dumped it in the gutter, or worse, into a stream or pond that still dotted Manhattan, just like people had been doing around the world for centuries. This needed to be put to an end, this was the start of underground sewers.

Underground sewers were constructed throughout Brooklyn when communities petitioned the government. After sewers were built, less people got sick from contaminated water because their wastewater was removed, dumped in the river and carried out to sea. That meant it could not contaminate their water anymore and people didn't get sick.
Map of the Borough of Brooklyn City of New York, showing all sewers completed up to June 1st 1902. Also those completed during the year 1902. Also those not completed, but authorized and in the course of construction during the year 1902. Flat Maps B A-[1902].F; Brooklyn Historical Society.
In order to build Brooklyn’s sewers underground, many workers had to dig enormous holes in the ground for pipe placement. They used tools like beach needles to dig the ground around pipes. Only men worked on these projects. They wore special clothes and boots so that they didn’t get wet standing in pools of water. They put up structures to hold the ground in place to prevent a tunnel collapse.

The people that made the tunnels in NYC are called the Sandhogs. They are known as New York’s legendary miners. They built every tunnel in New York City, including the sewer tunnels that rid the city of its waste, the water tunnels that bring clean water all the way from upstate, the subway tunnels for trains, and tunnels for cars.

Digging and tunneling is a very dirty and dangerous job. Many sandhogs were harmed or killed at work. Sandhog workers risked their lives to make this city work. Because their job was very dangerous, the sandhogs formed a union in 1903 so that they would be safer. A union is a group of workers who come together to defend their working rights, conditions, and pay.

“If it wasn’t for the sandhogs and their tunnels, we wouldn’t have trains to ride underground, water to drink, shower, or brush our teeth.”

Young Scholars of PS 233
New York opened its first wastewater treatment plant (and the first in the country) in 1887 on Coney Island to help clean up the beaches. In 1903, Jamaica Wastewater Treatment Plant went into operation. In 2009, the Newtown Creek Wastewater Treatment Plant in Greenpoint served 1.8 million people. Today’s sewers carry all of the city’s wastewater to treatment plants, where they can treat up to 310 million gallons a day. All of the city’s treatment plants treat enough water to fill two Empire State Buildings every day!
Today, sewers collect all kinds of wastewater. When you wash your dirty dishes, the water goes down into the sewer. When you go in the bathroom and take a poop and flush the toilet, it goes into the sewer. When you shower, all of the dirt and bacteria from your body goes down the drain into the sewer. When it is raining and water runs into storm grates on the side of the street, that rain goes into the same sewer.

**SO, WHAT DOES A WASTEWATER TREATMENT FACILITY DO?**

At the wastewater treatment facility (specifically the Newtown Wastewater Treatment Center), they clean the water, and they do it in steps. First, they take out all the trash by setting up a plastic net, which catches all the solids (besides poop). Then, the remains go into tanks. It sits there, while heavy stuff, like your business, goes to the bottom, and light stuff, like oil, floats to the top.

The top is skimmed by machines, and your business is collected and turned into a fertilizer for plants. Then, the remaining sludge goes into aeration tanks. It sits there while they pump air (for the bacteria) and sodium hypo-chloride, a chemical, to clean it. They let it sit there for a day, then they do it again. Then, they put the black sludge into the digester eggs, huge tanks that look like eggs, and have the sludge sit there for seven weeks, while heating the eggs at 90 degrees Fahrenheit. When the sludge is heated up, water bears, bacteria that decompose the sludge and turn it into gas and biosolids.

Then they load the sludge into cylinders and wait for the sludge boats to take the sludge to a different plant. At that plant, it will sit in the sun, where the remains can be used as a fertilizer for plants. The methane gas released by the eggs can make the air hot and can be used as an air warmer.
Brooklyn has a combined sewer system, while many other newer systems have separate sewer systems. In a separate sewer system, there are dedicated pipes for water from storm drains and for wastewater. In Brooklyn’s system, one set of pipes carry it all. There is a dam blocking the sewage from going into the waterways untreated. But sometimes, there is too much water and the sewage goes over the dam and into the waterways. This is known as combined sewage overflow (CSO). For years, heavy rains have flooded streets and caused sewage lines to overflow, contributing to the waterways’ contamination, like the Gowanus Canal’s contamination. When it rains, the water that is supposed to go to the treatment plant goes to the local waterways and contaminates the oceans!

The Department of Environmental protection is growing plants, in rain gardens, to soak up rainwater as combined sewage overflows are caused by storm water going into sewers. This helps because New York City and Brooklyn have had problems with overflowing sewage for a long time! Only a small amount of rain (1/10 of an inch) can make it happen, and hurt animals and water.
<table>
<thead>
<tr>
<th><strong>SEWER FACTS</strong></th>
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<tr>
<td>1 <em>New York City’s earliest sewer was an open trench that ran down Broad Street.</em></td>
<td>5 <em>The earliest sewer pipes were made of wood.</em></td>
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</table>
| 2 *Even though some people think it is true, alligators DO NOT live in sewers.* | 6 *Pouring oil and grease in pipes is a big problem and can clog pipes, possibly causing sewage to leak into people’s homes!*
| 3 *Some animals that DO live in the sewers are mice, water snakes, and albino cockroaches.* | 7 *New York City’s sewers are over 7,500 miles long.* |
| 4 *ONE person uses an average of 43,800 gallons of water a year.* |  |
The New York City water system is a public good we often take for granted. An intricate system of aqueducts, underground tunnels, and upstate reservoirs, this marvel of modern engineering allows the city to provide nine million residents with one billion gallons of fresh water per day.

Driven by moments of trial and error, the story of water in the New York City area is a complicated one. The city of Brooklyn, once an entity independent of New York City, experienced periods of population growth and increasingly polluted water. Brooklynites soon demanded a clean and steady water source to supply their ever-growing city. Brooklyn looked to its hinterland in the east and shaped the surrounding environment in the process. Going as far as Massapequa, Long Island, Brooklyn’s water supply left behind a trail of brick water conduits and reservoirs, all of which helped to shape Southern Long Island, Queens, and Brooklyn’s beloved parks and congested parkways. In approaching this book, I wanted the students to explore the environment around them and realize how the history and creation of New York City and Brooklyn’s water system shaped the urban landscape which we call home.

Theresa DeCicco, Young Scholars of PS 158 Program Educator
Chapter 5  Pollution & Oysters: Nature’s Cleaning Machines!

Jamaica Bay up until 1920 was full of oysters. But, by then, too much fishing and pollution (including from CSOs) wiped them out. Oysters can get sick from too much pollution in the water! Then if we eat an oyster that was sick, we can get sick, too!

Oysters are nature’s helpers. They clean dirty water. An adult oyster can filter 1.3 gallons or 5 liters of water an hour! Oysters cannot move or hunt for food, but almost everything that is floating in the water can go into their mouths. They do not eat everything that goes into their mouths. Their bodies are designed to sort these particles. They spit out what they do not use onto the mud, dirt, or sand on the bottom of the ocean. The particles they spit out are called pseudo feces. When they filter water this way, it becomes clearer as particles are pushed into the ocean floor.

Oysters can also stop storm water surges. A water surge is a swelling of water like a wave. Oyster beds, which are what you call groups of oysters growing together, act like a sort of wall underwater, protecting things behind it from being harmed or destroyed by rushing water. One of the interesting things we learned about was the Billion Oyster Project, which is trying to help the oysters multiply enough so there will be a billion oysters by 2030. That is a lot of oysters!
On February 27, 2020, the Young Scholars of PS 282 took a walking tour with the Gowanus Canal Conservancy. We learned more about the Gowanus and sewers. One of the groups looked at a map of the factories around the Gowanus where there was a lot of oil and coal handling factories to find out how it got so polluted.

Many factories polluted the Gowanus Canal. Factories dumped waste into the Gowanus Canal including wastewater and coal tar. The Gowanus Canal is filled with toxic sewage and is one of the most polluted bodies of water in the country.

The toxic sewage causes the water to turn black and wildlife, including fish, die. A lot of the wildlife gets trapped in plastic or sick from the chemicals. Also, the water smells really bad and it is not fun to live near anything smelly. Black sludge known as black mayonnaise started forming at the bottom of the canal. Throughout the history of the Gowanus Canal, these problems have been exacerbated by the effects of stormwater.

**EDUCATORS NOTE** The Gowanus Canal has been used for commercial purposes since the area was settled by the Dutch in the 17th century, who fished for oysters to ship back to Europe. Industrialization along the Gowanus Canal exponentially increased in the 19th century as Brooklyn became the fastest growing city in America. By the mid-20th century there were many factories lining the canal including coal gas manufacturing plants, oil refineries, machine shops, chemical plants, soap and sulfur production, and tanneries. By the turn of the century, the canal had become polluted by a combination of industrial pollutants and runoff from storm water.
The Young Scholars of PS 282 Interviewed Jordan Heiden, Education and Communications Coordinator for the Gowanus Canal Conservancy (GCC).

Young Scholars (YS): Why did you start working at The Gowanus Canal Conservancy?

Jordan Heiden (JH): I first started working at GCC as an AmeriCorps service member. I run our communications efforts and I also play a big role in our education efforts, so I lead educational programming outside at our field site, I teach teachers about important environmental issues at workshops and professional development events, and I get to develop helpful educational resources, like our curricula and field guides.

YS: How did the Gowanus Canal go from a salt marsh to what it is today?

JH: The Gowanus Canal was once a salt marsh that was home to an abundance of plant and animal species, along with the Lenape Native American people who inhabited the area and respectfully utilized its resources. During the period of industrialization in the 1800s, European settlers began building factories and converted the salt marsh to an industrial canal so boats could ship goods back and forth. Up until 1972 when the EPA Clean Water Act was passed, the Canal was treated as a dumping ground for various forms of pollution (coal tar being the biggest form). Things have finally started to turn around in past years. There are constant advancements being made, from green and grey infrastructure planning to the EPA Superfund clean-up. Right now though, the Gowanus Canal is still one of the most polluted waterbodies in the entire country.

YS: How long did it take people to take away industry from the Gowanus Canal?

JH: It took a long time! There’s technically still industry along the Canal, but not industry that pollutes the Gowanus Canal. There are lots of artists and small businesses that work in the area today, and with the impending Gowanus Rezoning, we will continue to see additional industry being developed. The old, bad industry that caused extensive pollution started to slow up in 1972, when the Clean Water Act was released. But it took time to transition from using the Canal as a dumping space to a space people respected and treated kindly.

YS: What are you doing to clean it up?

JH: GCC is working hard to develop and advocate for greenspace along the Canal to reduce the impacts of combined sewer overflow (CSO). We’re also continuing to develop our Lowlands Master Plan, which offers insights and ideas to ensure Gowanus is rezoned in a responsible, equitable, sustainable way. The Department of Environmental Protection (DEP) is working to increase green and grey infrastructure by building CSO storage tanks and additional curbside rain gardens. The Environmental Protection Agency (EPA) declared the Gowanus Canal a Superfund
site in 2010 (a decade ago!) and will begin the first phase of clean-up this coming August. Old coal tar pollution will be removed (dredged) and capped with various layers to promote habitat. The clean-up will likely take place for the next 10 or so years.

Raising Awareness: Christopher Swain and Efforts to Clean the Gowanus Canal!

A man jumps into the Gowanus Canal. The Canal is gross, but he does not care. He has to draw attention to the Canal's pollution. But he does not want some lame efforts. He needs real-deal efforts to clean the Canal. But how can we do that? What are we already doing?

Have you ever thought of swimming in the Gowanus Canal? Well, one person brought this thought to life and swam in one of the most polluted places in America, the Gowanus Canal. His name is Christopher Swain.

Chris is not just swimming in polluted waters for “fun.” He is doing it to raise awareness about polluted waters. It is not just the Gowanus he swims in. He has swum in multiple places, including Puerto Rico. Of course, Chris is very careful and wears lots of gear including gloves, face masks, flippers, and a full body suit. It takes a lot of bravery to swim in toxic water.

Young Scholar Quinn Reinhardt from PS 282 conducted this Interview with Christopher Swain.

Quinn Reinhardt (QR): Can you tell us more about your work? When did you know you wanted to do what you do?

Christopher Swain (CS): As a kid, I loved the water. I have great, sunlit, summer memories of swimming in the ocean with my sisters and my cousins. When I got older and learned about all of the serious water pollution, I felt sad. In my thirties, I realized I wanted to put my body on the line: to swim and advocate full-time for clean water.

QR: Were you scared when you swam in the Gowanus Canal?

CS: Yes. I was afraid of getting cut, of swallowing water and getting sick to my stomach, and of getting a skin rash or an eye infection.

QR: What protection did you wear and how deep did you go?

CS: I wore a puncture-resistant dry suit, SCUBA boots and gloves, swim goggles, a silicone cap, and ear plugs. I covered my exposed skin with a water barrier gel. I swam breaststroke on the surface and never put my head under the surface (just like my grandmothers used to do to protect their hairdos).
The Gowanus Canal Conservancy is a club that is helping clean the Gowanus Canal. One way they help is by planting “Green Spaces” by the Canal. These help absorb the rain that would eventually go into the sewers, and eventually, into the Gowanus Canal.

The Billion Oyster Project works with the Conservancy by putting oysters into the canal. This helps because oysters eat and drink polluted water, and it is good for them. Pollution helps the oysters grow.

The Environmental Protection Agency declared the Gowanus Canal a Superfund Site. This means that it needs special treatment to stay clean. They need to dredge out the “Black Mayonnaise” or sludge.
People in Brooklyn originally got water from the water table using wells and pumps. (The water table is water below the ground.) The water table was dropping because of the increasing urban population and the demand for water increased. Also, human and animal waste [sewage] was going into the water table. Sewage is a combination of nasty and dirty things such as poop, pee, animal insides, hair, and all that stuff.

**RIDGEWOOD RESERVOIR**

Brooklyn needed a place to get fresh water because of the demand for more water or the Water Question. In 1856, the City of Brooklyn started building reservoirs and in 1858, the Ridgewood Reservoir was built. The reservoir is on the border of the towns of Bushwick, Ridgewood and East New York.

The city decided to bring water from the eastern part of Long Island, to the western part where Brooklyn is located. So, after the Ridgewood Reservoir was finished, a brick conduit (channel) was built. It brought water from Massapequa, Long Island to a pumping station that was at the intersection of Atlantic Avenue and Logan Street in East New York, Brooklyn.
FROM RIDGEWOOD RESERVOIR TO HIGHLAND PARK

Brooklyn decided to stop using Long Island's water because it was too expensive. It cost a lot of money to use the pumps to pump the water. This saved them $500,000 a year! They decided to slowly stop using the Reservoir regularly. In the 1960s, Ridgewood Reservoir was used as a backup reservoir. They stopped using it in 1989. Over time, parts of the reservoir became other things.

Brooklyn had bought the land around the Ridgewood Reservoir in 1891 and made a park called Highland Park. Highland Park is on the Brooklyn and Queens border, and the Ridgewood Reservoir is part of it. Today, 151 species of birds live in Highland Park and people ride bicycles, exercise and have fun! And this is the story behind Highland Park.

After Brooklyn stopped using the Ridgewood Reservoir, parts of it were reused. The Long Island State Parks commission turned unwanted land into state parks. For example, Valley Stream Pond later became a beach and state park. This is the same story for the Ridge-wood Reservoir.

DID YOU KNOW

The Water Question was the city of Brooklyn asking, Where can we get more clean water for the people of Brooklyn? As more people came to live in the city of Brooklyn, there was a need for more clean water for people to drink, use for food, work, etc. Placed in charge of this massive project was chief engineer James K. Kirkwood. The plan called for the construction of six reservoirs, with the main structure of Ridge-wood Reservoir being located on a natural basin 172 feet above sea level on the Brooklyn-Queens border (known today as Highland Park). In 1858, Ridgewood Reservoir, along with a new sewage system opened. Brooklynites celebrated their new water system on April 28, 1859, with a five-mile long parade and grand firework display later that evening.
Did you know some of the streets are named after the water system in East New York?

North and South Conduit Avenues, which follow the Belt Parkway, in Southern Queens and Brooklyn follow the former brick conduits that directed water to Ridgewood Reservoir.

Aqueduct Racetrack in South Ozone Park is named after the former aqueduct which was connected to the Ridgewood water system.

Force Tube Avenue and Conduit Boulevard in Cypress Hills are named after the area’s connection to the water system.
Today, most of the city’s water flows through 3 major tunnels that bring water from upstate New York.

One person uses on average 120 gallons of water a day. That is 43,800 gallons of water per year! (365 x 120.)

Because of the water cycle, the water you drink today may have quenched a thirst 200 million years ago.
### Timeline for Ridgewood Reservoir & the Development of East New York

**The 1650s**

The Dutch West India Company “purchased” land from the Lenni-Lenape across the East River from New Amsterdam (Manhattan) and gave land grants to develop six towns: Breukelen (Brooklyn), Flatbush, New Utrecht, Flatlands, Gravesend, and Bushwick.

**1796 & 1798**

Yellow Fever outbreak in New York.

**1832**

Cholera outbreak.

**1834**

The town of Brooklyn becomes the city of Brooklyn. The city of Brooklyn originally was just the current-day neighborhood of Brooklyn Heights.

New York passed a law to ensure that the people of New York had a way to get a continuous supply of freshwater.

**1835**

John R. Pitkin created and developed the town of East New York, originally part of New Lots. Pitkin bought land to the north of New Lots Avenue and renamed the area East New York.

**1842**

New York City (not Brooklyn) got its own water system, the Croton Aqueduct.

**1852**

New Lots became its own township and the Long Island Water Company was founded.

**1856**

The City of Brooklyn bought land for the Ridgewood Reservoir, opposite the Evergreens Cemetery. The reservoir was built on a natural basin about 172 feet above sea level. Remnants of the reservoir can be seen today in Highland Park.

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**NOTE**

This timeline includes work from the young scholars of PS 158, and includes information shared by their program educator and the editor.
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<td>1858</td>
<td>Ridgewood Reservoir was completed. The reservoir began filling with water in November of 1858. By December, water was flowing throughout Brooklyn’s water mains. On April 28, 1859, the city of Brooklyn held a massive celebration in honor of its newly erected reservoir.</td>
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<td>1886</td>
<td>The town of East New York was annexed by the city of Brooklyn.</td>
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<td>1891</td>
<td>The city of Brooklyn purchased the property around the Ridgewood Reservoir and named it Highland Park.</td>
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<td>1898</td>
<td>Brooklyn, Queens, Staten Island, the Bronx, and Manhattan join together to become the city of New York. Because of this, Brooklyn can now access the Croton water system.</td>
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<tr>
<td>1917</td>
<td>The Ridgewood Reservoir was connected to the Catskill watershed and no longer relies on eastern Long Island for its water supply.</td>
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<tr>
<td>1959</td>
<td>The Ridgewood Reservoir was designated as a backup water supply.</td>
</tr>
<tr>
<td>1960</td>
<td>Because of a drought, the Ridgewood Reservoir was used to supply freshwater to Brooklyn.</td>
</tr>
<tr>
<td>1989</td>
<td>Ridgewood Reservoir stops being used as a backup water supply.</td>
</tr>
</tbody>
</table>
“Sanitation is all the things we do to keep the public healthy, especially our systems for cleaning the water supply and for disposing of sewage. In the past, Brooklyn did not have sewers or trash pickup, and things were hard. Nowadays we have all sorts of sanitation and that is why it is so clean and why we are much healthier.”

Young Scholars of PS 233
BEFORE THE SANITATION DEPARTMENT

Before sewers and trash pickups, people in Brooklyn struggled because their garbage and waste had nowhere to go. The streets got messy. When the people in Brooklyn did not have sewers or garbage disposal, they used holes, outhouses, and pigs. People used to pee in a cup and put the pee in a hole in their backyard. Pigs ate garbage that was thrown onto the streets. But nowadays, people in their neighborhood have all types of sanitation, such as sewers and garbage pickups. That is why today it is so clean. There is a big difference between now and back then.

In 1960, City officials did not clean the trash in the Brooklyn neighborhood known as Bedford-Stuyvesant or Bed-Stuy five days a week. This was not the same amount of days as white neighborhoods and the streets were left much filthier. CORE (the Congress of Racial Equality, an activist group) believed it was because of racism and discrimination. Trash piled up. CORE helped the people of Bed-Stuy to put all of their trash in a garbage truck and brought it to Borough Hall. Several demonstrators got arrested for the protest. Afterwards, the city government gave them what they wanted.
In the early 1960s, residents of the Brooklyn neighborhood known as Bedford-Stuyvesant, or Bed Stuy, recognized that their streets were left much filthier than those of other, especially white, neighborhoods. Trash was only picked up by the Department of Sanitation three days a week, and even then, trash was often left on sidewalks. Brooklyn’s branch of CORE, the Congress of Racial Equality, petitioned the local government to improve services, but was repetitively rebuffed with claims of lack of funding. So, in 1962, Brooklyn CORE devised a protest they called Operation Clean Sweep. The demonstration was ultimately successful, in that Bed-Stuy received five-day-a-week trash pickup almost immediately afterwards.

Aquifer  Layers of loose rock and material below the ground that are filled with water.

aqueduct  A channel for transporting water, typically in the form of a bridge across a valley, river, or other gap.

Bed-Stuy  A neighborhood in central Brooklyn. Its full name is Bedford Stuyvesant.

black mayonnaise  Colloquial name for the decades of coal tar and other toxins which coat the bottom of the Gowanus Canal.

Borough Hall  A building in Brooklyn that used to be City Hall before Brooklyn was a borough of New York City.

chamber pot  A container with a handle, usually used at night as a toilet. They were often stored under beds for ease of use.

cholera  Any of several diseases usually marked by severe vomiting and diarrhea.

Combined Sewer Overflow (CSO)  The result of storm sewers flooding the combined sewer system during rainfall, discharging sewage into nearby rivers or lakes in order to not overwhelm the capacity of the sewer system.

conduit  A channel for conveying water or other fluid.

contamination  The act or state of making or being made impure by polluting.

CORE  Congress of Racial Equality, an activist group dedicated to fighting against racial discrimination.

demonstrator  A person who joins with other people to protest something.

discrimination  The act of treating certain groups differently based on things such as race, age, or gender.

outhouse  A small building without plumbing used as a toilet.

oyster bed  A part of the sea bottom where oysters grow.

pollution  To make impure or dirty, as with harmful gasses or other wastes.

rain garden  A green space with absorbent organic materials meant to prevent sewage and water runoff from entering bodies of water.

reservoir  A large natural or artificial lake used as a source of water supply.

sanitary  Of or relating to health; free from infection.

sewer  An underground pipe that carries away liquid and solid waste.
**storm Drain**  A drain that takes overflow stormwater.

**wastewater**  Water that has been used.

**water bear**  A micro-animal also known as a tardigrade that lives in water. They help decompose waste.

**water conduit**  A natural or artificial channel through which water is transported or moved. Like a pipe or tunnel.

**water question**  A term used to describe the City of Brooklyn's increasing demand for a steady water supply.

**water surge**  A swelling, rolling, or sweeping forward of water like a wave.

**water table**  The top surface layer of water in an aquifer.

**water treatment plant**  A plant that treats water to improve the quality for a specific re-use.

**watershed**  An area or ridge of land that separates waters flowing to different rivers, basins, or seas.

**well**  A hole made in the earth to reach natural deposits of water.
Bibliography


The Brooklyn Water works and sewers: A descriptive memoir, Prepared and printed by order of the Board of Water Commissioners, New York: D. Van Nostrand, 1867, 71.


Malin, Gwynneth C., Short narrative on building the Brooklyn Sewers, Brooklyn Historical Society, January 2015.


Varona, Adolfo de., Sewer gases, their nature and origin and how to protect our dwellings: 1879, 13.

Photographs courtesy of Anna Rathkopf.
Photographs courtesy of Anna Rathkopf.
two sisters, one who is already an adult, and a sister who is a young adult. I enjoy playing the piano and I love playing steel pan, a percussive instrument developed in the 20th century. My mom or big sister take me outside when they can to ride my bike or my scooter. This is my first time in Young Scholars. I was really excited about writing a book and learned new things along the way.

Photographs courtesy of Anna Rathkopf.
Photographs courtesy of Anna Rathkopf.
At the turn of the 20th century, New Yorkers rich and poor were eating record numbers of oysters. While most of these oyster beds were in eastern Long Island, Brooklyn also benefited from a little-known but thriving oyster economy, which provided a primary food source for the area. The oysters were harvested from the shallow waters of the area’s tidal saltwater creeks.

New York’s booming population drove the city’s need for more oysters. Brooklyn’s oyster industry expanded particularly rapidly – from 12 million to more than 22 million by 1900. As Brooklyn grew more crowded and more crowded, sewage disposal became a pressing issue. In 1896, the city built the first sewer line utilizing instead of oysters to clean the sewage out to the ocean. This led to the oyster beds being destroyed, which in turn led to the city’s oyster economy collapsing under the weight of its own growth.
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