PHILADELPHIA

Giant Cube to Illustrate Daily Pumpage of Water for Use of Citizens of Philadelphia—Heavy line shows daily consumption, 300 million gallons; lighter and higher line, total amount pumped each day, 535 million gallons—a certain amount being pumped twice to complete delivery. One day's consumption of the City would fill a train of oil cars 300 miles long

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In addition to the work of recording contracts and granting licenses, the Bureau of Contracts and Statistics is given the work of collecting, compiling and placing before the taxpayers information touching the various departmental activities. To bring such information quickly to the notice of tax payers it has been thought proper to issue a series of publications dealing with the various divisions of municipal work. The first number, issued July, 1909, contained the Bullitt Bill; the August issue gave a History of the Parkway; the September number was devoted to the Department of Public Health and Charities; the October to Public School System; the November to Philadelphia's Fire Department; the December to the Police Department; the number issued in January, 1910, described Department of the Mayor; February number, Select and Common Councils; March number, Home of the City Government; April number, Pleasure Grounds of the People; May number, the Bridges of a Great City. The present number is devoted to the Water Supply of a Great City. "Philadelphia" may be obtained from George W. B. Hicks, Editor, Bureau of Contracts and Statistics, Rooms 203-205, City Hall, Philadelphia.

WATER SUPPLY OF A GREAT CITY

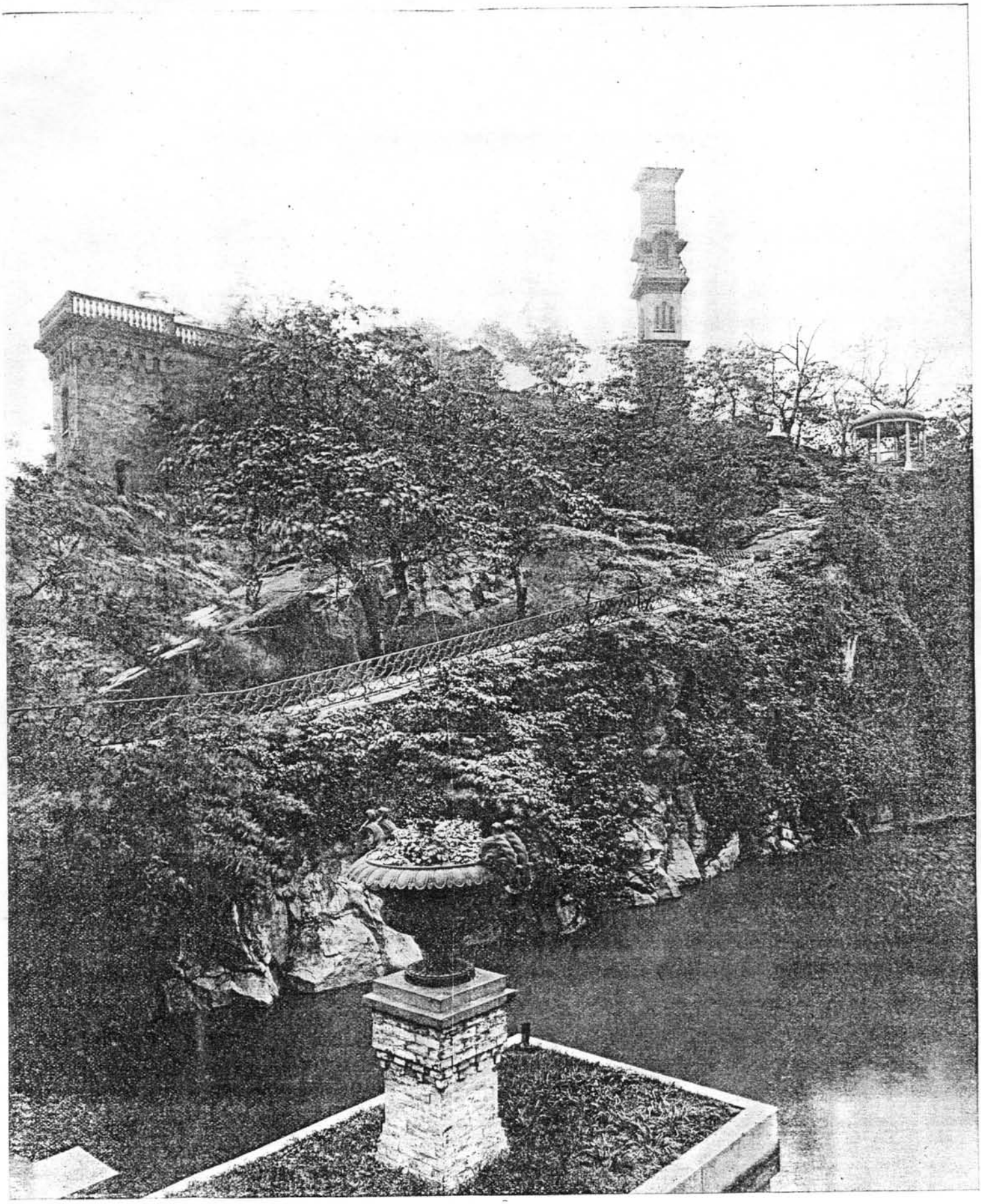
In all countries where civilization is tested by twentieth century standards, unprecedented growth of cities has forced the water supply question into the front rank of municipal problems. Although always a question of importance, as far back as the records of history run, the water question has, during the past twenty-five years, assumed an entirely new phase and taken on a new importance because, during that period, the conscience of the world has quickened into a new realization of the truth that man is his brother's keeper. In other words, there has come home to the civilized world realization of the truth that preventable death is only a few degrees removed from premeditated murder; further, that to allow preventable death is to deliberately decrease the wealth producing power of the community—destroy an asset whose value is as easily estimated as is the value of the growing crop or a mineral deposit. Coupled with this clearer realization of man's responsibility for the health of his fellow-man, there has developed all over the world increase of knowledge regarding sources of diseases, and, coincidently, of methods whereby disease may be prevented or its influence mitigated. There has, therefore, developed through the influence of these two avenues of enlightenment a new view concerning the duties of the municipality in the matter of water supply—a view differing widely from that held twenty-five years ago. This new view has placed upon those in authority in great cities a heavy burden measured by financial standards, but has brought, as compensation, a deeper interest in the subject on the part of the general public, and a public sentiment which approves liberal expenditure in providing and protecting sources of water supply and methods of water distribution.

It is necessary now, having emphasized the change in world opinion on the water supply question, to examine into certain conditions existing in Philadelphia which place the city in a class by itself, as regards demand made upon the authorities for a liberal supply of filtered water. First and foremost in this list of local conditions is the well-known home owning habit of the Philadelphia people. There is a common desire among all divisions of the community to possess a home—a detached house if possible. This habit of the individual house, and the location therein of certain features usually associated, in other cities, with the homes of people possessing large incomes—such as flowing water in many rooms and ample bath and wash room accommodations—has forced distribution of these homes over a wide area, and, secondly, resulted in a necessity to distribute water in generous quantities over a mileage of streets reaching a total of nearly 1,800 miles. A second local tendency, almost a fixed habit, inherited from old Quaker times, is a certain high standard of cleanliness as regard the outward appearance of these homes and the pavements fronting thereon. Philadelphia's white marble steps, window sills and surbases early became, and have since remained, a notable feature of Philadelphia architecture, and these, according to local traditions, must be kept spotlessly clean, no matter how large the expenditure of water and labor necessary to bring about such a result. When this habit is held by the majority of people occupying a few homes, the effect upon the water supply is small, but when it is the unvarying practice of a body of population numbering 1,550,000 and occupying, as the population of Philadelphia does today, more than 326,000 separate dwellings, then the habit has a fixed and increasing power to tax municipal water supply powers.

Moreover, this local habit of a free use of water in keeping the outside of the home clean grows with increasing rapidity each year, because Philadelphia, contrary to the general impression, although 227 years old, is growing more rapidly at the present time than at any other period in her history. How important this latter day growth really is can be judged by comparing conditions in 1876 and at the present time. This period, between 1876 and 1909—one-third of a century—shows a growth in dwellings from 143,936 in 1876 to a total of 326,612 at the end of 1909; the increase in all buildings being from 160,000 in 1876 to 358,255 in 1909.

Another pointed illustration of this rapid increase in demand is the fact that in 1876 the water mains were 628 miles long, while at the close of 1909 they were 1,612 miles. Not only, therefore, has the number of buildings to be supplied increased during the past one-third of a century by a number equal to the total growth of the City during the previous two centuries, but the traditional tendency towards extravagance in the use of water increases with the growth of the City's population, so that the per-capita consumption is today nearly four times the per-capita consumption prevailing a third of a century ago. This local habit of extravagance in the use of water is shown convincingly by the fact, that the amount of water delivered in Philadelphia daily to distributing mains is equal in amount to the total delivery of water made, in the same time, to the people of St. Louis, Cleveland, Baltimore and Boston, although the four cities mentioned have a combined population nearly double the present day population of Philadelphia. Free water consumption, however, is different from a waste of water. It is important that this misconception concerning Philadelphia should be corrected, for, while waste does take place—a half-inch stream of water, if allowed to run one hour, will waste 2,416 gallons, which cost the City 48 cents to deliver—even after waste is eliminated the City's normal demand will be in excess of that made in any other city in the world. Another illustration of a local demand, without parallel in other cities, is the habit of washing pavements and steps of homes forcing use today in the City of Philadelphia of nearly 100,000 wash paves, or connections in the pavement from which water is drawn for such purpose. Another illustration emphasizing special demand is furnished by the fact that there are today in the homes located within Philadelphia city limits 346,823 separate bath rooms. When it is remembered that the total number of homes to be supplied with such facilities is 326,612 the startling fact develops that we average in Philadelphia—including tenement houses and all character of dwellings—more than one bath tub for every dwelling within City limits. Another and even more suggestive illustration is that out of the immense total of 326,612 Philadelphia homes there are today 302,000 separate dwellings supplied with water from the municipal water plant and paying rates therefor. The surprising feature of this statement is that in the whole great City of Philadelphia, with its 129½ square miles of area, including, as it does, several large sections which pay only the farm rate of taxation, or half the regular city rate, there are less than 25,000 buildings which are without direct or individual water connection with the municipal water plant. This condition is even better than it appears on the surface, because four private water companies, working in the outlying section of the city, supply a portion of the buildings unconnected with the City's water plant. Speaking broadly, every home in Philadelphia has daily brought to its doors the most liberal supply of the best filtered water ever given by any government to the citizens of a municipality—water delivered in such large quantities as to show a per-capita consumption nearly five times the per-capita consumption of the great City of London. It should not be forgotten also, that in addition to supplying this immense number of homes and business buildings, the City water supply facilities furnish water to 15,561 fire hydrants located along the City's 1,800 miles of paved and graded streets.

Such is the Water Problem of the day. How has the City of Philadelphia met this problem during the course of her marvelous growth, through the 227 years since that far off time when, at the hands of William Penn, she received the honor of Municipal

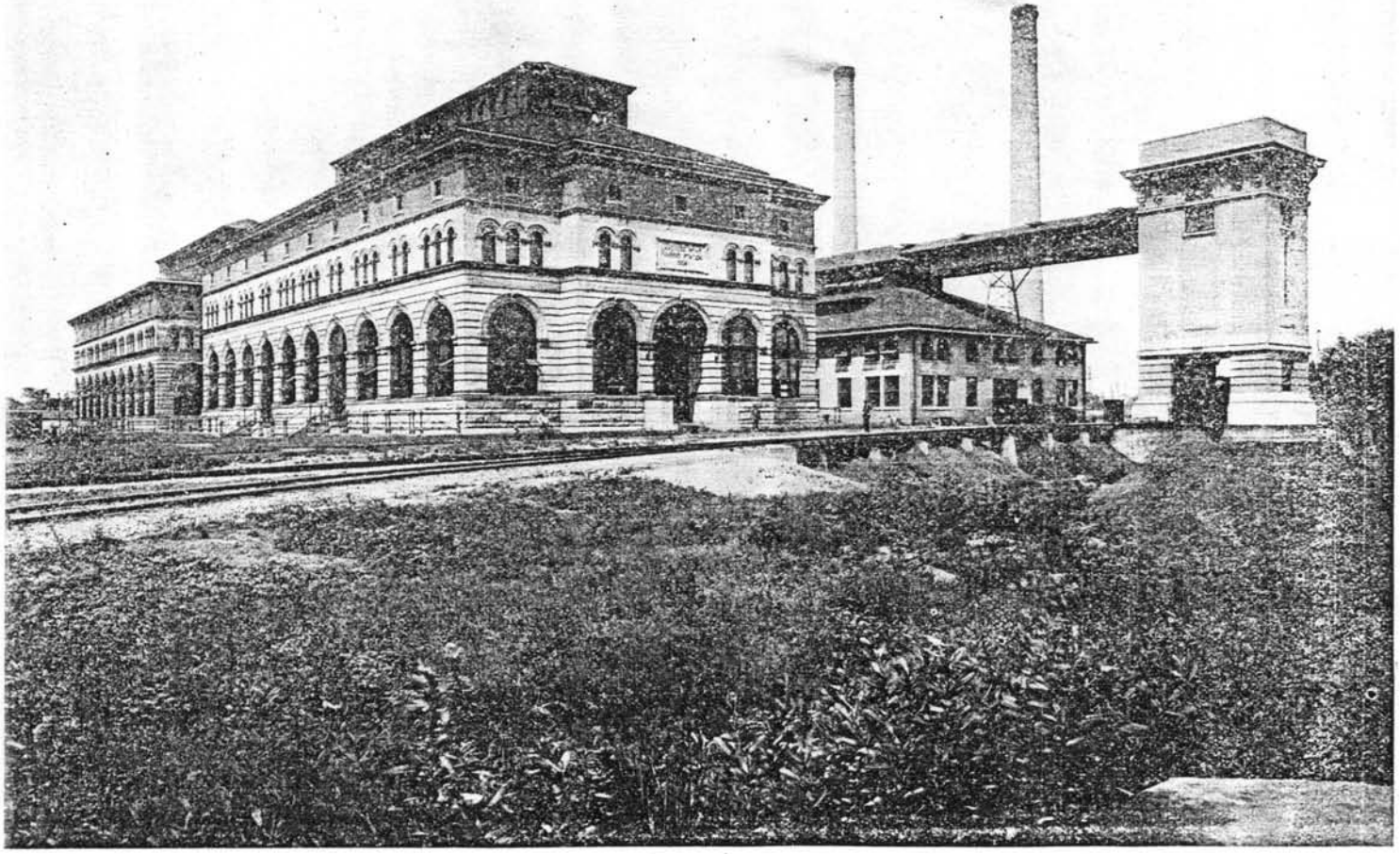


A Picturesque Corner of Old Fairmount Park Reservoir, an important part of the first water works erected in the United States, showing original stand pipe and observatory. This rocky hill is the proposed site of the great art gallery, to be located at the western end of the new Parkway.

life. For more than a century after the founding of Philadelphia, in 1683, the City depended entirely for its water supply upon pumps and wells, although lying between two flowing rivers. These pumps and wells were under public control and their management furnished an unfailing source of criticism of all things municipal. As late as the year 1771, or eighty-eight years after the founding of the City, the charge was made in the print of the day "that the wardens have only dug two wells since the law placing the pumps in their charge, but have received and expended four thousand pounds in supporting and repairing the few pumps on hand." Another criticism of the day was "that there are but four pumps kept at public charge on Water Street, and but thirty-four public pumps west of Third, but that private persons maintain in the same space and at their own charge 172 pumps and wells," while one critic urged strongly that the question of water supply, and the maintenance of pumps and wells, be again turned back into private hands, claiming that the whole City under private management could be well supplied by a plant of pumps and wells which would cost less than $50.00.

In 1799 City Councils awakened to the necessity of energetic action and passed an Ordinance appropriating $150,000 to develop a water supply, bonds to be taken by subscription, the City pledging its entire revenue, excepting tolls from the Market Street Bridge. All subscribers to these new water bonds were to have free water rights for three years, such rights being transferrible, the preference in supply, moreover, was to be given to the subscribers. Under this new plan the receipts from water charges were: First, to pay all running expenses. Second, to redeem the stock or bonds for running the plant; and the remaining balance, which was expected to be large, was to be used in improving the City and in the alleviation of taxes. With these funds the first water works in the United States, as well as the City, were completed at Centre Square, the site of the present City Hall, with a primary or pumping station at Chestnut Street on the Schuylkill river. These works, the first move to provide a water supply system, began delivering water the twenty-seventh of January, 1801, having cost to date $220,360.

Centre Square works, however, in ten years were pronounced by expert opinion behind the times; moreover, their location was unsuitable, and the decision was arrived at to develop new water works at Morris Hill, now known as Fairmount. The new water works were started in 1812, the year of the second war with Great Britain. It was necessary in building the Fairmount Water Works, however, to acquire from the State Legislature the right to carry pipes through Penn township and the District of Spring Garden, sections outside of the City limits. The Fairmount Water Works were completed in the year 1815. With their completion, the people of Philadelphia believed the water question had been solved for all time. Here, again, angry criticism and opposition from a section of the public found expression: for when Councils attempted to raise money by taxation, to build additional reservoirs, the Ordinance levying a tax was attacked in the Court as an abuse of alleged delegated legislative powers. The Courts, however, in the end



LARDNER'S POINT PUMPING STATION ON DELAWARE RIVER, largest pumping plant in the world, contains sixteen pumps, total pumping capacity of 297,000,000 gallons a day. Distributes filtered water received through the Torresdale conduit. Boiler houses contain twenty-six boilers. Brick chimneys are 150 feet high and 7 feet internal diameter. Coal is delivered to overhead pockets of 3,000 tons capacity by means of a tower and belt conveyor, capable of handling fifty tons per hour; coal can be received from either boats or railroad cars.

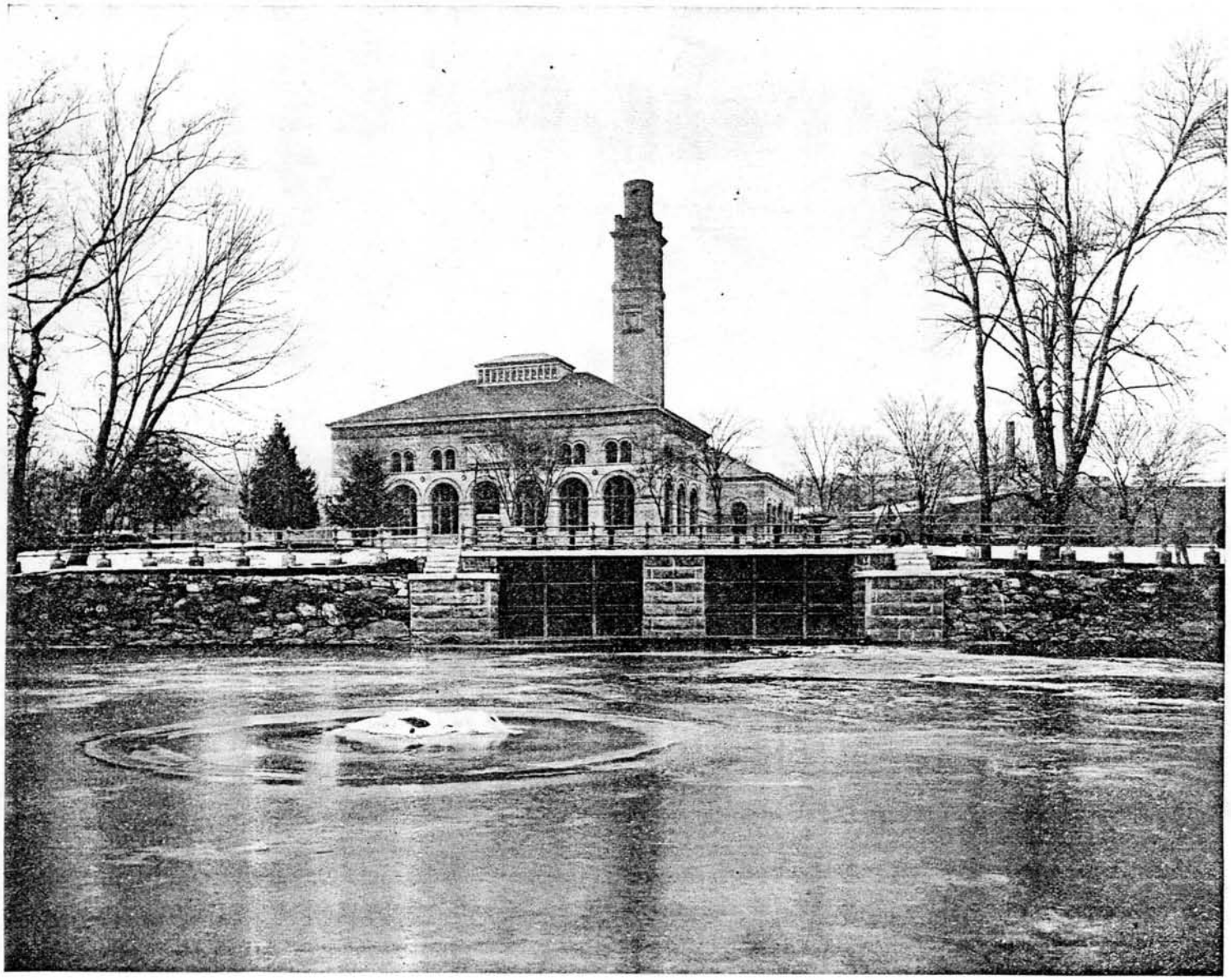
sustained Councilmanic action and the work proceeded.

A rapid growth in population followed the completion of the Fairmount Water Works and, coincidently, there came an end to the comfortable opinion that the water question had been settled for all time. But the awakened public conscience required considerable assistance from public officials before it ripened into legislative action. In 1856 Mayor Vaux called attention to the necessity for new water works. In 1867, or eleven years later, the Park Commission appointed a Committee to examine into the purity of the water. In 1875, or eight years later still, by order of Councils, a Commission was appointed to make careful tests of the quality of the water, and seven years later, or in 1882, a board of experts reported necessity to immediately increase capacity of reservoirs. The final report of this Commission, transmitted to Councils by the chief engineer in 1885, stated that, "at the point where the water for the City is drawn the impurity is constantly increasing and is probably approaching the limit of unwholesomeness."

Several severe typhoid fever epidemics hastened public action and brought public sentiment to a point where it was possible for the authorities to develop important and ambitious plans for a new water system. For this question of water supply had, from the very start, been hampered by the circumstance that the Provincial Legislature having granted certain rights of navigation to a corporation, the City, when it tried to use the Schuylkill as a source of supply, was forced to take second place, for, being a vendor of water, its right to draw water from the Schuylkill was subordinate to the rights of navigation, especially where it used that water to drive its machinery for distributing water to the people, the Courts having held the City liable for damages growing out of delay to boatmen, when its use of such water crippled navigation.

While the success of Philadelphia's water service, when measured by financial standards, is shown in its present day surplus of receipts over earnings, and its marked tendency toward increased receipts and decreased expenses, perhaps the most convincing testimony to its success, the best justification for the large expenditure necessitated to place it upon its present high level of excellent service, is the remarkable testimony furnished by the decrease in death from typhoid fever, this improvement in the public health being directly traceable to the improvement in water supply, made possible by the great filtration plant. For the official records show that, while deaths from typhoid fever in the year 1907, or before the plant was in operation, were 890, they fell, during the year 1909, when the supply of filtered water was available for the larger part of the year, to only 333, or 37 per cent. of the deaths in 1907. This change in condition is more emphatically testified when the number of cases of typhoid fever is considered, for the number of cases of typhoid of record during the year 1907 were 6,712, while those recorded during the year 1909 were only 2,406.

Philadelphia's water supply system is represented by three great factors: First, Four filtration plants, the last of the four, Queen Lane, just nearing completion. These filtration plants are: The plant located at

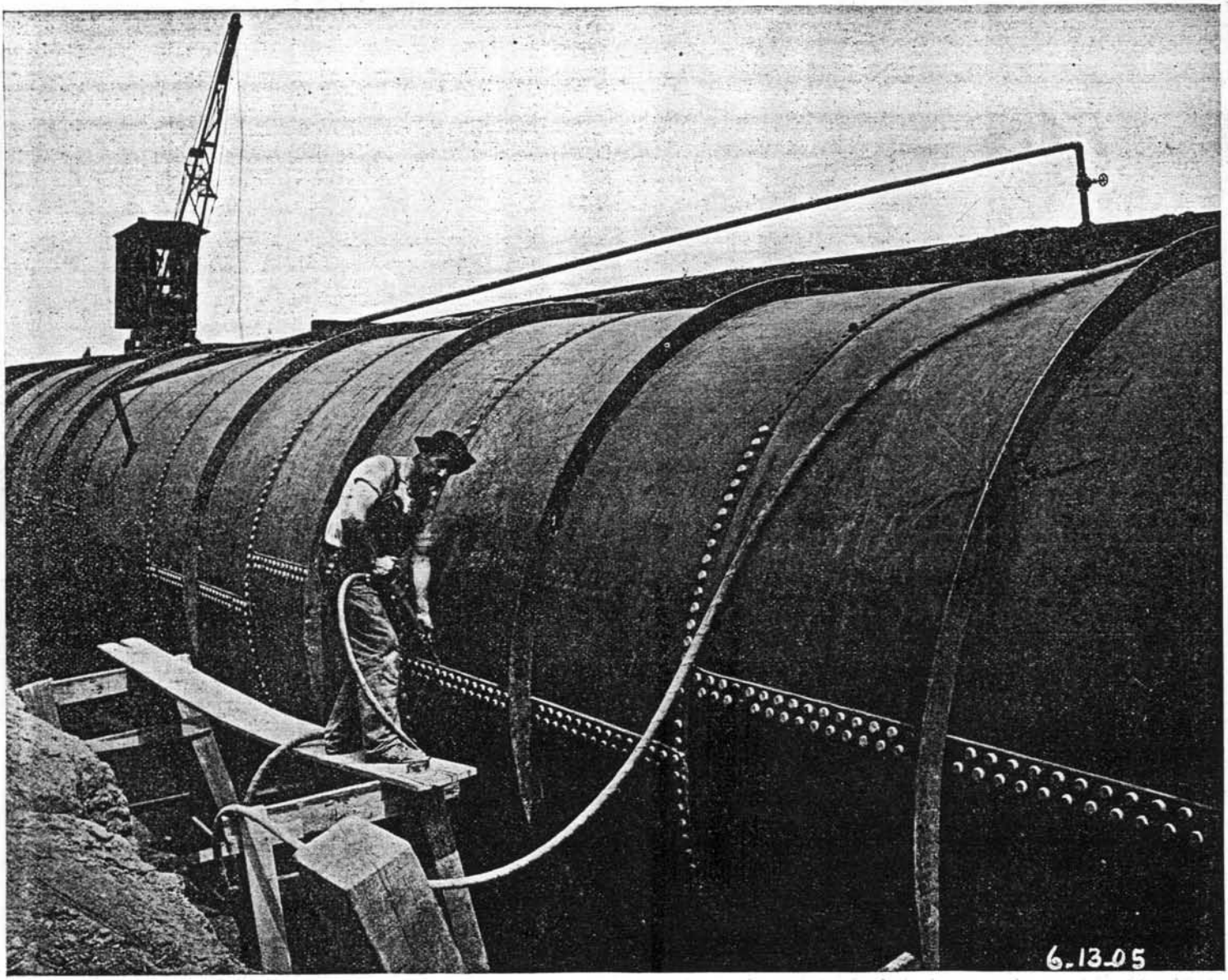


QUEEN LANE PUMPING STATION ON SCHUYLKILL RIVER, in East Fairmount Park, below mouth of Wissahickon Creek. There are four pumps with a total daily capacity of 80,000,000 gallons pumpage and twenty-four boilers of 200 horsepower each. The smokestack is 200 feet high by 12 feet internal diameter. Water is delivered from this station to the Queen Lane Reservoir through two lines of 48-inch cast iron pipe.

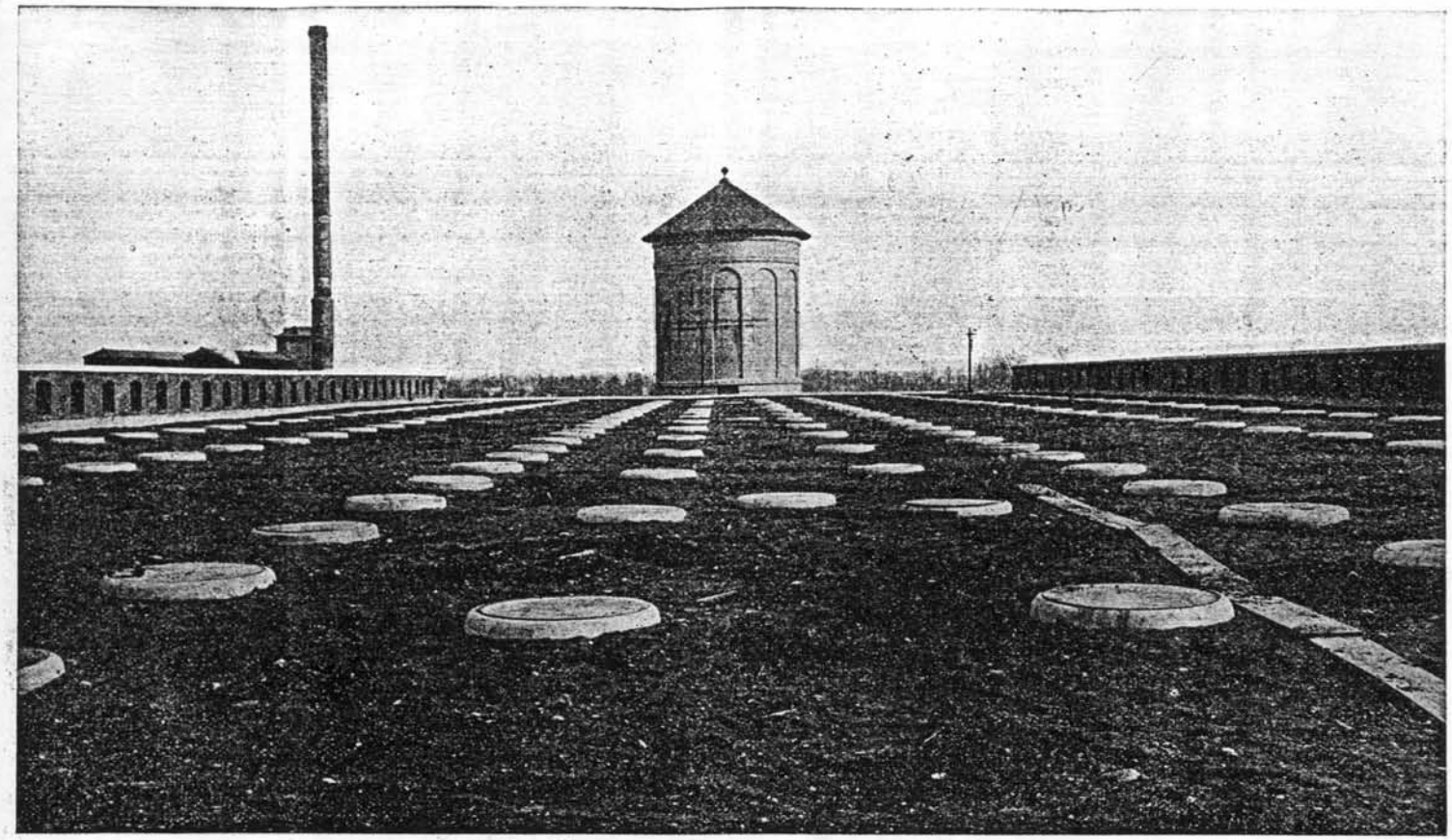
Torresdale, with capacity of 220,000,000 gallons a day, followed, in capacity, by the new Queen Lane reservoir, just being completed, with about one-third of Torresdale's capacity, or 75,000,000 a day. These are supplemented by the smaller filters at Belmont and Roxborough with a total of 70,000,000 gallons. Second: The reservoirs, divided into active and reserve, with a total capacity of 1,453,830,000 gallons, equal to five days' supply for the whole city. These reservoirs range in capacity from the great East Park Reservoir, with three basins and a total capacity of 688,618,000 gallons, down to the lower Roxborough clear water basins of 3,000,000 capacity. In this list of reservoirs are included the three stand pipes, utilized by the City to force water to the higher levels above the gravity line from the great reservoirs. The stand pipes referred to are the Belmont high service, water level of which is at an elevation of 364 feet above river level; the Roxborough high service stand pipe, 491 feet above that level; the Frankford high service pipe, 300 feet.

Third. The pumping system, supplemented by the system of water mains for distributing water to consumers. This pumpage system has a total daily capacity of 909,790,000 gallons, such pumpage being divided as follows: Taken from the Schuylkill, raw water, 231,790,000 gallons; from the Delaware, 297,000,000 gallons, making a total of raw water taken from the primary sources, 528,790,000 gallons. Supplementary to this intake and handling of raw water, there is a rehandling of water for the high service amounting to 31,000,000 gallons a day, while centrifugal pumpage, and pumpage at filter beds, represent a total centrifugal pumpage of 350,000,000 gallons.

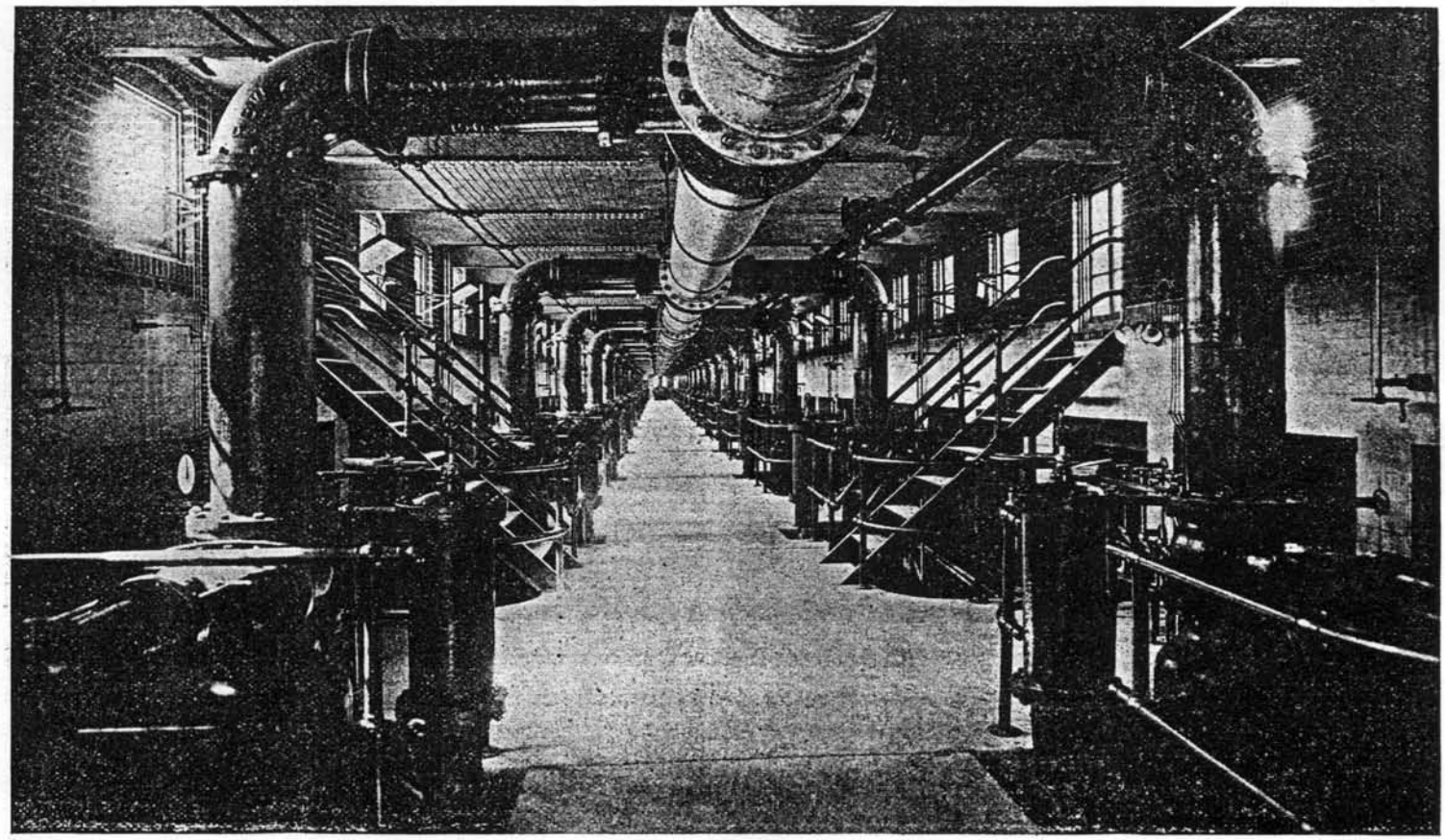
The second division of this third classification of water service, namely, distribution to consumers, takes place through mileage of all kinds of mains in City, 1,612 miles of pipe under streets; add to this mileage 1,430 miles of pipe forming connection between house and water main and you have pipe lines for distributing water to Philadelphia's separate consumers more than 3,000 miles in length, or sufficient to cross the Atlantic Ocean, or extend across the American Continent from Philadelphia to San Francisco. This great network of pipes varies in size from one-half inch in diameter to a diameter of 11 feet; 464 miles of water main have been laid and relaid since 1898, making practically a new system of service mains. To sum up the situation, Philadelphia, in the opening years of the twentieth century, offers to the world convincing proof, in her $70,000,000 water supply system, that she still leads all American cities in that development which represents the highest type of civilization. Philadelphia marked the opening days of the eighteenth century by the adoption of a new charter and establishment of a well planned manufacturing interest; she celebrated the opening of the nineteenth century by establishing the first great water works in America; the City marked the opening of the twentieth century by creating the greatest filtration plant in the world at an expenditure of $27,500,000, securing ability, through this new addition to her plant, to supply filtered water, from which 99 per cent. of all bacteria has been removed, to a population of 1,550,000 resident in 326,000 separate homes, performing this gigantic task by means of a water service employing 2,200 men, nine pumping stations with an aggregate daily capacity of 909 million gallons, four filter plants with combined daily capacity of 365 million gallons, reservoirs holding 1,400 million gallons, and water mains 1,600 miles in length, making a per capita delivery of 200 gallons a day at a cost of less than one cent a day to each individual resident in the City.



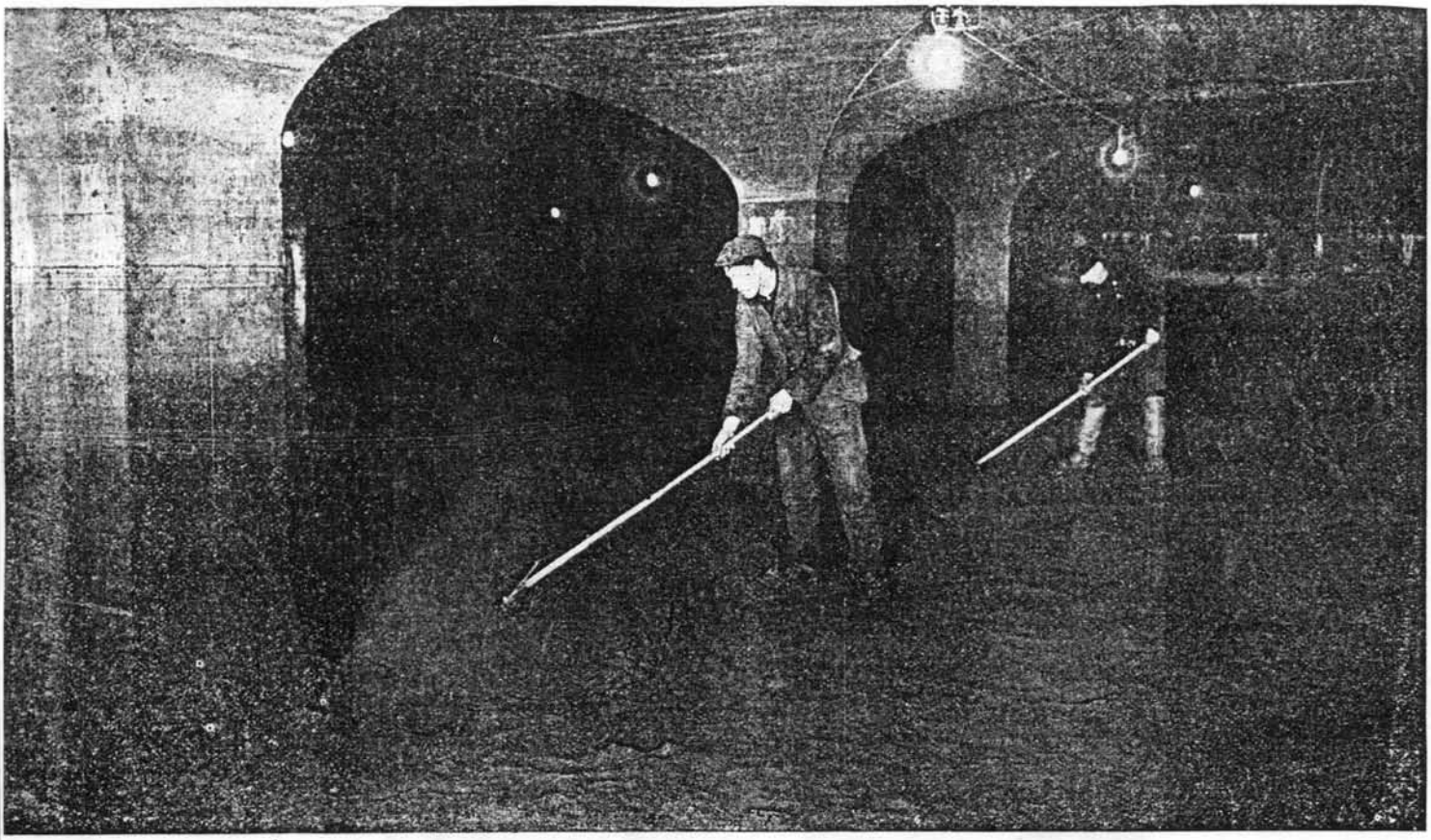
GREAT STEEL PIPE, eleven feet in diameter, from Torresdale pre-filters to final filters—riveted steel, surrounded by concrete.



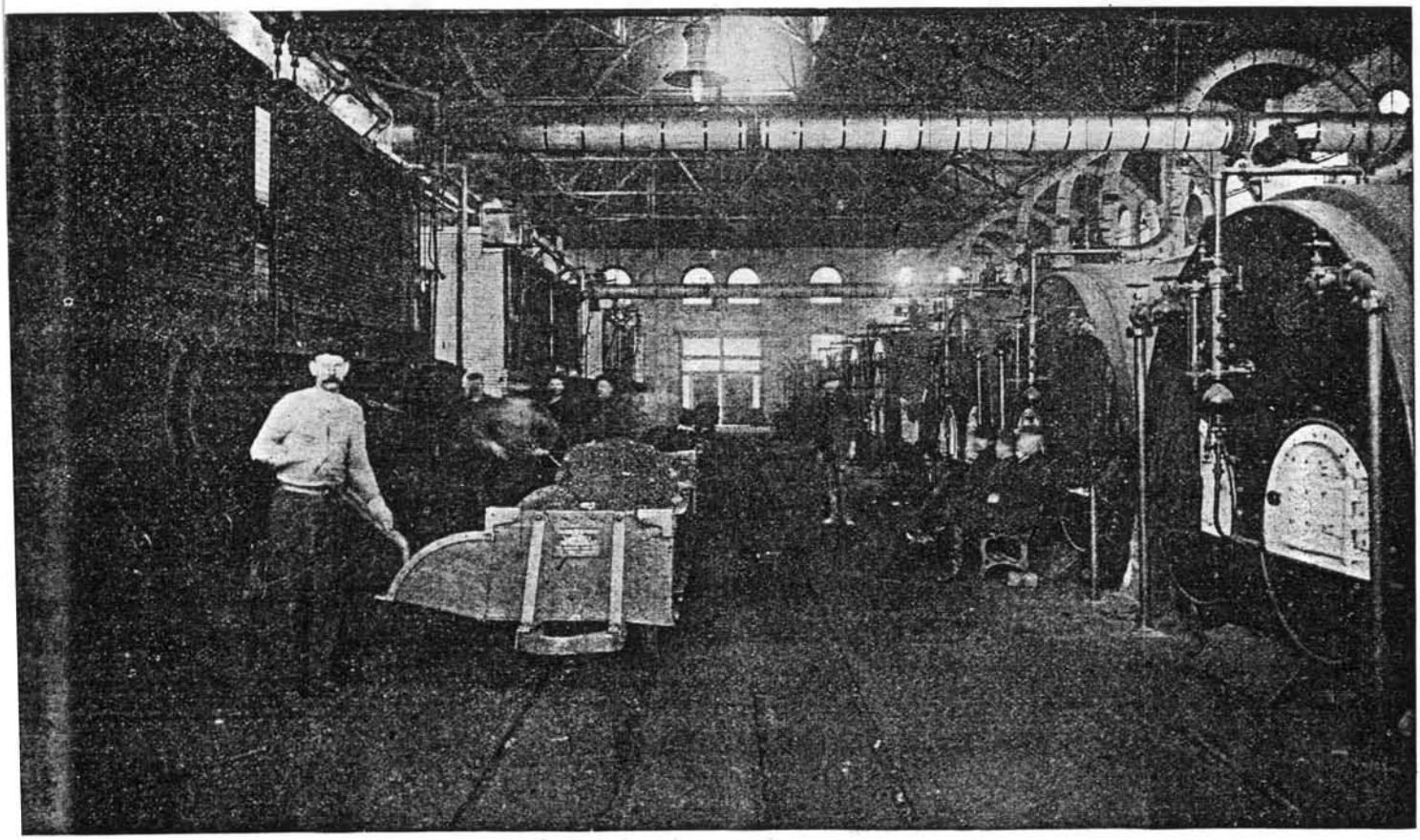
ROOF OF TORRESDALE PRELIMINARY FILTER BEDS. These beds are 120 in number, are arranged in rows or batteries of 15 each, with 2 batteries facing each filter house, making 30 controlled at each house or gallery, of which there are four. Each bed measures 20 feet 3 inches by 60 feet. Floors and walls and roof constructed of concrete.



OPERATING GALLERY, TORRESDALE PRELIMINARY FILTERS, where water is given its first washing. There are four such rooms from which the operation of 120 pre-filter tanks is governed.



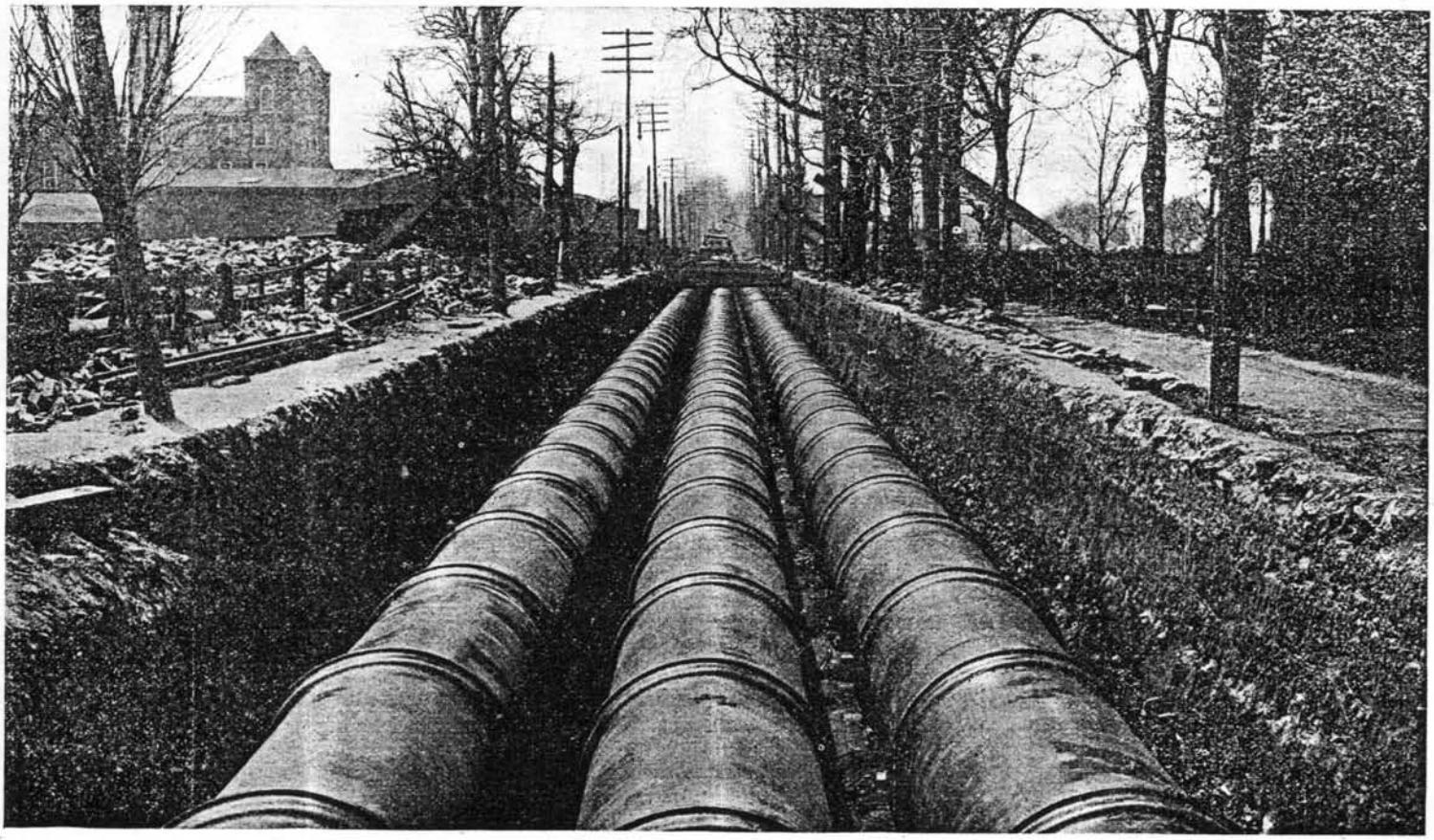
TORRESDALE FILTERS—TYPICAL VIEW OF INTERIOR OF SAND FILTERS—Leveling Sand in filters after cleaning.



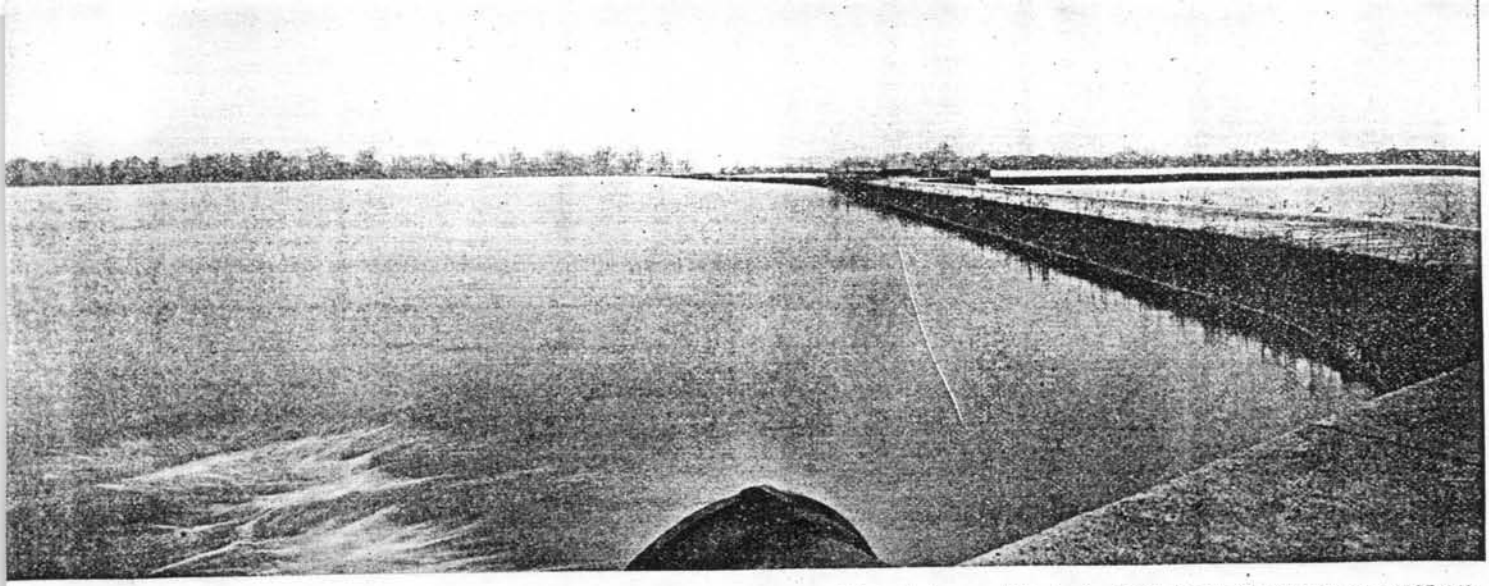
LARDNER'S POINT PUMPING STATION ON DELAWARE RIVER; boiler room containing 12 furnace flue tubular boilers and 14 water tube boilers.

DOUBLE LINE OF GIANT PIPES, climbing hill from Torresdale Filter Plant, carrying water to the great Lardner's Point Pumping Station for redistribution to the City.

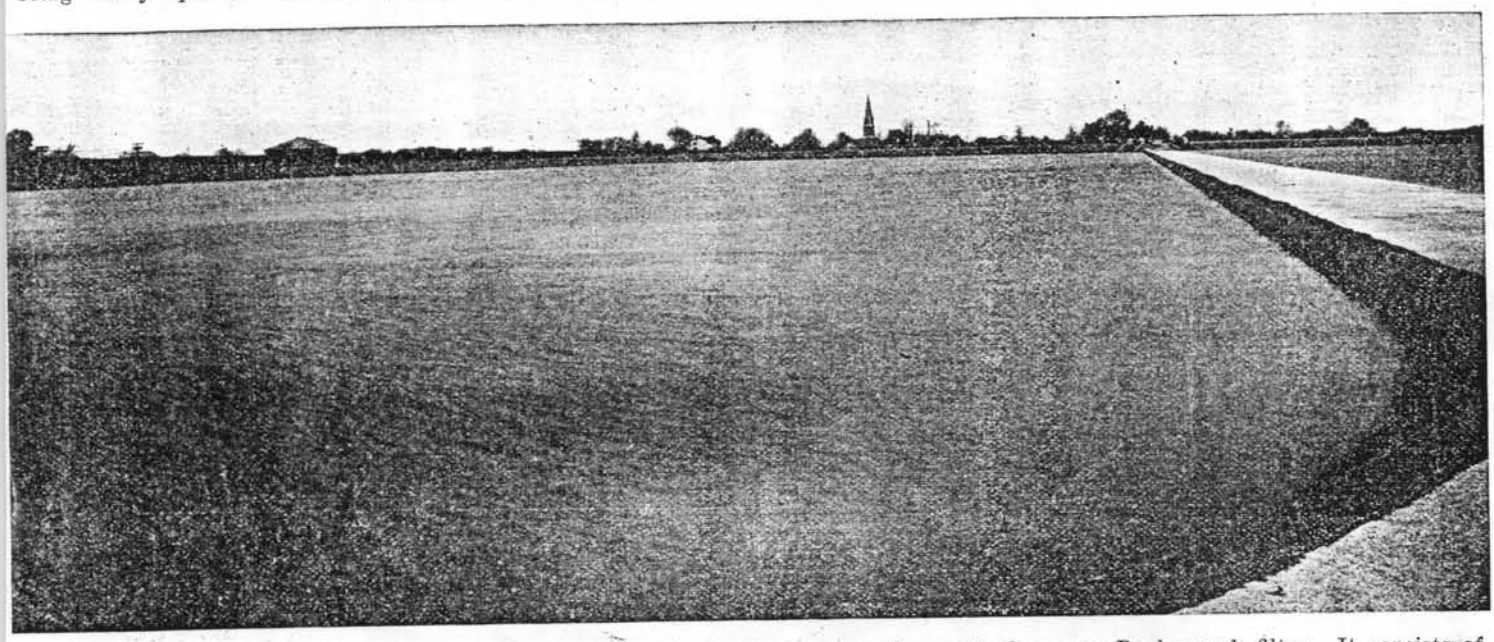
WASTE OF WATER.—Flow of water through various sizes of pipe in 24 hours; 1/32-inch stream, 250 gallons per day, value 5 cents; 1/16-inch stream, 900 gallons per day, value 18 cents; 1/8-inch stream, 3,600 gallons per day, value 72 cents; 1/4-inch stream, 14,500 gallons per day, value $2.90; 1/2-inch stream, 58,000 gallons per day, value $11.60; 3/4-inch stream, 133,000 gallons per day, value $26.40; 1-inch stream, 232,000 gallons per day, value $46.40.



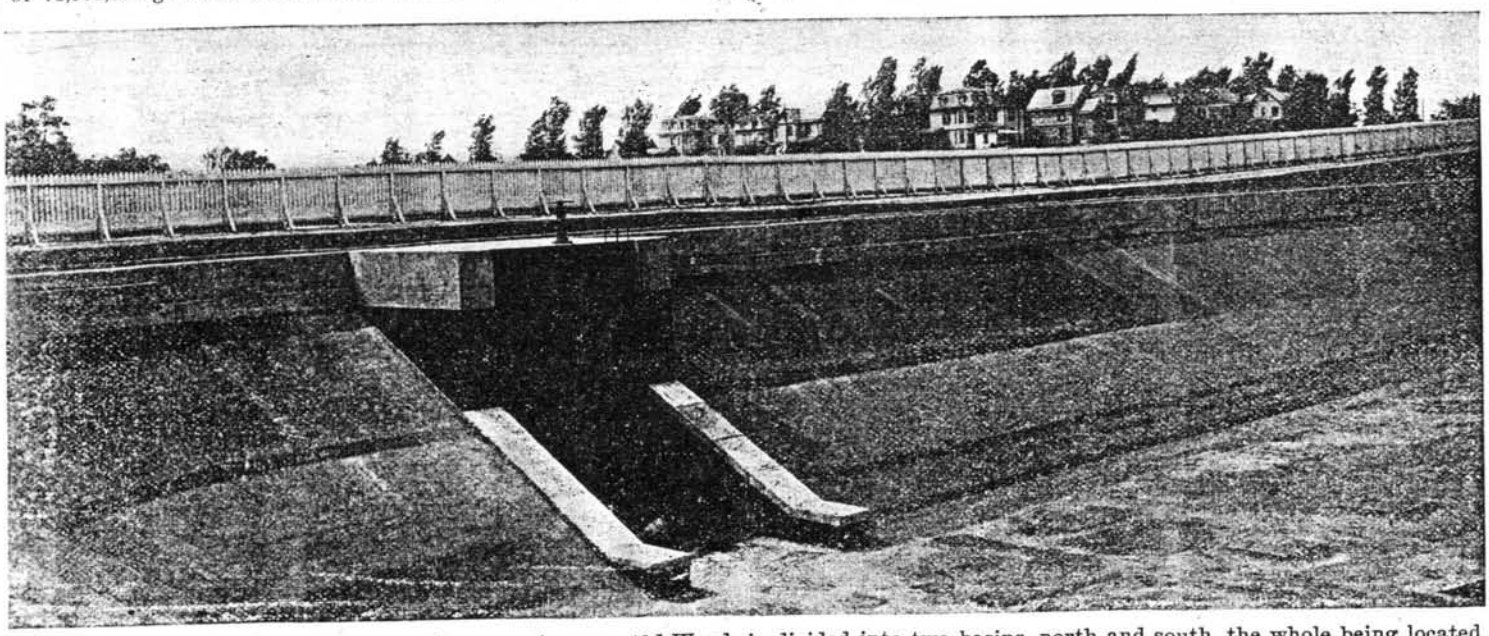
TRIPLE LINE OF SIXTY-INCH WATER MAINS, running through a City street, illustrating method of distribution throughout the City's 1,800 miles of paved and graded streets. The water mains form a reservoir which contains an additional reserve of water, amounting to 65 million gallons.



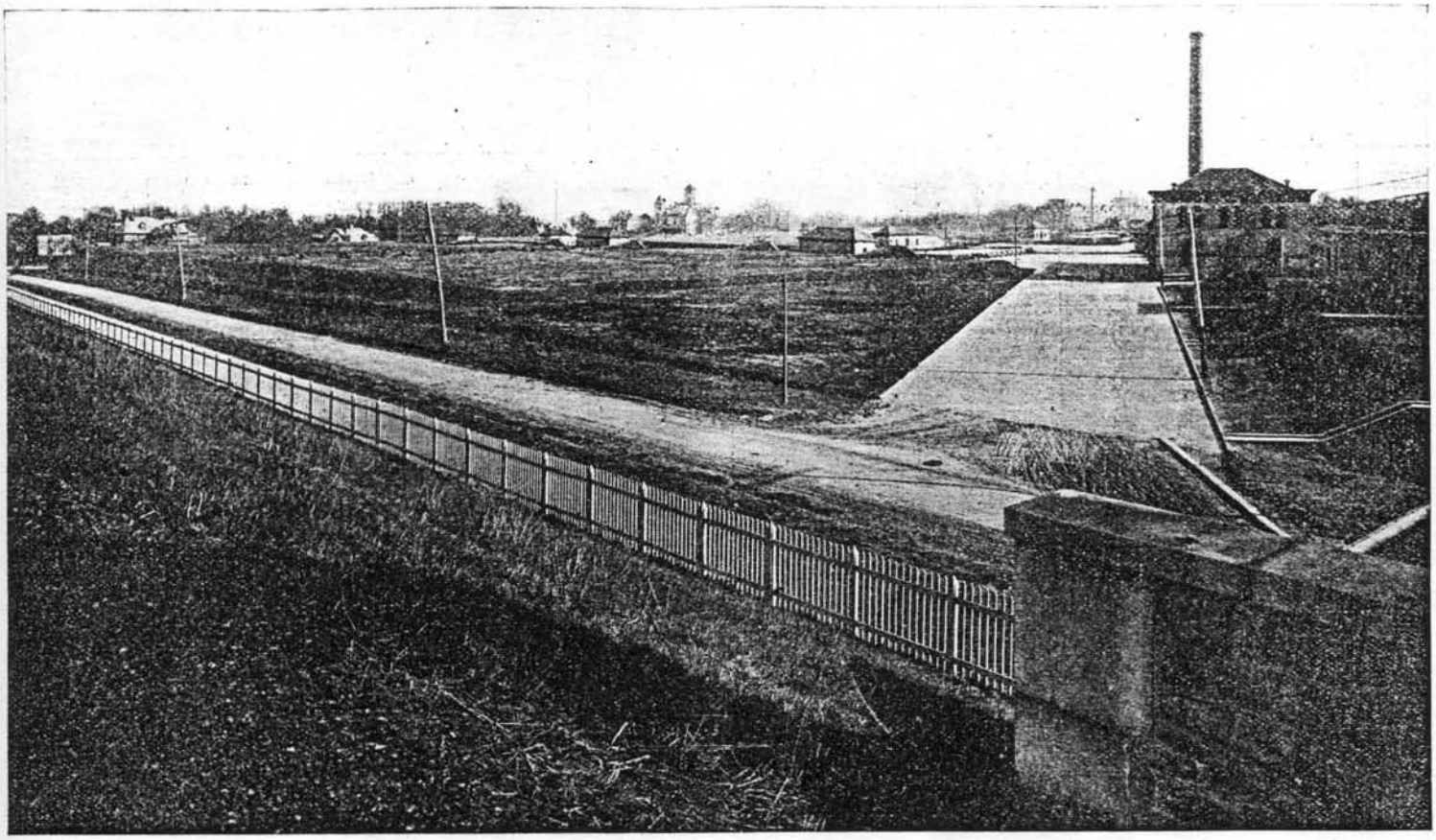
EAST PARK RESERVOIR, LOCATED AT THIRTY-THIRD AND COLUMBIA AVENUE, East Fairmount Park, is divided into South, West and North basins; 133 feet elevation above mean high water in the Delaware River, depth, 25 feet. Capacity: South basin, 62,738,000 gallons; west, 306,400,000 gallons; north, 319,480,000 gallons; total, 688,618,000 gallons. This is the largest reservoir in the City, its capacity being nearly equal to one-half the total reservoir capacity of Philadelphia's water system.



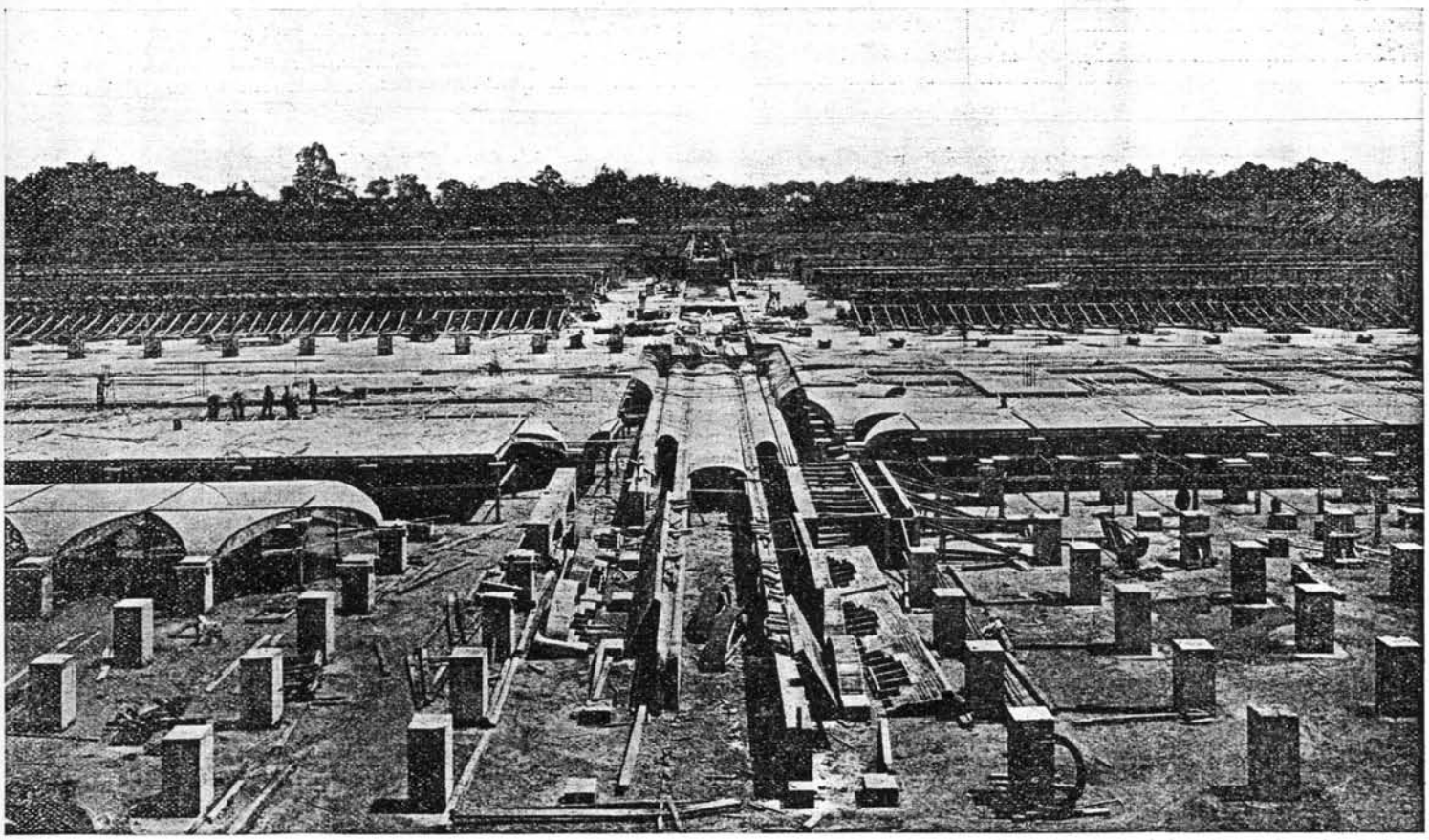
UPPER ROXBOROUGH RESERVOIR is used as a sedimentation basin in connection with the upper Roxborough filter. It consists of two basins, north and south, 414 feet above high water, Delaware River, each basin being 25 feet in depth. North basin has a capacity of 71,504,000 gallons; south basin, 75,438,000; total, 147,032,000 gallons.



OAK LANE RESERVOIR, FIFTH AND CHELTEN AVENUE, 42d Ward, is divided into two basins, north and south, the whole being located 210 feet above high water, Delaware River, the depth being 20 feet 5 inches. The capacity of north basin is 35,000,000 gallons, and of south basin, 35,000,000 gallons, making total capacity of 70,000,000 gallons. This reservoir contains filtered water only, and is so con-



BELMONT FILTER PLANT, WEST PHILADELPHIA; FORD ROAD AND BELMONT AVENUE. This plant filters water for the entire section of the City west of the Schuylkill River, receiving its supply from the Belmont Pumping Station, located in West Fairmount Park, on the Schuylkill River, near Columbia Bridge. There are two subsidiary basins, each having a capacity of 36,000,000 gallons; nine preliminary tanks and eighteen plain sand filters, a clear water basin and other equipment. Net capacity is 40,000,000 gallons daily.



QUEEN LANE FILTER PLANT now nearing completion. This new filter is built in one section of the Queen Lane Reservoir. The plant is a two-story structure. Filtered water basins occupy entire space under final filters, such space being 1,056 feet by 709 feet; when filled to its normal depth, nine feet, it will have daily filter capacity of 75,000,000 gallons. The floor of the original reservoir forms the floor of the new filtered water basin.

Water Supply Work for Past Thirty Years

Year.	Population.	Total Consumption for Year, Gallons.	Average Daily Consumption, Gallons.	Average per Capita Consumption, Gallons.
1909	1,568,757	111,696,176,895	306,016,923	197.2
1908	1,531,752	117,868,099,810	322,013,989	210.24
1907	1,499,747	110,389,374,085	302,436,641	201.7
1906	1,468,411	116,732,205,859	319,814,262	217.8
1905	1,437,730	119,220,012,409	326,630,253	227.2
1904	1,407,690	120,153,801,452	328,289,075	233.1
1903	1,378,208	119,456,525,979	327,278,153	238.
1902	1,349,500	114,607,314,362	313,392,642	232.7
1901	1,321,301	102,191,010,693	279,975,453	211.9
1900	1,293,697	101,823,485,000	287,187,630	221.9
1899	1,425,813	107,991,371,604	295,866,771	199.
1898	1,400,080	102,241,835,372	280,114,616	198.2
1897	1,382,632	95,667,466,871	257,532,030	186.3
1896	1,367,815	87,693,642,529	239,600,116	172.2
1895	1,329,957	78,775,849,104	215,824,244	162.
1894	1,238,112	72,073,724,238	197,344,806	159.
1893	1,190,493	65,352,736,978	179,048,594	150.
1892	1,142,650	59,787,584,178	163,801,600	143.
1891	1,071,672	54,678,916,408	149,805,250	140.
1890	1,046,000	51,698,508,699	141,639,749	131.
1889	1,050,000	42,518,919,781	116,490,191	110.
1888	1,020,000	37,068,763,428	101,280,774	100.
1887	995,000	32,426,779,765	88,840,492	89.
1886	975,000	28,658,966,569	78,433,289	80.
1885	953,000	25,165,020,072	68,945,260	72.
1884	932,000	25,495,179,353	69,658,969	74.
1883	911,000	25,284,957,251	69,273,856	76.
1882	890,000	24,691,440,430	67,647,782	76.
1881	865,300	22,721,014,838	62,249,355	71.
1880	847,170	21,120,792,386	57,707,082	68.

Data Relating to Final Filters and Filtered Water Basin

Filters

	Number.	Area, Acres.	Daily Capacity, Million Gallons.
Lower Roxborough	5	0.53	12
Upper Roxborough	8	0.70	20
Belmont	18	0.735	40
Torresdale	65	0.75	220
Queen Lane	22	0.76	75

Filtered Water Basin

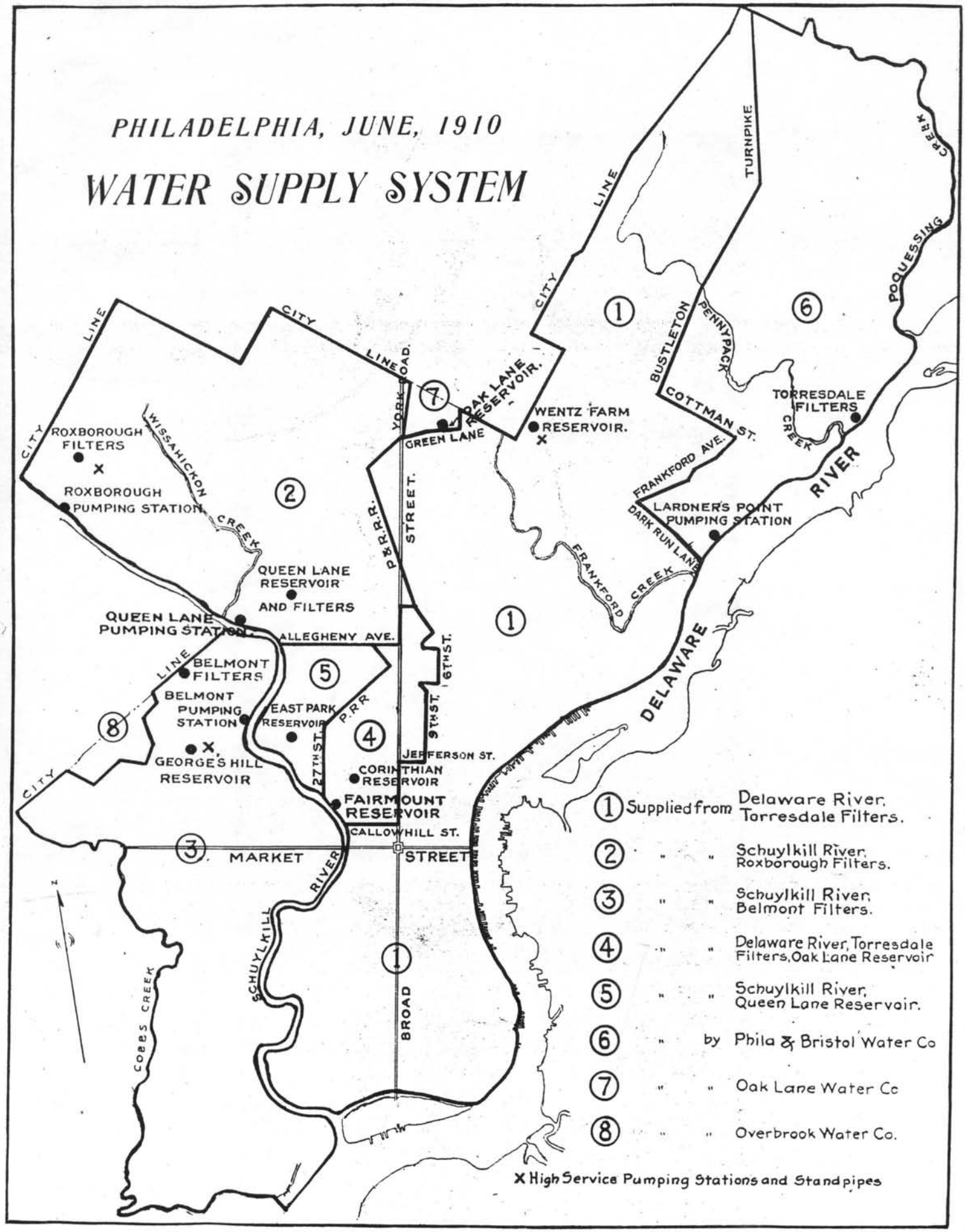
	Area, Acres.	Normal Depth of Water.	Capacity, Gallons.
Lower Roxborough	0.69	13'9"	3,000,000
Upper Roxborough	1.685	15'0"	8,000,000
Belmont	3.480	15'0"	16,500,000
Torresdale	11.200	15'0"	50,000,000
Queen Lane	17.200	9'0"	50,000,000

Facts Concerning Great Torresdale Filter Plant

Delaware River water is first pumped through an eleven foot riveted steel conduit, covered with concrete on to the preliminary filter beds. These filters use both water and air in the washing of the sand. They lie south of the slow sand beds, and at an elevation high enough to cause water to pass through both preliminary and final filters by gravity. The preliminary filters contain 120 beds, each bed measuring 20 feet 3 inches by 60 feet in the clear, the operation being controlled by an individual operating table. Floors, walls and roof are of concrete. Roof of filter beds consists of a six-inch reinforced concrete slab; there are man-holes three feet in diameter over each bed. Roof drains are placed at convenient intervals. Man-holes rise six inches above the top cover of the filters and are equipped with screens that filters may be ventilated. Electric lights illuminate all the beds. The filtering material consists of fifteen inches of gravel of varying size, and twelve inches of sand, the depth of water carried over the filtering material being four feet. Two collectors extend the full length of each bed on each side of the wash water gullet thirty inches wide and eight inches deep. Air supply for washing the water consists of a twenty-inch pipe, running full length of each filter house, suspended from the roof There is a blower for supplying compressed air operated by electric motor in each house. Air system is also connected to wash water piping and air is introduced through the manifold in the bottom of each filter. All power required for the preliminary plant is generated at the pumping station. The final filters number 65, and are located northward of the preliminary filters arranged in four groups, so that each filter faces a Court. These filters are rectangular in shape, 43 measuring 140 feet 8 inches by 235 feet 8 inches, 22 measuring 132 feet 2 inches by 253 feet 2 inches. They have an area of three fourths of an acre each, and are all constructed on one level built of concrete, covered by groined arches.

The filtered water basin, or third section of the plant, lies south of the filters, being constructed on lower ground, and its elevation is such that water is delivered to it from the final filters by gravity. It measures 601 feet 10 inches, 762 feet 2 inches, depth, 15 feet, having a capacity of 50,000,000 gallons at the normal water line. Filtered water passes into this basin at one corner, through a gate-house provided with eight sluice gates. It is so built that the basin can be shut off and filtered water by-passed around the basin. In the opposite corner from point where water enters filter basin is an outlet chamber. An overflow chamber is also constructed in the conduit. The top of the filtered water basin, similar to the covering of all other basins, is made water tight.

From the filtered water basin at Torresdale water is carried through the Torresdale conduit to the pumping station at Lardners' Point, three miles distant; this pumping station being the largest in the world. The conduit is 13,809 feet in length and 10 feet 7 inches in internal diameter. The elevation at the entrance shaft is 127 feet below the ground surface, but the lower end is ten feet higher. It is constructed on this rising grade to the lower end to prevent air locks. To attach the existing systems of distribution to this Delaware River point of supply instead of the old Schuylkill source of supply it was necessary to construct three lines of sixty-inch cast iron pipe, each three miles in length, and 2 miles of 48-inch pipe. A part of the new system of considerable importance is the Oak Lane reservoir, erected to compensate for the variation in consumption in the Torresdale distributing district. This reservoir, located at Fifth street and Chelten avenue, in the 42d Ward, is constructed with two compartments, each with a capacity of 35,000,000 gallons, normal water depth being 20 feet 6 inches, its flow line 210 feet above high water in the Delaware river. Cost of plant, $27,525,000.


PHILADELPHIA, JUNE, 1910
WATER SUPPLY SYSTEM
CITY LINE
YORK ROAD
OAK LANE RESERVOIR
WENTZ FARM RESERVOIR
GREEN LANE
P&R.R.R.
STREET
TURNPIKE
BUSTLETON
PENNYPACK
COTTMAN ST.
TORRESDALE FILTERS
POQUESSING CREEK
FRANKFORD AVE.
LARDNER'S POINT PUMPING STATION
DARK RUN LANE
FRANKFORD CREEK
RIVER
DELAWARE
ROXBOROUGH FILTERS
ROXBOROUGH PUMPING STATION
WISSAHICKON CREEK
QUEEN LANE RESERVOIR AND FILTERS
QUEEN LANE PUMPING STATION
ALLEGHENY AVE.
16TH ST.
9TH ST.
BELMONT FILTERS
BELMONT PUMPING STATION
EAST PARK RESERVOIR
P.R.R.
27TH ST.
GEORGES HILL RESERVOIR
JEFFERSON ST.
CORINTHIAN RESERVOIR
FAIRMOUNT RESERVOIR
CALLOWHILL ST.
MARKET STREET
SCHUYLKILL RIVER
COBBS CREEK
BROAD
1 Supplied from Delaware River, Torresdale Filters.
2 " " Schuylkill River, Roxborough Filters.
3 " " Schuylkill River, Belmont Filters.
4 " " Delaware River, Torresdale Filters, Oak Lane Reservoir
5 " " Schuylkill River, Queen Lane Reservoir.
6 " by Phila & Bristol Water Co
7 " " Oak Lane Water Co
8 " " Overbrook Water Co.
X High Service Pumping Stations and Standpipes