A

# COMMUNICATION

FROM THE

## Chief Engineer of the Water Department

TO THE

## SELECT AND COMMON COUNCILS,

IN REFERENCE TO

## Supplying Schuylkill Water to the District watered by the Kensington or Delaware Works,

AND ON FURNISHING

A BETTER SUPPLY TO THE HIGHER LOCALITIES OF THE FIFTEENTH AND TWENTIETH WARDS, AND EQUALIZING THE SUPPLY TO THE CITY EAST OF THE SCHUYLKILL RIVER.

PHILADELPHIA:
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1862.

DEPARTMENT FOR SUPPLYING THE CITY WITH WATER,
PHILADELPHIA, APRIL 24, 1862.

*To the Select and Common Councils*
*of the City of Philadelphia:*

GENTLEMEN:—In compliance with a resolution adopted by your honorable bodies, and approved March 15th, 1862, I beg leave to state, that the district usually supplied with water by the Kensington Water Works has been supplied temporarily from the Spring Garden works, and that the reservoirs of the former have been emptied and cleaned in the meantime. In the performance of this duty, I have found an accumulation of a soft mud in the bottom of the reservoirs, undoubtedly derived from the river Delaware, and which appears to have been deposited at the rate of nearly one inch per month.

The Kensington reservoirs have been thouroughly cleansed, and the induction passage from the river to the pumps, which consists of a wooden trunk or box, has been repaired so as to make it certain that water will be taken hereafter from the end of the wharf. This trunk has for some time past been in such bad repair that the water has been taken mainly from the sluiceways of the docks, and has contained, consequently, more or less impurity.

I beg leave to say in this connection, that although this alteration and some care in future, may prove a partial remedy, I regard it as certain that the supplying of pure, or in any considerable degree suitable water for domestic purposes from the river Delaware at the location of the Kensington water works, is impossible.

The sewers opening into the river Delaware discharge their contents at the rate of an average of about thirteen millions of gallons daily, which large quantity is greater during summer, and necessarily includes every description of impure and refuse matter from the city, and this impurity is undoubtedly increased of late years by the prevalent and growing plans of constructing and connecting with the sewers, water closets in the large hotels and in private dwellings. It is by no means safe to assume that the water in the channel of the Delaware is beyond the reach of the deterioration

which results from the cause here alluded to, and the action of the tides very probably carries a large portion of the impurities from the sewers much beyond the present location of the Kensington works, and before there can be any complete subsidence or deposit in the bottom of the river. Other less important causes—the movements of steamboats and the general traffic on the river, for instance—also co-operate with the tides to keep in suspension, for a time, the contents of the sewers thus thrown into the river.

At the Kensington works the water is further deteriorated by the emptying of Gunner's run into the Delaware, which takes place at less than fifty yards above their location, and by the fact that the docks in their immediate vicinity have been for some years much used for the preparation of cat-fish and other fishes for the markets of the city.

I beg leave to state that there are demonstrable, in my opinion, ample causes for the unsuitable quality of the water supplied by these works, and which also, in my opinion, render impracticable and inexpedient any plan for obtaining water from the river Delaware. One plan, which is the extension of the main induction passage into the channel of the river, I regard as too doubtful to be worthy of the expense of the experiment, and another, which is to remove the works to a point above the city, is not only very doubtful in point of success, but would be much more expensive than an obvious remedy which I beg leave to suggest.

The district now supplied from the Delaware can readily be supplied from the Schuylkill (and the supply of water from the Schuylkill throughout the city can be readily equalized when the new additions to the Fairmount works are completed, and with an additional engine at Spring Garden works). For this purpose it would be necessary to elevate the reservoir at the Kensington works to the same height as the reservoir at Corinthian avenue and Spring Garden works, and to connect the former with the two latter by a main of forty inches diameter to Tenth street, thence by a thirty inch main to Kensington reservoir. This would give an additional capacity to the Kensington

reservoir of eight millions of gallons, and the greater height would much increase its capability of distribution over an area now but partially supplied in its higher localities and in its more distant parts, for instance in the late borough of Frankford, in which the supply is deficient.

The proposed elevation of the Kensington reservoir and the connection suggested would also insure a supply of water to an extensive district which it is now impossible to supply from any of the works, and would thus tend materially to the general improvement of that portion of the city.

It is proposed to connect the Spring Garden reservoir and that at Corinthian avenue by a forty-eight inch main with the necessary branches to which may connect a forty-eight inch main from Spring Garden works, and also a main of forty-eight inches from Fairmount works; then connect the Spring Garden and Kensington reservoirs by a main, as before suggested.

This main would be of sufficient capacity to fully supply the Kensington reservoir, with the additional elevation above suggested, and to allow all the distributing mains on the high parts of the district included between the Spring Garden reservoir and the Tenth street to be attached, thus giving a reliable supply to the higher portions of the Fifteenth and Twentieth Wards, which are now deficient, and frequently almost without any supply of water whatever.

The proposed connections would effectually remedy the evil of a short supply by bringing an ample storage into the immediate vicinity of the demand. By opening the connections between the Kensington district and the lower portion of the district now supplied from Spring Garden reservoir, the great draught from the higher parts of the latter district would be prevented, and the Kensington district, from its increased head and an additional distributing main would still have a better supply than at present.

The water supplied from the Kensington reservoir would, under the arrangement and connection, be the purest of any in the city, on account of its increased depth and the Spring Garden and Corinthian avenue

reservoirs acting as subsiding reservoirs. At present the Kensington works supply the Seventeenth, Eighteenth, Nineteenth, and parts of the Sixteenth, Twenty-third and Twenty-fifth Wards.

The greatest demand on the works is during the months of July and August, at a season when there is a possibility of low water in the Schuylkill, and the consequent inability of the Fairmount and Spring Garden works to make up the additional demand which would arise from the connection of the Kensington district; should any serious accident occur in the machinery at the Spring Garden works, further inability would necessarily arise.

I would therefore recommend the erection of an additional Cornish engine at these works, capable of pumping ten millions of gallons per day with a forty-eight inch ascending main to the reservoir, and which would be sufficient to meet all emergencies.

For the purpose of supplying water to all parts of the city from Fairmount and Spring Garden works, I would recommend also the laying of a main forty-eight inches in diameter from Fairmount works to Corinthian avenue reservoir, which would enable these works to pump directly into the three reservoirs to which I have above referred. This arrangement would render the new works now in progress and nearly completed at Fairmount, completely available, and during nearly the whole year these new works could be exclusively devoted to contributing to the supply now derived from the Spring Garden, Corinthian avenue and Kensington reservoirs, and only in cases of extreme draught or accident at the Fairmount works, would the proposed additional power at the Spring Garden works be called into requisition.

The proposed main between the Spring Garden and Kensington reservoirs would contain 811,091 gallons, and would be a valuable addition to the storage capacity of the higher localities with which it would be connected.

The capacities of the several reservoirs here alluded to are as follows:

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| The Corinthian avenue reservoirs, | 37,500,000 | gallons. |
| The Spring Garden " | 9,800,000 | " |
| The Kensington " | 9,400,000 | " |
| Total, - - - - - - - | 56,700,000 | gallons. |

The demand on the Corinthian avenue reservoir is about three and a half millions of gallons per day, and it has therefore a capacity of ten and three quarter days' supply.

The demand on the Spring Garden reservoir is about seven millions of gallons daily, and its capacity is therefore not quite one and a half day's supply.

The demand on the Kensigton reservoir is about two and a half millions of gallons daily, and its capacity less than four days' supply.

The suggested elevation of the Kensington reservoir added to the preceding, would make a total storage capacity of the three reservoirs, of 65,000,000 gallons, and the total daily demand on them is 13,000,000 gallons, or their united capacity would be five days' supply by connecting them as I have herein suggested.

This connection would insure five days' supply to the whole of the 11th, 12th, 13th, 14th, 15th, 16th, 17th, 18th, 19th and 20th Wards, and to parts of the 21st, 22d, 23d and 25th Wards, in portions of which at present there is not more than a supply for half this time, and in some localities a supply for only a few hours.

The connection of the three reservoirs here alluded to would not only give a better supply, but would so equalize the storage capacity that localities now having only a few hours' supply would be increased to five days, and some portions of the district supplied from the Fairmount works could be added so as to entirely equalize the supply to the whole city. Such an arrangement would somewhat increase the supply in the district watered by the Fairmount works, and the increase and consequent advantage to the districts supplied by the Kensington and Spring Garden works are sufficiently obvious.

The arrangement suggested would be a permanent remedy, and would certainly, as above stated, so greatly

increase the capacity of the Kensington reservoir as to include a large area now impossible to supply, and would undoubtedly create an additional demand for water from property owners, and incidentally increase its value and greatly encourage improvement and enterprize.

In the first year after the laying of the thirty inch main which supplies the first four wards of the city and the consequent greater capability of supply, the increased receipts were about twenty per cent. of its cost and there has been a constant annual increase.

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| The total quantity of water supplied by the Kensington Works in 1861 was, . . . . | 983,805,740 | gallons. |
| Or a daily average of, . . . | 2,695,358 | " |

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| The total cost of supplying the above, . | $22,470 12 |
| To supply the same quantity from Spring Garden Works would cost, . . . | 11,884 37 |
| And the same quantity supplied from the Fairmount Works would cost, . . | 11,126 84 |

These sums include the interest on the cost of the Works, and exclusive of such interest the cost of supply would be as follows:

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| From Kensington, . . . | $13,468 30 |
| Spring Garden, . . . | 8,382 00 |
| Fairmount, . . . . | 1,632 00 |

The value of the property owned by the City now occupied by and including the Kensington Works is about sixty thousand dollars, and in the event of adopting the proposed recommendation, their use as a water works would be abandoned.

The present pumping main, which would cost about $50,000 to lay, could be advantageously used as an additional distributing main, already much needed, and even now almost indispensable in supplying fully the higher parts of the district, and would leave the present distributing main to connect directly with the lower portions of the Kensington and Spring Garden Districts.

The district supplied by the Kensington Works con-

tains a population of 120,000, and pay water rents amounting to $70,000.

The first four wards of the city, which are supplied from the Corinthian Avenue reservoir, contain a population of 110,000, and pay water rents amounting to $95,000.

In these two cases the smaller population pays the larger amount of water rents.

The increased demand in the Kensington District in 1861 over that of 1856 is little more than 590,000 gallons per day, while in the district supplied from Fairmount Works, during the same period of five years, the increase is about 2,500,000 gallons daily.

In the Spring Garden District the increased demand in the same period is about 1,500,000 gallons per day, and in the Twenty-fourth Ward, where the facilities for obtaining a supply are not reliable and are inferior to those of the Kensington Works, the daily increase in a period of five years is over 800,000 gallons. These facts are given for the purpose of showing that causes exist rendering the demand for water supplied by the Kensington Works comparatively more restricted than the demand from any other of the Water Works of the city.

The proposed arrangement would very probably much increase the value of property in the entire district now supplied from the Kensington Works, and also in the more limited districts above referred to in the Fifteenth and Twentieth Wards, and would tend directly to the development of general improvement in those parts of the city.

The greatly increased ability to supply, by means of the proposed connections, and the additional area which would result from raising the Kensington reservoir, would undoubtedly create a very largely increased demand for consumption, and this ability to supply may very properly be kept in advance of private enterprise.

In compliance with your resolution the Kensington District was supplied with water from the Spring Garden Works for thirty-four days, during which time no complaint of the quality of the water, nor relating to

the health of the district, reached this Department, nor has there been to my knowledge any further action of the Board of Health nor of the citizens of the district.

Very respectfully,

ISAAC S. CASSIN,
*Chief Engineer of Water Works.*

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DEPARTMENT FOR SUPPLYING THE CITY WITH WATER,
PHILADELPHIA, APRIL 24, 1862.

*To the Select and Common Councils of the City of Philadelphia:*

GENTLEMEN:—In compliance with a resolution adopted by your honorable bodies, and approved April 10th, 1862, I herewith submit the following estimates.

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| For connecting a 40 inch main on Master street, from Spring Garden Reservoir to Tenth street, together with necessary connections to service pipes in cross streets from Twenty-sixth to Tenth street, with stops, branches, &c., . . . . | $93,150 00 |
| For connecting a 30 inch main running on Master street, from Tenth street to Seventh street, and on Seventh street to Kensington Reservoir, . . . . . | 79,569 00 |
| For building retaining wall around and raising Kensington Reservoir seven feet, or to the same level as Corinthian Avenue and Spring Garden Reservoirs, | 68,335 00 |
| For connecting a 48 inch main from Corinthian Avenue Reservoir to Spring Garden Reservoir, . . . . . | 46,500 00 |
| Total, . . . . . | $287,554 00 |

Very respectfully,

ISAAC S. CASSIN,
*Chief Engineer of Water Works.*