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CITY OF BOSTON.

FINAL WATER REPORT.

In Common Council, January 5, 1850.

Laid on the table and ordered to be printed.

Attest: W. P. Gregg, *Clerk C. C.*

To the Hon. John P. Bigelow, *Mayor and Chairman of the Joint Standing Committee of the City Council on Pure Water.*

The period of the appointment of the undersigned as Water Commissioners being about to expire, we beg leave to submit our final

REPORT:

All the important parts of the works which we have undertaken to establish for the supply of Water to the City, with the exception of those for conveying it to East Boston, are completed. Some trifling portions of work remain to be finished. A large number of tracts of land along the line of the aqueduct, mostly of small extent, purchased for the purpose of reducing the amount of charges for damages, and also some portions of machinery, remain to be disposed of,—and some twenty or thirty claims for damages, mostly from the taking of land, remain to be settled. The greater part of these claims are of moderate amount.

A great deal of time and care has been devoted to the settling of claims for land damages, which have been attended with much difficulty, on account of extravagant demands made by many of the claimants, and the disposition, in a large portion of cases, to value lands taken for the water works, by a very different rule, from that which would be applied in a case of ordinary sales.

In all the cases of unsettled claims, the lands have been taken, in conformity with the provisions of the act, and in several of them, application has been made to the court by the claimants, for the appointment of Commissioners. A number of the cases settled were deter-

mined by the award of Commissioners, or of referees, and two by the verdict of juries, on appeal from the Commissioners' award. The greater portion of cases have been settled by agreement with the claimants. In one of those yet unsettled, that of Nancy Harbach and others, in Newton, the Commissioners have ordered an appeal from the award of the Court Commissioners, on the ground that, in their opinion the amount awarded, of $7,700, is far greater than the actual damage sustained.

Among the claims unsettled are four in Newton, which are more or less connected, in the nature of the damages alleged, with the case of Harbach and others. In support of these claims it is maintained, that the estates in the vicinity of the Newton Tunnel, are seriously injured by being exhausted of their springs of water, even to a great distance from the tunnel. The Commissioners are of opinion that the injury, whatever it may be, is far more limited in extent, than is alleged by the claimants.

For the purpose of meeting the demands of this nature made by a part of the claimants in that vicinity, and of obtaining the means of compensation for them all, the Commissioners have established an Aqueduct in Newton, by the formation of a company, under the provisions of the Revised Statutes. The Aqueduct is held in shares, in such manner that the water may be appropriated as the interests of the City, in compounding the claims for damages occasioned by the tunnel, may require. A large well has been dug, and a reservoir formed beneath the surface, on an elevated lot of land purchased for the purpose, which affords a large quantity of water, sufficient for the supply of a number of families. Pipes have been laid for conveying the water to the premises to be supplied, through the streets, in

conformity with the provisions of the law granting authority to this effect, to companies so formed. A substitute has been already afforded, by means of pipes from this aqueduct, and permanent cisterns laid in cement masonry, for the water of five wells in the vicinity of the tunnel, which had temporarily failed, and there is apparently a sufficiency of water for the supply of a number of families in addition.

The Compensation Reservoirs, established on lands purchased therefor, in Hopkinton and Marlborough, for the purpose of affording a supply of water in compensation for that which is diverted from the Concord river, during the season when it is demanded for the use of water privileges situated thereon, have been in successful operation during the last summer. A large quantity of water was discharged daily, from both these reservoirs, during a period of ninety-two days in the dry season of last summer. The Whitehall Reservoir which extends over an area of 576 acres, was not filled, by a deficiency of 6¼ inches in depth, in consequence of the moderate amount of rain and snow which fell during the last winter. The height of the dam is 10 feet 10½ inches. At the Fort Meadow Reservoir, the height of the dam is 26 feet 7 inches; and when filled it will cover an area of 299 acres. It was filled the last season, to the depth of 23 feet 2½ inches only. The depth to which both reservoirs are now filled authorizes the expectation, that in the course of the ensuing spring, they will be entirely filled, or that there will be a very small deficiency. A system of regulations and of superintendence is required to be established, by means of which the waters of these reservoirs may be made fully available, to the purposes for which they are intended.

During the past season a variety of works on the line of the aqueduct, and in the vicinity of the lake,

have been prosecuted, under the superintendence of the Chief Engineer of the Department. These works consist of the dressing up, and finishing of some portions of the back filling of the aqueduct, and of the grounds adjoining, and also of the shores of the lake, the roads and bridges which cross it, the walls and slopes for the protection of the banks, and the dam at the outlet of the lake. Much attention has been given to the discovery of leakages, by examination in the interior of the aqueduct, and the repair of them, so as to prevent the admission of water from springs along the line. These leakages occurred, to some extent, where the conduit was laid either through tracts of quicksands, or upon ground from which copious springs of water issued, during the construction of the work. It has been found practicable to stop these leakages, by wooden wedges driven into the crevices of the brick work. The whole of the brick masonry stands with entire firmness, and is likely to be permanent. No failure of stability and strength in the structure of the conduit, nor any change of shape has been found, in any part of it.

There have been no leakages on any part of the line by which water has escaped from the aqueduct. The only difficulty which occurred in making the conduit entirely firm and tight, was in parts in which it was impossible to prevent the forcing of the external water arising from springs, through the fresh masonry, for a sufficient length of time, to permit the cement to harden. The water in such cases found a passage through the cement, so far as to permit it to flow off, without weakening the structure. These passages which although numerous, were but trivial at each point, have now been closed in the manner above described.

The amount of Water afforded by Cochituate Lake during the past year, although a season remarkable

for its comparatively small quantity of rain and snow, has been sufficient to give the most satisfactory assurance, of the abundance of the supply which may be relied on from it, for all the domestic wants of the City, at any future period. According to the estimate of the Chief Engineer for the Western division, the quantity which has been used for the supply of the City, together with what has been intentionally wasted by the discharge of it into Concord and Charles rivers, for the purpose of facilitating operations on the works, and also the quantity accumulated in the lake, in addition to that which it contained at the commencement of the last year, was not less than an average of 10,339,000 gallons per day. There has been a manifest improvement in the transparency and purity of the water, since its introduction, and there is reason to anticipate that it will continue to improve.

The extent of iron pipes laid, for the introduction of water from the Brookline Reservoir, and the distribution of it in the City proper and South Boston, is 81 miles and 2,659 feet, of which 9 miles and 2,241 feet consist of pipes of 30 and 36 inches in diameter. The residue of the pipes, consisting in the chief part of those for distribution of the water throughout the City, are of various dimensions, viz: of 24, 20, 16, 12, 6, and 4 inches, in diameter. The number of service pipes laid for the supply of houses, and places of business, is 13,341, and the number of taps opened, and of water takers, 12,108, leaving 1,233 service pipes introduced into houses, which are not yet used. The number of the latter is daily diminishing by new applications for water, and there will doubtless be a steady demand for new service pipes. In addition to the above, inch pipes of lead, to the extent of 1,293 feet, have been laid on the wharves for the supply of shipping. The number

of fire hydrants, in the City proper, is 779, and in South Boston 137, making a total of 916. The hydrants have been recently prepared for the winter, by the insertion of a wooden platform or cover, two feet below the outer iron cover, and filling the space between the covers with hay. This, it is believed, will afford an effectual protection against frost or other casualty.

In addition to the extent of the iron pipes above stated, there is a double line of 30 inch pipes, each of 1,000 feet in length, for conveying the water of the aqueduct across the Charles River, over the arched bridge erected for the support of it, and connecting the two sections of brick conduit.

The Reservoir on Beacon Hill was finished, and the water let into it, on the 23d of November last. It was filled, by means of the 30 inch pipe alone, in the space of 18½ hours; and in 21½ hours, it had risen to the height of 4½ inches, on the wasteway by which the overflow is discharged into the common sewer. In consequence of the freshness of the masonry, and the immediate approach of cold weather, which prevented its hardening rapidly, it was thought not expedient to suffer the water to remain permanently in the reservoir at present. When filled, there was a trifling leakage, though less than was anticipated, in consequence of a portion of the cement of the walls, and of the concrete in the bottom having been very recently laid, and being imperfectly set. It is found by recent trial that this leakage, or exuding of water, through some small portions of the masonry, is already diminished. For the reason above stated, the reservoir has not been used for aiding the distribution in the City, except for a very short period. The South Boston Reservoir was completed, and the water introduced into it, on the 28th November, and the water now flows

freely through it. This reservoir has been closed with a fence, to prevent improper intrusion upon it. In this reservoir the height of water is maintained through the day, within from two to four feet of the height at the Brookline reservoir.

In the plan of the Beacon Hill Reservoir, it was deemed expedient to provide a small stairway to afford access to the summit, for all necessary purposes, but not of dimensions adapted to its being a place of public resort. It seemed obviously improper, for various reasons, that the reservoir should be open to the public as a place of common resort and recreation, as the water would be thereby exposed to become soiled, and to contract impurities, which would render it, in imagination at least, unfit for use. It has been therefore deemed unnecessary to surround the coping and platform, at the summit of the reservoir, with a railing, or to incur the charge of maintaining a guard in constant attendance. Even with a railing and guard, or watchman, there would be great danger in opening it freely to the public, on account of its great elevation, the limited space upon it, and the narrowness of the access to it. This consideration, and the obvious unreasonableness of unnecessarily exposing the occupants of the adjoining dwelling houses, to the annoyance of having their windows overlooked by the public, afford reasons, in addition to the liability of introducing causes of impurity to the reservoir, for not opening the access to the public, as a place of recreation, and for the indulgence of curiosity.

During the past year, the shipping in the harbor has been supplied with water from the hydrants, by an association of watermen, under an arrangement, by which they paid to the City a compensation of one hundred and fifty dollars per month, and received, for their own

emolument, whatever they obtained for the water. This contract having expired on the 1st inst, and the watermen having declined to renew it, on terms which were regarded by the Commissioners equitable, in the rate of charge to be made by them to the consumers, for the water, as well as the compensation received by the City; an appointment has been made of Captain Alden Gifford, as the agent of the City, for supplying this demand. It is made his duty, to supply all vessels applying for water from hydrants, by means of hose, water carts, or boats, as shall be most convenient—to employ the necessary assistants for this purpose, to keep an account of the proceeds, and after deducting the necessary expenses to be defrayed by him, under the supervision of the Registrar, to pay over the balance at stated periods to the Water Board. The water will thus be supplied at a reduced rate, and it will probably afford a much greater income to the City, than under the former arrangement. It appears from an official statement that the number of vessels cleared from this port the last year, was 6,721, in addition to the large number sailing under coasting licenses.

The whole expenditure by the Commissioners to this date, including payment for the works and for services of every description, for land and for water rights, and for damages, including the purchases made by authority of the City Council for compensation reservoirs, and the purchase of land for a reservoir in East Boston, amounts to $4,039,826 70. These payments have been made by drafts, by the Water Commissioners on the City Treasurer, which have been all promptly paid at sight. From this amount should be deducted a credit of $41,774 87, paid into the City Treasury, from the proceeds of lands, machinery, and materials re-sold, and from insurance recovered, showing the entire cost of the works, to this date, exclusive of interest, to be $3,998,051 83.

We beg leave, in closing this communication, to express our most hearty acknowledgments of the uniform and cordial co-operation and support of the City Authorities, in the discharge of our official duties, during the whole period of our appointment. This acknowledgment is due especially to the late and present Mayors, to the several Boards of Aldermen, and of the Common Council, to the several Water Committees, to the City Solicitor, and to the City Treasurer. For the aid which they have thus severally afforded us, and the confidence they have been pleased to repose in us, we respectfully return our most sincere thanks.

We feel bound also on this occasion, to express our acknowledgments to the Chief Engineers, William S. Whitwell, and E. S. Chesbrough, Esquires, for their very able services, for their most faithful and satisfactory discharge of all the duties devolved upon them, and their constant devotion to the expeditious and thorough execution of the work in their respective departments. To their skill and efficiency, we are greatly indebted for the successful completion of this great work.

We wish also to express our acknowledgments to Mr. Samuel Holbrook, the Chief Clerk of the Commissioners, to Mr. J. Avery Richards, the Registrar, to the Resident and Assistant Engineers, to the principal Contractors, and to the Inspectors, Agents, and Clerks, in the several departments of the service, for the fidelity and ability with which they have discharged their respective duties.

NATHAN HALE,
JAS. F. BALDWIN,
THOS. B. CURTIS.

Boston, January 4, 1850.