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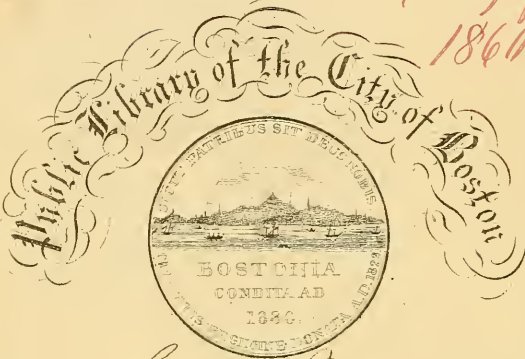
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ANNUAL REPORT
OF THE
COCHITUATE WATER BOARD
FOR
1860.

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R E P O R T

OF THE

COCHITUATE WATER BOARD

TO THE

CITY COUNCIL OF BOSTON,

FOR THE YEAR 1860.



BOSTON:

GEO. C. RAND & AVERY, CITY PRINTERS,

No. 3 Cornhill.

1861.

CITY OF BOSTON.

In Common Council, Jan. 10, 1861.

ORDERED: That the Cochituate Water Board be authorized to make their Annual Report in print.

Sent up for concurrence.

J. H. BRADLEY, *President.*

In Board of Aldermen, Jan. 14, 1861.

Concurred.

SILAS PEIRCE, *Chairman.*

Approved January 15, 1861.

J. M. WIGHTMAN, *Mayor.*

R E P O R T .

OFFICE OF THE COCHITUATE WATER BOARD, }
Boston, January 15, 1861. }

TO THE CITY COUNCIL.

The Cochituate Water Board respectfully submit to the City Council their Annual Report for the year 1860. In compliance, also, with the City Ordinances, they submit the Reports of the City Engineer, the Water Registrar, and the Clerk of this Board, all of which are worthy of attention from those who are interested to know the condition and workings of this department.

It is believed that the works were never in a condition more safe and efficient than at the present time.

The first important work of the year 1860 was the completion of the New Main, left over from 1859. This was finished entirely in May last; and so important was the conclusion of this undertaking deemed to be by this Board, that a Special Report on the subject was submitted to the City Council. It is not therefore deemed necessary to allude any further to that subject.

Early in the season the Board gave attention to the condition of the lake and its surroundings. It was

found that many of the original stakes marking the angles of the five rods owned by the City around the pond, had become decayed or been removed ; and it was deemed advisable that new stone ones should be obtained and substituted for the old wooden ones, — and this before the means of knowing their exact position should become obliterated. Mr. Knowlton was therefore instructed to obtain suitable split stones, and have one placed at every angle around the pond, thus marking the bounds of the City property in a permanent manner. This order has been mainly executed. Some places where the land was soft and boggy have been left to be attended to when they could be approached better on the ice. The expense of this job has been thus far \$200.

The condition of the borders of Snake Brook has been long deemed unsatisfactory, both to the credit of the city and to the health of Cochituate Village. Especially since the raising of the dam, the water on its margin where it backs up for a long distance, has been so variable in depth, and the mud so alternately flooded and drained, that it seemed necessary to do something for its more creditable appearance, as well as for the health and comfort of the citizens. After mature consideration by the whole Board on the spot, it was deemed best to make only one job of it, and Mr. Knowlton was directed to fill in from the neighboring bank, so as to cover all the objectionable portions of the margin of the brook, and thus secure from all exhalations of a noxious character the whole neighborhood. This has been done, and the citizens appear to be highly pleased with the considerate and liberal

policy of, the City. The cost of this improvement has been \$2,701.54.

The next important undertaking was the raising the pipes on Tremont Street. Operations were commenced on the 20th day of August, and the two lines of 30-inch pipes, between Castle and Waltham streets, have been successfully raised; also the 20-inch pipe on Dover Street, between Tremont and Emerald streets, and the Service Mains of Tremont and Dover streets. Two 36-inch, one 24-inch, and two 12-inch stop-cocks have been renewed; and six hundred and thirty-six feet of 30-inch pipe have been taken out, and the same number of feet of 36-inch pipe laid in place of it. The 36-inch line is now complete to the north line of Dover Street. 2,486 feet of 30-inch, 528 feet of 20-inch, 100 feet of 12-inch, and 1,784 feet of 6-inch pipe, have been raised so as to conform to the new grade of Tremont and Dover streets. The Service Pipes have not all been renewed this fall, as the houses would not be occupied during the winter; they will be put in early in the spring. The work was carried on to a disadvantage by so many parties being at work at the same time.

There remain on hand stock and tools to the amount of \$5,377. The importance of raising the remainder of the pipes out to the Gate Chamber, while we have everything in order for the purpose, is earnestly recommended to the incoming Board. The whole cost of the operation has been \$17,398.26, thus far.

In relation to this matter of raising the pipes, it must be apparent to every one that it is a work of great delicacy, requiring great skill, judgment, and

attention. It was successfully executed by Mr. Stanwood, Superintendent of the Eastern Division, to the entire satisfaction of this Board.

The late severe fire in Beacon Street developed the total inadequacy of suitable means to meet such an emergency. The pipe there laid was 6-inch diameter, hydrants few and far between, and it was impossible for the Steam Fire Engine to obtain a supply of water. It was deemed by this Board of the utmost importance that no time should be lost in placing that valuable portion of the city in as secure a position as possible against the occurrence of a similar calamity. Immediate order was given to lay down 12-inch pipes in place of 6, and 1,670 feet have been laid, and the continuance of the same should have early attention in the spring. The cost of this extension has been \$4,491.27, thus far.

By reference to the Water Registrar's Report, it will be seen that nine of the leading hotels have paid no water rents for the last year, and a part none for the last quarter of the year before. The amount thus assessed, and not paid, is \$9,526.60. This has been assessed by meters, and payment is resisted on the ground of illegal assessment. The case is not yet decided, but it is much to be desired that it may be shortly. When this is paid, and one equal sum for this year, it will at once carry the receipts of the current year beyond the estimate of the Water Registrar.

The Consumption of Water. In the last Annual Report, the following language was indulged in: "It seems as if we might now fairly conclude that the individual

consumption had come to its maximum, — the variation in three years not exceeding one gallon ;” say $72\frac{1}{2}$ to 73 gallons. But the present year is a fearful example of the fallacy of such calculating. By the Report of the Engineer, hereto annexed, it appears that the average daily consumption of water has been 17,238,000 gallons. By the census returns, it appears that the number of inhabitants is 177,902. This shows a consumption of 97 gallons for each individual; an amount believed to be without parallel in the civilized world. Of course there is nothing in the sales of the water that could lead to the expectation of such a monstrous increase; and we must again resort to the old story of extravagant and inordinate *waste*.

The past year has afforded the first opportunity ever enjoyed to test the capacity of the Lake. During the year, not a pint has been allowed to escape that could be retained. It has been impossible to fill the Lake to the height of the dam, so the whole has been drawn to the city. The fall of rain has been unusually large; say $55\frac{1}{2}$ inches; while the average of nine years has been $48\frac{3}{4}$. The actual daily delivering of water has been 17,238,000 gallons, and the water in the Lake, January 1, this year, being ten inches higher than a year ago, would give an additional supply of about one half a million gallons daily, or about 17,700,000 gallons. It would seem to be a safe inference that, in years when we have $55\frac{1}{2}$ inches of rain, the maximum yield of the Lake will be 17,700,000 gallons, and no more. But as in the average of years only $48\frac{3}{4}$ inches fall, we can safely rely upon only a proportional diminished supply.

In bringing this enormous quantity of water to the

city, the Board can but express the opinion that the capacity of the aqueduct has been put to the severest test that ought ever to be applied to it. To work it under any increased head, must be attended with the utmost hazard.

Two conclusions seem to this Board now to be reached, of a practical character. The *first* is that the Lake can be relied on for no greater supply of water than has been drawn from it this year; and the *second* is that the aqueduct can convey no more water than it has done this year.

These conclusions are of a nature to arrest public attention, and to induce inquiry what is to be done? What use shall we make of the present quantity, in view of the great difficulty and expense of increase? Every effort should be made to guard against *waste*. The people can economize in its use, for they have done so. When the break took place at Needham, the consumption was reduced near three fourths.

This Board was in hopes that some latitude might be indulged in in playing the public fountains and in supplying opportunity for skating. But nothing of these indulgences can be entertained. Any considerable quantity drawn for skating, must put in jeopardy the supply on Beacon Hill and all the high service. If at all, and under any circumstances, this object is to be thought of, it should be done with the greatest care not to interfere with the regular and necessary supply.

When all the unnecessary uses of the water are stopped, then, in case of insufficient quantity, it would become the policy of the City to cut off, one after

another, the classes of takers for mechanical purposes. It is to be hoped, however, that the time is not near at hand when this will be necessary ; it is only alluded to as indicating what would undoubtedly become the policy of the City, at all times, in order to supply a full and needful quantity of pure water for domestic use.

This state of facts would seem to settle all idea of annexing other municipalities to the City of Boston.

Meters of Worthington's construction continue to give entire satisfaction, and will be more extensively used.

Details of hydrants, stop-cocks, and extension of the work will be found in the Report of the City Engineer, annexed.

By reference to the Report of the Clerk of this Board, it will be seen that the expenditure for the year has been \$146,304.55. Of this amount, \$34,880.71 was for the new main, \$17,398.26 for raising pipes on Tremont and Dover streets, \$4,491.27 for extending the 12-inch pipe on Beacon Street, and for extension of the work \$59,120.98 ; leaving \$30,413.33 as the expenses of the year.

All of which is respectfully submitted.

EBENEZER JOHNSON, *President.*
SAMUEL HALL,
GEORGE P. FRENCH,
CLEMENT WILLIS,
G. E. PIERCE,
GEORGE DENNIE,
L. MILES STANDISH.

RECEIPTS AND EXPENDITURES.

*Statement of Expenditures made by the Cochituate Water Board,
from December 31, 1859, to January 1, 1861.*

Hopkinton Reservoir, for services - - -	\$35 00
Laying Service Pipe - - - - -	5 50
Plumbing Shop, for stock, &c. - - -	22 50
Taxes - - - - -	167 27
Pipe Yard, for stock, &c. - - - -	321 05
Fountains - - - - -	225 86
Hose - - - - -	201 24
Stationery (including stationery for Water Registrar and Superintendents) - -	156 53
Rents - - - - -	52 00
Damage, in streets, &c. - - - -	211 25
Wages, Miscellaneous - - - - -	41 50
Oil - - - - -	89 10
Printing (including Water Registrar's, and Superintendents) - - - -	537 05
Miscellaneous Expense, expenses of the Board, Engineering, &c. - - - -	497 26
Meters - - - - -	2,206 75
New Main, whole amount paid, \$304,657 07	
Deduct previous payments, 269,776 36	34,880 71
Repairing Main Pipe - - - - -	1,179 50
Aqueduct Repairs at Snake Brook, &c. - -	4,368 60
Lake, finishing wall, banks, &c. - - -	1,982 93
Repairing Service Pipe - - - - -	2,375 06
<i>Amount carried forward</i> - - -	\$49,556 66

<i>Amount brought forward</i>	-	-	-	\$49,556 66
Repairing Streets - - - - -	-	-	-	1,639 31
" Hydrants - - - - -	-	-	-	1,754 56
Salaries - - - - -	-	-	-	8,212 08
Office Expense - - - - -	-	-	-	1,718 50
Off and on Water - - - - -	-	-	-	2,907 73
Wages Proving Yard - - - - -	-	-	-	3,256 81
" Plumbing Shop - - - - -	-	-	-	529 99
" Blacksmith Shop - - - - -	-	-	-	911 03
" Laying Main Pipe - - - - -	-	-	-	5,259 86
" " Service Pipe - - - - -	-	-	-	3,837 57
Beacon Hill Reservoir, for labor, &c. - - - - -	-	-	-	597 29
South Boston, " " " - - - - -	-	-	-	115 74
East Boston, " " " - - - - -	-	-	-	304 46
Brookline, " " " - - - - -	-	-	-	1,218 08
Service Pipe - - - - -	-	-	-	11,162 92
Main Pipe - - - - -	-	-	-	21,854 21
Stable - - - - -	-	-	-	1,366 98
Laying Main Pipe, for stock, &c. - - - - -	-	-	-	2,246 56
Blacksmith's Shop, " " " - - - - -	-	-	-	207 96
Hydrant and Stop-cock Boxes - - - - -	-	-	-	549 95
Repairing Stop-cocks - - - - -	-	-	-	1,167 01
Travelling Expenses - - - - -	-	-	-	160 18
Tolls and Ferriage - - - - -	-	-	-	165 47
Postage and Express - - - - -	-	-	-	49 47
Tools - - - - -	-	-	-	322 28
Raising Water Pipes, on Tremont and Dover streets - - - - -	-	-	-	17,398 26
Carting - - - - -	-	-	-	467 25
Hydrants - - - - -	-	-	-	1,083 35
Proving Yard, for stock, &c. - - - - -	-	-	-	296 21
Stop-cocks - - - - -	-	-	-	1,495 55
Laying Pipe on Beacon Street - - - - -	-	-	-	4,491 27
<i>Amount carried forward</i>	-	-	-	<u>\$146,304 55</u>

<i>Amount brought forward</i>	-	-	-	\$146,304	55
Less this amount drawn for New					
Main	-	-	-	\$34,880	71
Less this amount drawn for Rais-					
ing Pipes on Tremont and Dover					
streets	-	-	-	17,398	26
Less this amount drawn for Laying					
Pipe on Beacon Street	-	-	-	4,491	27
				<u>56,770</u>	<u>24</u>
				\$89,534	31

CASH PAID CITY TREASURER.

Received Rent for Arches under					
Beacon Hill Reservoir	-	-	-	\$300	00
Received for Wood	-	-	-	146	80
" " Grass and Pasture	-	-	-	35	00
" " Old Hose	-	-	-	50	00
" " Pipe, laying, &c.	-	-	-	<u>1,107</u>	<u>66</u>
				1,639	46
Received for off and on Water, for					
Repairs	-	-	-	1,450	05
Received for off and on					
Water, for Waste	-	-	-	198	00
Received for off and on					
Water, for non-paym't	-	-	-	<u>1,517</u>	<u>50</u>
				\$3,165	55
Less this amount for					
non-payment, which					
has been paid City					
Treasurer	-	-	-	1,517	50
				1,648	05
				<u>3,287</u>	<u>51</u>
Balance	-	-	-	\$86,246	80

EXTENSION OF THE WORK.

Main Pipe	-	-	-	\$21,854	21	89,534	31
Service Pipe	-	-	-	<u>11,162</u>	<u>92</u>		
<i>Amounts carried forward,</i>				\$33,017	13	\$89,534	31

<i>Amounts brought forward,</i>	\$33,017 13	\$89,534 31
Laying Main Pipe - - - - -	2,246 56	
Hydrants - - - - -	1,083 35	
Stop-cocks - - - - -	1,495 55	
Hydrant and Stop-cock Boxes -	275 25	
Carting - - - - -	300 00	
Tools - - - - -	200 00	
Oil - - - - -	89 10	
Wages, Proving Yard - - - -	3,256 81	
“ Plumbing Shop - - - -	370 00	
“ Laying Main Pipe - - - -	5,259 86	
“ “ Service Pipe - - - -	3,837 57	
“ Blacksmith Shop - - - -	711 03	
Proving Yard, for stock, &c. -	200 00	
Meters - - - - -	1,950 00	
Laying Service Pipe - - - -	5 50	
Stable (for carting) - - - -	1,000 00	
Blacksmith Shop, for stock, &c. -	150 00	
Tolls and Ferriage - - - -	100 00	
Aqueduct Repairs, covering the Aqueduct at Snake Brook -	2,701 54	
Lake, finishing Wall, Banks, &c. -	871 73	
	<hr/>	59,120 98
		\$30,413 33

*Expenditures and Receipts on account of the Water Works,
to January 1, 1861.*

Amount drawn by the Commissioners -	\$4,043,718 21
“ “ “ Water Board, 1850 -	366,163 89
“ “ “ “ “ 1851 -	141,309 23
“ “ “ “ “ 1852 -	89,654 20
“ “ “ “ “ 1853 -	89,854 03
“ “ “ “ “ 1854 -	80,182 35
“ “ “ “ “ 1855 -	63,866 33
<i>Amount carried forward,</i>	\$4,874,748 24

<i>Amount brought forward,</i>		\$4,874,748	24
Amount drawn by the Water Board, 1856	-	81,429	35
“ “ “ “ “ 1857	-	96,931	25
“ “ “ “ “ 1858	-	76,006	01
“ “ “ “ “ 1859	-	385,652	47
“ “ “ “ “ 1860	-	146,304	55
		<u>\$5,661,071</u>	87
Amount paid the City Treasurer			
by the Commissioners	- -	\$47,648	38
Am't paid by Water Board, 1850,		8,153	52
“ “ “ “ 1851,		5,232	38
“ “ “ “ 1852,		15,869	12
“ “ “ “ 1853,		4,621	40
“ “ “ “ 1854,		12,423	29
“ “ “ “ 1855,		9,990	38
“ “ “ “ 1856,		7,840	43
“ “ “ “ 1857,		13,750	00
“ “ “ “ 1858,		9,200	00
“ “ “ “ 1859,		5,554	00
“ “ “ “ 1860,		3,287	51
		<u>143,570</u>	41
		\$5,517,501	46
Sundry Payments by the City	-	63,359	51
Discount and Interest on Loans		<u>3,443,617</u>	61
		3,506,977	12
		9,023,478	58
Sundry Credits by the City		\$55,833	08
Am't received for Water Rates		<u>2,714,710</u>	31
		2,770,543	39
		<u>\$6,253,935</u>	19

SAMUEL N. DYER,

Clerk of Cochituate Water Board.

APPENDIX

CITY ENGINEER'S REPORT.

OFFICE OF CITY ENGINEER, }
BOSTON, *January*, 1861. }

EBENEZER JOHNSON, ESQ., *Pres. of the Cochituate Water Board* :

SIR: The usual Annual Report of matters connected with the Water Works is herewith submitted.

Lake Cochituate, &c.

During the past year the borders of the Lake have been improved in part, by slope walls in places where the banks were in danger of being washed so much away as to approach very near to the five-rod line.

Snake Brook has been much improved, partly by filling in some portions of it which contained stagnant water, the filling being obtained on its banks; and partly by clearing out the dirt which had accumulated in some parts of it. All the lands and structures about the Lake are in good condition.

Raising the Dam at the Lake.

During the past year Mr. Knowlton has kept a record, as hitherto, of the daily heights of water at the Lake. By con-

densing and summing up these heights, we find that during 4 days the water stood at a level of only *five* feet in the Lake. 29 days it stood *above five and less than six* feet. 64 days it stood *above six and less than seven* feet. 173 days *above seven and less than eight* feet. 42 days *above eight and less than nine* feet. 54 days *over nine* feet, and 7 days it has been *up to nine feet seven inches* in the Lake.

Until the latter part of 1859 when the dam and roads about the Lake had been raised two feet, the extreme depth of water which could be made available from the Lake by gravitation, was only eight feet. Two feet being then added would give us an available depth of ten feet when the Lake is full, provided we used no more water than originally expected. But as our increase of consumption has been largely over what was expected when the works were constructed, we must deduct the difference in depth required to keep up such a supply as we now require, which leaves but about six and a half feet of really available depth when the Lake is full. During the past year we have been benefited by the raising— for the full period of 103 days. To this we may add a few days when the water was so nearly up to eight feet that we should have been compelled to waste the water from the Lake to avoid the danger of its breaking over the dams, had there been a sudden freshet. We have therefore been benefited nearly one third of the year, because the dam, roads, and gate-house were raised. The extra amount of water which we have been enabled to save on this account equals about 1,500,000,000 gallons, which would have supplied the city 88 days at the rate of 17,000,000 gallons per day. It is also equal to a depth of about seven feet over the entire surface of the Lake.

Waste water, consumption of water, and capacity of the Lake.

In my report for the year 1859, it was shown that during the early part of that year, and up to July the 8th, a large

amount of water was wasted from the Lake into Sudbury River.

From July 8, 1859, to January 1, 1861, there has not been any water wasted in that direction. All the water drawn from the Lake has been brought to the city.

By reference to the table of *consumption of water* it will be seen that the amount used during the past year has averaged over 17,000,000 gallons daily, an average increase of more than 4,000,000 daily, over the amount used in 1859, and about twice as much as was brought to the city in 1853.

Much of this additional increase of consumption is owing, no doubt, to the increased effective head on the pipes caused by the new 40-inch main. This new main was connected with the 30-inch main crossing the Common in the latter part of December, 1859. The consumption of water in that month was a little rising of 14,500,000 gallons daily. In January following, the amount used averaged nearly 18,000,000 gallons daily, and in February nearly 19,000,000 gallons were used daily, it being in January over 3,000,000 gallons, and in February over 4,000,000 gallons more than had ever been used in any previous month since the introduction of the Cochituate water.

On the first of January, 1860, the water stood at the height of 7 feet 6 inches in the Lake. On the first of January, 1861, the water stood at the height of 8 feet 4 inches in the Lake, a depth of 10 inches gain, equal to 187,000,000 gallons over and above the total consumption in the year; equal to a daily average of about 500,000 gallons. Adding this to the daily average amount used, we have a trifle over 17,700,000 gallons as a total daily amount afforded by the Lake during the past year.

The average annual rain-fall at the Lake during the past nine years has been $48\frac{7}{10}$ inches. For the year 1860 the total rain-fall was $55\frac{4}{10}$ inches, at the Lake. For 1853 the total rain-fall was $55\frac{8}{10}$ inches. The rain-fall in 1853 and in 1860 being very nearly the same, and the amounts of water

afforded by the Lake in these two years being also very nearly the same.

The commissioners of 1845, after a very careful series of observations, estimated that the daily average which the Lake would afford, was equal to 10,176,570 gallons per day, and this was the basis on which the works were built and the money expended for them.

By reference to the Report for 1856, pages 5 to 9 inclusive, of the appendix (the City Engineer's Report), the amount of water used and wasted from the Lake will be seen. The conclusion then arrived at was, that the Lake could be relied on to furnish an average daily supply of over 16,000,000 gallons of water by storing its waters one year with another.

In the year 1853 the Lake afforded a daily average of 17,217,417 gallons: one half of this amount only having been brought to the city.

In 1855 we used 10,346,300 gallons daily, and wasted an unknown amount directly from the Lake, having no use for it. In 1860, as previously shown, the daily use and reserve amounted to a little over 17,700,000 gallons.

The original expectation was that 250,000 inhabitants would use 7,250,000 gallons daily. At this time 180,000 inhabitants actually use 17,238,000 gallons daily. At the last rate of consumption 250,000 inhabitants will use 24,000,000 gallons of water daily, an increase of about 230 per cent. over what was supposed sufficient when the works were built.

There will be occasional years when we shall have a still larger amount of water afforded by the Lake, and very probably there will also be years when the amount will fall short of the past year's supply.

I do not consider it safe to rely on any more increase of supply to be obtained from the Lake, unless other large storing reservoirs are made in which to store the water in unusual wet seasons, or some other additional source is added to it.

Conduit.

During the past year, although the water has been kept running through the Conduit in unprecedented quantities, there has been no break in it, neither has it required any unusual repairs. The banks over it have been strengthened in a few places. It is now as strong as ever, but it will be extremely dangerous to undertake to run more water through it than we now do.

The following table shows the different heights at which the water has been running, and the number of days in each month at the different heights.

The height of the Conduit is six feet four inches.

	HEIGHTS IN FEET AND INCHES.									
	These heights show a head on the Conduit.									
	0.0	6.4	7.0	7.4	7.6	7.7	7.8	7.10	8.0	9.0
	NUMBER OF DAYS IN EACH MONTH.									
January			31							
February.....			29							
March		27	4							
April		30								
May	1	17	13							
June.....			15		15					
July.....	2				2		21		6	
August	1				9		19		1	1
September			18	7	5					
October			31							
November.....			30							
December.....			11		14	1	2	3		
	4	74	182	7	45	1	42	3	7	1

It will be seen by this table that the Conduit has been empty only four days during the year. It has been just full 74 days, and for 287 days, being the remainder of the year, with one day's exception, it has been running with a head on it varying from eight inches to one foot eight inches.

In 1859 the Conduit was empty 12 days. It was run less than full 93 days; just full 145 days; 17 days with a head on it of four inches, and only 98 days with a head on it varying from eight inches to one foot eight inches; running in 1860, 190 days more than in 1859, with the large head upon it.

Reservoirs.

The stone wall outside of Brookline Reservoir has been repaired and pointed; the wooden fence has also been very generally repaired, and the whole otherwise put in complete order.

All the reservoirs in the city remain in much the same condition as they have been the past few years.

Pipes Laid and Raised.

Early in the spring work was resumed on the 40-inch main, and everything connected with that line was finished by the 15th of May.

It was connected with the 30-inch at the corner of Tremont and Boylston streets, — it having been previously connected with the 30-inch main crossing the Common, — thus forming a connection with the two original lines of 36 and 30-inch pipes from Brookline Reservoir through Tremont Street; doing away in a great measure with the liability of being entirely out of water in case of a break in either of the original mains.

The two lines of 30-inch pipes in Tremont Street, between Waltham and Castle streets, and the 6-inch pipes, also the 24 and 6-inch pipes in a portion of Dover Street, have been

raised in accordance with the new grades of those streets. That portion of the 36-inch line of pipes, between Waltham and Dover streets, which was finished out with 30-inch pipes when the works were built, has been taken up and relaid with 36-inch pipes. These lines of pipes were raised and relaid under the especial direction of Mr. Stanwood. The whole work was done in a very substantial and careful manner. Other pipes, of various sizes, in about the usual annual quantities, have been laid the past season.

Consumption of Water. Daily Average number of Wine Gallons drawn from the Brookline Reservoir.

MONTHS.	1853	1854	1855	1856	1857	1858	1859	1860
January	8,050,500	10,695,200	9,702,700	12,669,000	15,089,000	12,160,000	14,512,000	17,862,000
February	8,643,600	10,654,200	10,349,800	12,791,000	14,175,000	14,399,000	14,769,000	18,901,000
March	8,202,200	9,582,100	10,125,600	12,504,000	13,941,000	14,154,000	14,480,000	15,409,000
April	7,903,600	8,738,500	8,540,000	10,800,000	12,454,000	13,465,000	13,760,000	14,621,000
May	8,123,400	9,685,300	9,103,800	10,378,000	12,414,000	11,423,000	11,302,000	14,790,000
June	8,945,900	11,745,200	9,984,400	11,223,000	12,504,000	10,867,000	11,639,000	17,838,000
July	8,809,200	10,613,800	11,056,600	13,167,000	13,551,000	13,621,000	13,219,000	17,239,000
August	8,461,900	10,028,100	11,120,800	12,664,000	13,077,000	13,141,000	12,704,000	19,297,000
September	8,640,700	9,712,400	11,710,800	11,522,000	12,030,000	12,745,000	12,389,000	17,957,000
October	8,871,100	8,769,800	10,771,200	11,891,000	10,864,000	12,969,000	12,026,000	16,938,000
November	8,624,700	8,030,200	10,383,200	11,691,000	11,372,000	12,143,000	12,715,000	16,862,000
December	9,228,400	10,597,600	11,307,200	13,284,000	11,241,000	13,075,000	14,586,000	19,151,000
Average for year,	8,542,300	9,902,000	10,346,300	12,048,600	12,726,000	12,847,000	13,175,000	17,238,000

Average Monthly Heights of Water in the Reservoirs at Brookline, Beacon Hill, South Boston, and East Boston, 1856—1860 inclusive.

MONTH.	BROOKLINE.					BEACON HILL.					SOUTH BOSTON.					EAST BOSTON.				
	1856	1857	1858	1859	1860	1856	1857	1858	1859	1860	1856	1857	1858	1859	1860	1856	1857	1858	1859	1860
JAN.	120.44	123.76	124.55	124.48	123.27	115.87	112.09	116.33	114.02	118.25	109.88	110.28	113.17	114.11	107.48	89.45	94.57	95.77	98.51	93.26
FEB.	123.71	123.93	124.56	124.08	122.95	116.89	114.28	113.81	115.36	117.94	109.80	110.39	113.28	114.33	109.30	87.17	93.62	93.80	93.47	95.29
MARCH.	123.50	123.94	124.37	124.48	123.88	116.87	114.10	114.27	116.61	119.89	109.86	110.53	113.28	114.60	109.40	90.05	94.03	93.75	93.88	94.80
APRIL ..	124.18	124.15	124.66	122.52	123.77	118.48	115.51	117.10	116.99	119.83	109.58	110.76	113.05	114.69	109.34	95.33	96.00	95.99	98.97	93.84
MAY	124.27	124.11	124.49	124.43	123.13	118.03	114.22	117.70	117.01	117.70	107.64	111.24	112.67	114.35	111.90	99.36	93.48	94.85	94.79	96.66
JUNE....	124.25	124.37	124.54	124.22	123.26	113.42	114.47	116.40	115.65	116.69	109.30	111.05	86.70	113.88	113.17	101.05	95.37	93.60	93.98	96.29
JULY ...	123.72	124.36	125.65	124.05	122.99	114.92	114.18	115.36	115.30	116.13	109.73	110.45	114.12	113.62	113.26	91.31	93.53	92.91	93.48	95.53
AUG. ...	124.02	123.93	124.56	124.13	122.78	116.84	114.00	114.81	114.82	115.70	110.65	110.35	113.85	112.38	110.97	94.15	93.59	96.38	93.41	96.99
SEPT....	124.12	123.46	124.60	124.37	123.33	115.92	114.72	116.45	113.82	117.15	108.70	110.19	110.90	111.88	114.66	94.68	92.23	93.45	93.61	95.97
OCT.....	123.97	124.40	124.41	124.29	123.59	116.41	116.21	116.59	114.76	115.34	107.68	107.58	111.46	111.38	113.49	95.18	91.47	94.05	93.97	96.97
NOV. ...	123.98	124.29	124.62	123.55	123.62	115.77	115.98	116.73	114.90	116.23	107.55	111.37	114.22	110.85	114.48	96.94	94.79	94.34	93.79	97.60
DEC.....	123.79	124.66	124.90	123.90	122.98	114.40	117.45	116.44	113.61	114.67	109.84	112.98	114.16	109.75	114.91	94.65	97.04	93.70	91.77	98.89
Average,	123.66	124.11	124.63	124.07	123.29	116.15	114.77	116.00	115.24	117.13	109.18	110.60	110.91	112.98	111.86	94.11	94.18	94.42	94.05	96.01

NOTE.—The above average heights are given in feet and parts, above marsh level. Maximum high water in the Brookline Reservoir is 124.6 feet above marsh level. By deducting the heights in the City Reservoirs from the heights in the Brookline Reservoir, in each month, we find the LOSS OF HEAD in the different sections of the city at that time.

Loss of head from the Brookline Reservoir to Beacon Hill and East Boston Reservoirs.

The effect of increased consumption of water in the city may be seen by reference to the table in this and previous reports of *average annual heights of water in the reservoirs.*

A synopsis is given in the following table.

YEAR.	Average annual heights of Water above Marsh Level in			Loss of Head from Brookline to Bea- con Hill Reservoir.	Loss of Head from Brookline to East Boston Reservoir.
	Brookline Reservoir	Beac'n Hill Reservoir.	E. Boston Reservoir.		
1850	123.16	119.04	.....	4.12	.....
1851	123.36	119.39	105.06	3.97	18.30
1852	123.67	116.60	104.07	7.07	19.60
1853	122.86	114.89	104.91	7.97	17.95
1854	123.65	115.69	99.84	7.96	23.81
1855	123.82	117.79	97.49	6.03	26.33
1856	123.66	116.15	94.11	7.51	29.55
1857	124.11	114.77	94.18	9.34	29.93
1858	124.63	116.00	94.42	8.63	30.21
1859	124.07	115.24	94.05	8.83	30.02
1860	123.29	117.13	96.01	6.16	27.28

Extreme high water in Brookline Reservoir is 124.6 feet.

Monthly Fall of Rain, in inches, in 1860.

MONTH.	PLACES AND OBSERVERS.					
	Lake Cochituate, by E. F. Knowlton.	Boston, by J. P. Hall.	Lowell, by Merrimack Manufacturing Co. J. B. Francis.	Lowell, by Locks and Canals Co. J. B. Francis.	Cambridge, by G. P. Bond.	Providence, by A. Caswell.
January	1.24	1.89	0.66	0.80	1.00	0.80
February	3.80	3.85	2.06	2.44	2.21	3.54
March	1.98	2.19	2.08	2.14	1.73	1.80
April	2.25	1.73	1.02	1.09	1.32	1.55
May	1.98	2.35	1.91	1.85	2.26	1.65
June	11.16	8.01	4.87	4.84	7.37	4.02
July	6.82	5.90	6.87	6.55	5.65	3.09
August	4.89	4.30	5.03	4.30	5.24	5.70
September	9.92	7.35	9.44	9.96	9.33	5.38
October	1.72	2.66	2.46	2.50	1.86	2.10
November	5.97	5.37	4.65	3.71	4.23	3.95
December	3.71	5.86	5.86	6.49	4.75	4.66
Totals.....	55.44	51.46	46.91	46.67	46.95	38.24

NOTE.—The melted snow is, as usual, included in the above amounts of rainfall.

Statement of Location, Size, and number of Pipes laid in 1860.

IN WHAT STREETS.	BETWEEN WHAT STREETS.	Diam. of pipe in inches.	Feet of pipe.
BOSTON PROPER.			
Tremont	To the connection on Common	40	670
	Total, 40 inches in Boston		670
Tremont	Dover and Waltham	36	636
	Total, 36 inches in Boston		636
Albany	Plympton and Norwich	12	90
Boylston	Arlington and Berkeley	12	567
Arlington	To connect with Boylston	12	48
Beacon	Charles and Berkeley	12	1,732
	Total, 12 inches in Boston		2,437
Chapman	Washington and Suffolk	6	56
Commonwealth Avenue	Arlington and Berkeley	6	614
East Concord	Washington and Harrison Avenue	6	17
Canton	Harrison Avenue and Albany	6	187
Plympton	Harrison Avenue and Albany	6	824
Lehigh	Federal and South	6	223
Camden	West of Tremont	6	350
Commonwealth Avenue	Arlington and Berkeley	6	612
Newton	West of Tremont	6	70
Public Garden	From Boylston	6	461
Dedham	West of Tremont	6	350
Montgomery	West of Tremont	6	327
	Total, 6 inches in Boston		4,091
Metropolitan Place	From Washington	4	350
North Grove	For City Stables	4	181
Marlboro'	Washington and Bradford	4	55
Porter	Pleasant and Indiana Place	4	95
Long Wharf	For Steamer	4	47
Newland	Rutland and Concord	4	128
India Wharf	For Steamers	4	75
Bromfield	For Music Hall	4	133
	Total, 4 inches in Boston		1,064
SOUTH BOSTON.			
H	Fourth and Eighth	12	1,228
Fourth	K and P	12	2,827
Dorchester	Near First, for Blow-off	12	27
	Total, 12 inches in So. Boston		4,082
First	N and O	6	395
O	First and Second	6	328
Fifth	I and K	6	241
Old Harbor	Seventh and Eighth	6	82
Old Harbor Place	From Old Harbor Street	6	220
Broadway	N and O	6	270
Second	P and Q	6	140
M	Fourth and Fifth	6	304
Seventh	G and K	6	1,201
Eighth	H and K	6	483
First	B and C	6	338
Dorchester	Dorchester Avenue and Ellery	6	540
K	Below Ninth	6	312
Third	Dorchester and H	6	70
C	First and Second	6	160
	<i>Amount carried forward</i>		5,184

Statement of Pipes, continued.

IN WHAT STREETS.	BETWEEN WHAT STREETS.	Diam. of pipe in inches.	Feet of pipe.
SOUTH BOSTON.			
<i>Amount brought forward.</i>			5,184
Sixth	B and C	6	276
Broadway	O and P	6	575
Sullivan	D and E	6	158
First	O and P	6	287
M.	Eighth and Ninth	6	210
I.	Seventh and Eighth	6	300
E.	First and Second	6	125
Seventh	C and D	6	270
Seventh	L and M	6	108
Highland	South of Eighth	6	624
Eighth	G and H	6	450
I.	Fifth and Sixth	6	160
Fifth	I and K	6	32
Sullivan	Highland and Old Harbor	6	371
Broadway	L and M	6	310
Total, 6 inches in South Boston			9,340
Old Road	K and M	4	674
Brewster	Seventh and Eighth	4	298
Gold	D and E	4	112
Gates	Telegraph and Eighth	4	28
Total, 4 inches in South Boston			1,112
EAST BOSTON.			
Saratoga	Putnam and Prescott	6	336
Bremen	Decatur and Porter	6	200
Porter	Chelsea and Bremen	6	50
Condor	Prescott and Putnam	6	90
Central Square	Fountain	6	104
Eutaw	Marion and Brooks	6	240
Total, 6 inches in East Boston			1,070
Saratoga	Junction of Chelsea Street	4	50
Centre	Orleans and Cottage	4	106
Total, 4 inches in East Boston			156

RECAPITULATION.

SECTION.	1860.	Diameter in inches.				
		40	36	12	6	4
Boston Proper . . .	Total number of feet laid	670	636*	2,437	4,091	1,064
	Stop-cocks in the same	1	1	8	7	4
South Boston . . .	Total number of feet laid			4,082	9,340	1,112
	Stop-cocks in the same			3	18	4
East Boston . . .	Total number of feet laid				1,070	156
	Stop-cocks in the same				2	
Sums of Pipes		670	636	6,519	14,501	2,332
Sums of Stop-cocks		1	1	11	27	8

During the year one hundred and ten feet of 6-inch pipe and one hundred and fifty feet of 4-inch pipe have been taken up in the City proper.

2,827 feet of 6-inch and 101 feet of 4-inch in South Boston.

* This was laid in place of 30-inch pipe, which was taken up.

Statement of the Length of different Sizes of Pipes laid, and the Number of Stop-cocks put in, to Jan. 1, 1861.

DIAMETER OF PIPES IN INCHES.

	40	36	30	24	20	16	12	6	4	Aggregate.
Ft. of Pipe laid in Brookline, Roxbury, & Boston proper	23,082	19,991	*29,896	5,773	.....	6,096	55,192	229,642	75,953	
Number of Stop-cocks in the same		5	8	10	1	19	109	463	199	
Feet of Pipe laid in and for So. Boston and Dorchester	.....	.....	.....	.....	8,155	.....	18,730	83,008	22,875	
Number of Stop-cocks in the same	.....	.....	.....	.....	4	.....	31	113	36	
Feet of Pipe laid in and for East Boston	.....	.....	.....	.....	15,972	1,523	16,114	66,521	3,007	
Number of Stop-cocks in the same	.....	.....	.....	.....	6	8	†21	88	13	
Feet of Pipe laid in Newton and Needham	.....	1,074	2,140	.....	.....	.....	159	.....	.....
Number of Stop-cocks in the same	.....	.....	.....	.....	.....	.....	2	1	.....
TOTALS.										
Length of Pipes laid	23,082	21,065	31,836	5,773	24,127	7,619	90,195	379,171	101,885	684,703 feet, equal to 129 miles, 3,583 feet.
Number of Stop-cocks put in	4	5	8	10	11	22	163	665	248	1,136

* During the year 1860, 636 feet of 30-inch pipe were taken up in Tremont Street, and replaced by 36-inch.

† Including one in Branch, for State Prison Pipe.

Adding to the above, the length of the hydrant branches and bends, which is about 4½ miles, and we have about 134 1-6 miles, as the total length of Pipes of 4 inches and upwards, in diameter, laid down in and for the City of Boston.

Statement of Service Pipe laid in 1860.

Diam. in inches.	Boston Proper.		South Boston.		East Boston.		Total.	
	Number.	Length in Feet.	Number.	Length in Feet.	Number.	Length in Feet.	Number.	Length in Feet.
1.....	9	448	2	247	1	107	12	802
$\frac{3}{4}$	5	93	5	348	1	113	11	554
$\frac{3}{8}$	546	16,336	301	11,456	111	4,115	958	31,907
Aggregate							981	33,263
Making the total number up to January 1, 1861							23,245	

Repairs of Pipes during the Year 1860.

DIAMETER OF PIPES IN INCHES.

WHERE.	40	36	30	24	20	16	12	6	4	2	1 $\frac{1}{2}$	1	$\frac{3}{4}$	$\frac{3}{8}$	Total.
Boston Proper .	6	5	5	.....	.....	3	15	32	41	25	52	21	3	280	488
South Boston....	.....	.....	.....	.....	2	.....	1	.....	4	2	.....	4	.....	40	53
East Boston ....	.....	.....	.....	.....	3	.....	8	4	5	1	.....	3	.....	27	51
Totals	6	5	5	.....	5	3	24	36	50	28	52	28	3	347	592

Of leaks that have occurred in pipes of four inches in diameter and upwards, one hundred and four were caused by the loosening of lead in the joints, ten by settling of earth, four by frost, nine by defective stop-cocks, six by defective pipes, and one struck by a pick. Total, one hundred and thirty-four in pipes of four inches and upwards.

Of the leaks that have occurred in service pipes and two-inch pipes, sixty-five were caused by fish, forty by defective pipes, twenty-five by frost, fourteen by defective cocks, thirty-one by stiff connections, eighteen by rust, one hundred and

twenty-seven by the settling of earth, seventeen struck by picks, two destroyed by the soil, thirty-nine by defective couplings, thirty by builders and drain diggers, one stopped by paper, nine by cocks blowing out, three by rats, four by boxing cellars, one stopped by gasket, three by tenants, two by driving piles, three stopped by dirt, and twenty-four by defective joints.

Total, four hundred and fifty-eight in service and two inch pipes.

Statement of the Number of Leaks, 1850-1860.

YEAR.	LEAKS IN PIPES OF A DIAMETER OF		
	Four inches and upwards.	Less than four inches.	Total.
1850	32	72	104
1851	64	173	237
1852	82	241	323
1853	85	260	345
1854	74	280	354
1855	75	219	294
1856	75	232	307
1857	85	278	363
1858	77	324	401
1859	82	449	531
1860	134	458	592

Hydrants.

During the year fifty-two new hydrants have been established, as follows: Twenty-one in the City Proper, twenty-six in South Boston, and five in East Boston. Altogether there have been established up to the present time —

In Boston Proper	-	-	-	-	-	923
“ South Boston	-	-	-	-	-	287
“ East Boston	-	-	-	-	-	175
“ Brookline	-	-	-	-	-	3
“ Roxbury	-	-	-	-	-	9
“ Charlestown	-	-	-	-	-	11
“ Chelsea	-	-	-	-	-	7
Total	-	-	-	-	-	<u>1,415</u>

Ninety-two hydrants have been taken out and replaced by new or repaired ones. One hundred and twenty-three hydrant boxes have been renewed this year. There are some hydrants in the city that are connected directly with the stop-cocks, which cannot be used when the stop-cocks are shut, this being often the case when repairs are being made.

It would be a great improvement to connect the hydrants directly with the main pipes, independently of the stop-cocks. One at the corner of Bedford and Washington streets has been changed in this way during the past year. Two important hydrants have been taken out to make way for buildings on Otis and Winthrop places. As a substitute, in part, for the loss of these two hydrants, a pipe has been laid, connecting the six-inch pipe in new Devonshire Street with the old fire reservoir in Franklin Street. This reservoir being kept full, in case of fire, the Steam Fire Engines would have the advantage of the water in it, in addition to the water obtained from the hydrants in Franklin Street.

In case of fire, the Steam Fire Engines require a larger supply of water than the small hydrants can deliver for their use.

In order to remedy this, and to keep up a sufficient supply for the Steam Fire Engines, larger hydrants should be put in. Pipes should also be laid to connect the main pipes with all the old brick reservoirs under the streets, so that the reservoirs can be kept full, and whenever a fire occurs in

any locality where the hydrants cannot give the Steam Fire Engines a full supply, this difficulty would be remedied or partially so, by these Reservoirs.

The usual care has been taken with the hydrants. At the present time they are in good order for the winter, having been packed with salt hay.

Stop-cocks.

The stop-cocks are in a good condition, with but three exceptions, one 16-inch on Milk Street, one 16-inch on Brooks Street, East Boston, and one 6-inch in Dover Street, that should be renewed in the spring. During the year all the stop-cocks have been cleaned and oiled; two 36-inch stop-cocks, one 24-inch, and three 12-inch have been renewed.

Forty-eight new stop-cocks have been put in and covered by new boxes, and seventy stop-cock boxes have been renewed.

*Statement of Pipes and other Stock on hand, exclusive of Tools,
January 1, 1861.*

NUMBER OF	DIAMETER IN INCHES.										
	40	36	30	24	20	16	12	6	4	2	1½
Pipes	18	25	96	8	67	40	50	93	39	36	30
Blow-off Branches.....	2	.....	2	.....	.....	.....	.....	.....	.....	.....	.....
Y Branches .....	.....	.....	1	.....	.....	1	.....	2	.....	.....	.....
3-Way Branches.....	9	2	5	.....	.....	6	7	6	6	6	.....
4-Way Branches .....	.....	.....	2	.....	.....	1	7	6	.....	.....	.....
Flange Pipes .....	.....	.....	3	.....	2	.....	.....	.....	.....	.....	.....
Sleeves	6	1	9	8	2	5	7	12	7	4	.....
Clamp Sleeves.....	.....	2	4	2	.....	1	1	7	3	.....	.....
Caps	2	3	4	.....	1	2	8	19	14	.....	.....
Reducers.....	3	2	.....	2	.....	2	4	2	4	.....	.....
Bevel Hubs .....	.....	.....	.....	.....	.....	.....	.....	5	2	.....	.....
Curved Pipes.....	1	2	10	1	4	3	2	8	1	.....	.....
Quarter Turns.....	.....	.....	.....	.....	1	.....	2	10	4	.....	.....
Double Hubs .....	.....	.....	.....	.....	6	9	.....	.....	.....	.....	250
Offset Pipes.....	.....	.....	.....	2	.....	.....	2	8	6	.....	.....
Stop-cocks	1	3	1	2	2	3	2	9	3	5	.....
Yoke Pipes .....	.....	.....	.....	.....	.....	.....	4	6	.....	.....	.....
Pieces of Pipe.....	9	6	5	2	.....	3	10	22	9	.....	.....
Man-hole Pipes.....	2	.....	2	.....	.....	.....	.....	.....	.....	.....	.....

Hydrants.

16 Wilmarth.

20 Lowell.

50 Ballardvale (old ones).

4 Wharf.

3 New York pattern.

1 Sample pattern.

31 Lowell pattern (nearly finished).

For Hydrants. 6 bends, 12 lengtheners, 5 frames, 9 covers, 13 nipples, 13 valve-seats, 43 stuffing-boxes, 12 caps, 11 wharf hydrant covers, 25 unfinished hydrants, 40 lbs. composition wharf hydrant castings, 70 lbs. hydrant do., 80 straps.

For Stop-cocks. 6 friction wheels, 19 clamps, 7 stands and gears for 36 and 30-inch stop-cocks, 3 36-inch composition screws, 2 30-inch do., 2 24-inch do., 126 lbs. composition castings for 6-inch, 18 composition rings for 12-inch, 13 plungers and 19 screws for 6-inch, 6 screws for 4-inch, 8 4-inch stopcocks partly finished, 3 flanges for 12-inch, 7 screws for 12-inch, 51 lbs. composition plungers for 6-inch, 3 plungers for 16-inch, 2 do. for 12-inch; 4 boxes bolts 1 $\frac{1}{8}$ -inch, 1 box $\frac{3}{4}$ -inch do., 1 box $\frac{1}{2}$ -inch do., 1 40-inch valve ring, 13 frames and covers, 7 caps.

For Service Pipe. 19-inch air cocks, 11 1-inch union do., 5 1-inch T do., 40 $\frac{3}{4}$ -inch union do., 6 $\frac{3}{4}$ -inch T do., 219 $\frac{5}{8}$ -inch union do., 17 $\frac{5}{8}$ -inch T do., 7 $\frac{5}{8}$ -inch Y do., 160 $\frac{5}{8}$ -inch flange do., 5 $\frac{5}{8}$ -inch straight do., 75 short $\frac{5}{8}$ -inch do., 235 lbs. composition castings for 1-inch cocks, 70 lbs. composition castings for $\frac{3}{4}$ -inch do., 833 lbs. composition castings for $\frac{5}{8}$ -inch do., 200 lbs. cocks of various kinds for repairs, 6 $2\frac{1}{4}$ -inch hose couplings, 59 1-inch union do., 52 $\frac{3}{4}$ -inch do., 131 $\frac{5}{8}$ -inch do., 260 lbs. couplings for various kinds of connections, 150 couplings, various sizes, 42 uprights, 27 straight boxes, 15 Y do., 7 T do., 50 square do., 30 caps, 3 1-inch flanges, 5 1 $\frac{1}{4}$ -inch connections, 10 1-inch connection couplings, 31 $\frac{3}{4}$ -inch do., 15 $\frac{5}{8}$ -inch do.

Meters. 4 2-inch composition meters, Worthington's pattern, 54 1-inch do., 14 $\frac{5}{8}$ -inch do., 1 3-inch iron do., 6 1-inch iron do., 6 $\frac{5}{8}$ -inch iron do., 1 Scotch (1-inch capacity) iron, 6 do. $\frac{5}{8}$ -inch iron, 44 Huse's pattern, condemned.

Stock for Meters. 933 lbs. lead, 40 lbs. composition caps, 2 reducers (26 lbs. composition), 192 lbs. composition cast-

ings, 2 1-inch cocks, 1 do. 1 $\frac{1}{4}$ -inch, 2 composition flanges, 4 1-inch nipples, 14 $\frac{5}{8}$ -inch do., 4 sets 2-inch couplings, 22 sets 1-inch couplings, 18 sets $\frac{3}{8}$ -inch do., 3 lbs. brass wire, 2 reducers, 4 x 3, cast iron.

Lead Pipe. 525 lbs. 2 $\frac{1}{2}$ -inch, 1,668 lbs. 1-inch, 1,835 lbs. $\frac{3}{4}$ -inch, 1,445 lbs. $\frac{5}{8}$ -inch, 198 lbs. block tin pipe, 148 lbs. block tin pipe for thawing purposes.

Pig Lead, &c. 4,000 lbs. pig lead, 700 lbs. sheet lead, 37 lbs. solder, 13 lbs. block tin.

Blacksmith Shop. 1,272 lbs. bar iron, 6,776 lbs. working pieces, 332 lbs. bar steel, 186 lbs. pieces do., 1,419 lbs. old bolts, 700 lbs. scrap iron, $\frac{1}{2}$ ton Cumberland coal.

Carpenter's Shop. 8 hydrant boxes, finished, 15 do. unfinished, 14 top pieces, 2,000 feet spruce lumber, 300 feet oak plank, 1 cask spikes, 300 feet boards, 1 cask nails, 1 set carpenter's tools.

Stable. 1,200 lbs. English hay, 14 bushels grain, 3 horses, 3 sets of harness, 4 wagons (1 old), 1 chaise, 1 pung, stable utensils, &c.

Tools, &c. 1 large hoisting crane, 1 boom derrick, 4 pairs crank derricks and 2 pairs shears with apparatus belonging to same, tools for laying main and service pipes and the repairs of the same, the usual tools for machine shop, blacksmith's and plumber's shop, for reservoirs, fountains, &c.; also the office furniture.

At Beacon Hill Reservoir. 1 large proving press, 5 swivel patterns, 1 swing stage and irons, capstan frame and levers, 1 large copper ball, 1 composition cylinder and 2 jets, 1 6-inch do. and 2 jets, 1 reducer and 2 sets 12-inch plates, 2 4-inch do., 3 composition reel jets, 6 cast-iron jets, 1 drinking fountain.

Miscellaneous. 5 man-hole plates, 6 covers for do., 3,500 lbs. old cast iron, 3,000 feet old lumber, 1,000 bricks, $\frac{1}{2}$ cord wood, 14 bundles gasket, 1 barrel oil, 25 baskets charcoal,

300 lbs. composition chips, lot of old machinery from Marlboro', lot of patterns for stop-cocks, hydrants, proving presses, fountain jets, pipes, &c., lot of old bolts, drills, screws, &c., $\frac{1}{2}$ carboy vitriol, 14 heads for proving press.

There are a great many things stored at Beacon Hill Reservoir that are of no use to the Water Department, and might be sold whenever an opportunity occurs.

Respectfully submitted.

JAMES SLADE,

City Engineer, &c.

WATER REGISTRAR'S REPORT.

OFFICE OF WATER REGISTRAR, CITY HALL, }
Boston, January 1, 1861. }

E. JOHNSON, ESQ., *Pres. of the Cochituate Water Board*: —

SIR: I herewith submit the following Report, prepared according to the 16th section of the ordinance, passed Oct. 31, 1850.

The total number of water takers, now entered for the year 1861, is 24,316, being an increase, since January 1, 1860, of 1,045.

During the year there has been 1,085 cases where the water has been shut off; of these, 1,067 were for non-payment of water rates, and 18 were for unnecessary waste of water.

The number of cases where the water has been turned on is 1,661; of these, 759 were cases which had been shut off for non-payment of rates; 11 were shut off for unnecessary waste, and 891 were turned on for the first time.

The total amount received from December 31, 1859, to January 1, 1861, is - - - - - \$334,544 86

Of the above there was received for water

used in previous years the sum

of - - - - - \$1,041 91

Leaving the receipts for water

used during the year 1860, the

sum of - - - - - \$333,502 95

Amount carried forward,

\$334,544 86

<i>Amount brought forward</i>	-	-	-	\$334,544 86
In addition to the above, there has been received for letting on the water, in cases where it had been turned off for non-payment of rates, the sum of	-	-	-	1,517 50
Total amount	-	-	-	<u>\$336,062 36</u>

The increased amount of receipts in 1860, over the previous year, is	-	-	-	\$19,771 39
The amount of assessments now made for the present year is	-	-	-	278,389 20
The estimated amount of income from the sales of water during the year 1861 is	-	-	-	350,000 00
The expenditures of my Department during the year 1860 have been	-	-	-	3,429 75

The items of this expenditure are as follows:—

Paid Chas. L. Bancroft, for services as clerk				\$867 50
“ Stephen Badlam, “ “				867 50
“ Chas. E. Dunham, for services as inspector				743 50
“ Noah P. Burgess, “ “				678 50
“ Rand & Avery, for printing	-	-	-	110 50
“ Eayres & Fairbanks, for stationery	-	-	-	94 25
“ M. Lyon, for distributing water bills	-	-	-	24 00
“ J. R. Barry “ “	-	-	-	22 00
“ Geo. S. Carpenter “ “	-	-	-	22 00
Amount	-	-	-	<u>\$3,429 75</u>

Statement showing the number of Houses, Stores, Steam Engines, &c., in the City of Boston supplied with Cochituate water to the 1st of January, 1861, with the amount of Water Rates paid for 1860.

17,890 dwelling-houses, from \$6 00 to \$31 00,	\$205,524 50
14 boarding-houses, " 33 00 to 98 00,	774 57
104 model-houses, from 14 00 to 210 00,	3,678 68
5 lodging-houses, " 15 00 to 78 00,	145 00
3,318 stores and shops, " 6 00 to 81 54,	26,407 67
265 offices, " 6 00 to 20 50,	1,856 00
17 banks, " 6 00 to 16 50,	194 50
198 buildings, " 15 00 to 207 50,	6,816 11
48 churches, " 6 00 to 20 00,	361 50
29 halls, " 6 00 to 26 50,	328 67
17 private schools, " 6 00 to 30 50,	191 50
3 theatres, " 15 00 to 93 75,	151 25
4 greenhouses,	34 50
1 custom-house,	156 00
1 post-office,	25 00
2 hospitals, " 21 67 to 178 00,	408 26
2 medical colleges,	82 00
1 State house,	134 50
3 libraries, " 6 00 to 35 00,	51 00
7 asylums, " 35 00 to 242 48,	531 13
5 markets, " 30 00 to 64 00,	236 75
48 market stalls, " 6 00 to 10 00,	319 50
156 cellars, " 6 00 to 12 00,	923 29
43 hotels, " 15 00 to 863 05,	5,190 81
386 restaurants & saloons, 8 00 to 41 00,	4,647 06
2 club-houses " 15 00 to 50 00,	100 00
8 bathing-houses, " 15 00 to 130 00,	371 67
789 stables, " 5 00 to 420 00,	9,584 29
76 shops & engines, " 10 00 to 284 42,	7,668 47
<i>Amount carried forward,</i>	<u>\$276,894 18</u>

<i>Amount brought forward,</i>			\$276,894 18
9 fo'dries & engines, "	12 58 to	462 00,	1,150 08
1 forge,			453 62
12 print'g & engines, "	15 00 to	93 20,	917 63
30 fact'ries & engines, "	25 50 to	578 40,	5,601 13
28 factories,			513 82
3 gaslight co's, "	79 68 to	481 20,	985 44
2 sugar refineries,			3,698 26
17 mills and engines, from	20 00 to	1,507 20,	4,691 13
22 engines, "	12 00 to	150 72,	697 17
49 printing offices	" 6 00 to	28 00,	648 04
9 distilleries, "	46 95 to	691 50,	3,204 68
11 breweries, "	10 00 to	264 00,	1,262 88
4 bleacheries, "	9 00 to	10 00,	46 00
1 laundry,			25 00
1 pottery,			20 42
58 bakeries, "	6 00 to	12 00,	530 50
2 bak'ies & engines, "	20 00 to	63 12,	118 40
7 build'gs & engines, "	29 90 to	205 56,	1,397 10
1 ship yard & engines,			127 50
11 ship yards, from	10 00 to	18 00,	132 00
4 dry docks, "	15 00 to	57 00,	149 23
564 hose, "	3 00 to	10 00,	1,744 00
26 fountains, "	3 00 to	15 00,	154 33
13 packing houses, "	9 00 to	30 00,	211 00
8 railroad comp's, "	75 00 to	1,886 64,	5,618 61
3 ferry companies, "			2,392 76
36 steamboats, "	15 00 to	700 00,	6,715 20
234 schools, "	6 00 to	16 00,	1,624 00
20 engine, hose, and			
hook & ladder houses,	16 00 to	21 00,	350 00
8 police stations, from	15 00 to	80 00,	367 00
2 city stables,			103 75
6 fire alarm motors, "	10 00 to	15 00,	65 00
<i>Amount carried forward,</i>			<u>\$322,609 86</u>

<i>Amount brought forward,</i>	\$322,609 86
1 Court House,	95 00
1 City Hall,	50 00
1 Faneuil Hall,	40 00
1 City Building,	37 50
1 Probate Office,	31 00
1 office (at City Scales),	9 00
2 offices (Niles Block),	30 00
1 Dead House,	10 00
1 Public Library,	50 00
1 House of Correction,	462 00
1 Lunatic Hospital,	225 00
1 Faneuil Hall Market (urinals, &c.),	70 00
1 street sprinkling,	400 00
1 offal station,	150 00
1 Common Sewer Dept. (making mortar, &c.),	75 00
1 house (in Vine Street),	7 00
1 steamer Henry Morrison,	192 56
1 Jail for Suffolk County,	243 00
Massachusetts State Prison,	817 74
Milldam Company,	300 00
Contractors for supplying shipping,	3,431 45
Filling gasometer,	59 46
Sprinkling streets,	121 86
Building purposes,	1,575 88
Skating park,	1,500 00
Steamboat hose,	283 50
Filling boilers, &c.,	11 64
City of Charlestown,	470 00
Mass. Mechanics Charitable Association Fair,	25 00
1 Aquarial Garden,	25 00
1 United States Court House,	94 50
	<u>\$333,502 95</u>

The following table exhibits the yearly revenue received from the sales of Cochituate water, since its introduction into the city, Oct. 25, 1848:—

From October 25, 1848, to January 1, 1850	-	-	-	\$72,043	20
January 1, 1850, to " " 1851	-	-	-	98,367	90
" " 1851, to " " 1852	-	-	-	161,299	72
" " 1852, to " " 1853	-	-	-	179,486	25
" " 1853, to " " 1854	-	-	-	196,352	32
" " 1854, to " " 1855	-	-	-	217,007	51
" " 1855, to " " 1856	-	-	-	266,302	77
" " 1856, to " " 1857	-	-	-	282,651	84
" " 1857, to " " 1858	-	-	-	289,328	83
" " 1858, to " " 1859	-	-	-	302,409	73
" " 1859, to " " 1860	-	-	-	314,808	97
" " 1860, to " " 1861	-	-	-	334,544	86
				\$2,714,603	90

Statement showing the average daily consumption of Cochituate water in the leading hotels, together with the amount of water-rate charged to each respectively.

	Galls. per day.	Amount.
Tremont House, from October 1, 1859, to January 1, 1861. . . .	25,230	\$1,740.93
Revere House, " " " "	24,410	1,728.54
Parker House, " " " "	20,515	1,459.79
American House, from January 1, 1860, " "	16,448	981.92
United States Hotel, " " " "	11,725	979.74
Winthrop House, from October 1, 1859, " "	7,537	862.23
Marlboro' House, from January 1, 1860, " "	8,261	711.30
Coolidge House, " " " "	4,462	606.66
Pearl St. House, " " " "	3,131	454.49
Totals		\$9,525.60

This amount of \$9,526.60 for the use of Chchituate water in the above-named hotels, remains uncollected, owing to an

injunction having been procured by the proprietors of these establishments to prevent the water being shut off from their premises. Sept. 15, 1860, the case was argued in the Supreme Court, but as yet no decision has been made known.

Statement showing the number and kind of water fixtures contained within the premises of water-takers in the city in 1858, 1859, and 1860.

1858	1859	1860	
4,326	4,475	4,714	Taps. These have no connection with any drain or sewer.
26,631	29,190	31,098	Sinks.
7,729	9,358	10,141	Wash-hand basins.
3,334	3,498	3,910	Bathing-tubs.
3,327	3,699	4,210	Pan water-closets.
3,845	4,476	5,071	Hopper water-closets.
173	409	583	Self-acting water-closets.
654	910	1,070	Urinals.
2,015	2,450	3,006	Wash tubs. These are permanently attached to the buildings.
12	21	13	Shower-baths in houses where there is no tub.
9	10	10	Rams.
612	612	594	Private hydrants.
77	110	106	Slop hoppers.
52,744	59,218	64,526	



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