ANNUAL REPORT

OF THE

Cochituate Water Board

FOR

1871-72.

City Document. — *No.* 78.

CITY OF BOSTON.

REPORT

OF THE

COCHITUATE WATER BOARD

TO THE

CITY COUNCIL OF BOSTON,

FOR THE YEAR ENDING

APRIL 30, 1872.

CITY OF BOSTON.

In Board of Aldermen, June 4, 1872.

Ordered, That the Cochituate Water Board be and hereby are authorized to submit their annual report in print; the expense thereof to be charged to the appropriation for printing.

Passed in Common Council.

Came up for concurrence.

Read and concurred.

Approved by the Mayor June 5th, 1872.

A true copy.

S. F. McCLEARY, *City Clerk.*

CITY OF BOSTON.

City Hall, Cochituate Water Board Office,
May 20th, 1872.

To the City Council of the City of Boston: —

In compliance with the provisions of the City Ordinance, the Cochituate Water Board herewith submit their annual report for the year ending April 30, 1872, together with the reports of the Clerk of the Board, City Engineer, Water Registrar, the Superintendents of the Eastern and Western Divisions, and the Engineer especially employed by this Board upon the question of New Supply, to which they would refer the City Council for detailed statements of the progress and condition of the Water Works during the year.

A perusal of these reports will show the works to be in a very satisfactory condition. The average level of the water in the Lake for the year ending January 1st, 1872, was $6\frac{50}{100}$ feet above the level of the bottom of the conduit, showing an average loss of $4\frac{46}{100}$ feet from the previous year.

The short supply of water for the year ending May 1, 1871, and the remarkable drought during several succeeding months, caused great anxiety, and the means for securing an additional supply engaged the time and attention of the Board. In the month of October last, it was determined to employ an Engineer to make surveys, prepare plans and estimates for a scheme of works to furnish an additional supply of pure water.

The Board were especially fortunate in securing for this work the services of Mr. Joseph P. Davis, an engineer of large experience and acknowledged ability.

Mr. Davis entered upon the discharge of the duties assigned in the month of November, and as the result of his investigations it was decided to petition the Legislature for the passage of an act authorizing the city to take water from Sudbury River. The Legislature gave early attention to the application, passed an act, which received the approval of the Governor on the 8th day of April, 1872. A copy of the act will be found on page 129.

The City Council immediately made an appropriation to enable us to commence the work, and it is confidently expected that within thirty days from this date we may be able to make a temporary connection between Sudbury River and Lake Cochituate, which will relieve our present needs.

After making this connection, the engineer will proceed with the work of surveys for permanent works to connect Sudbury River, not only with Lake Cochituate, but also with Chestnut Hill reservoir.

The augmented territory of the city, and the constantly-increasing demand for pure water, renders it imperative that a new conduit to convey water from Sudbury River, or Lake Cochituate, to Chestnut Hill reservoir, should be constructed at any early day. The capacity of the present (and original) conduit has been nearly, if not fully, reached.

In constructing a new conduit we should recommend that its capacity be much greater than that of the one now in use.

The engineer has made a detailed report of his labors up to this time, which may be found on pages 114 to 122.

The plan showing the proposed temporary connections has been lithographed, and is submitted herewith.

(See pages 122–123.)

CONSUMPTION OF WATER.

The average daily consumption of water for the year ending December 31, 1871, was 13,945,500 gallons; a decrease, as compared with the previous year, of upwards of one million gallons per day.

With a city rapidly increasing in population, and growing daily in business both of mercantile and mechanical character, this statement may seem strange, but it is easily accounted for in the fact that the community were fully aware of the diminished supply of water, and regulated its use accordingly.

The income from water rates has been $\$788{,}252\frac{5}{100}$, being an increase over the previous year of $\$53{,}461\frac{31}{100}$, and the estimated income for the year ending April 30th, 1872, is $800,000.

The expenses have been as follows: —

For the current expenses		$277,120 11
Interest and premium on the water debt .		536,876 00
		$813,996 11
The Treasurer has credited the Water Works for the same year		$840,707 45
The balance shows an excess of receipts over expenditures of		$26,711 34
Expended on Chestnut Hill reservoir	26,210,12	
Less receipts	1,265,37	
		$24,944 75
Expended in Wards 13, 14, 15, and 16, .		345,372 58
" on New Main and Pipes in East Boston		37,145 30
" on additional Water Supply . .		2,302 81
		$409,765 44
Deduct excess of receipts over expenses this year		26,711 34
Amount carried forward, . . .		$383,054 10

Amount brought forward, . . .		$383,054 10
Cost of works May 1, 1871	10,571,896,64	
Less amounts transferred May 1, 1871, from water debt to city debt	1,352,000,00	
		$9,219,896 64
Making the net cost to May 1, 1872		$9,602,950 74

The amount transferred from the water debt to the city debt as noted above materially diminished the sum of interest which has usually been charged annually to the cost of the works, and as the result of operations, the net gain of receipts over expenditures for the current year has been $26,711 34, which is very satisfactory when compared with former years.

EASTERN DIVISION.

This division comprises that portion of the works lying east of the Brookline reservoir, including the distributing pipes and reservoirs in the city, and is under the superintendence of Mr. E. R. Jones.

During the year there has been laid one hundred and thirty three thousand eight hundred and thirty feet of main pipe, equal to twenty-five and one third miles (about one mile more than was laid the previous year), making the total amount laid since the commencement of the work two hundred and nineteen and three-fourths miles.

Connected with these mains are two thousand four hundred and thirty-three fire hydrants; of this number nine hundred and seventy-seven are of the Lowry pattern.

The number of service pipes laid during the year has been two thousand two hundred and seventy-five, measuring seventy-three thousand five hundred and fifteen feet, or about 14 miles.

Total number of service pipes, May 1st, thirty-four thousand nine hundred and seventy.

In June last water was turned into the forty-eight-inch pipes, connecting Chestnut Hill reservoir with the main lines. A few defects have been discovered in this line of pipe, only one of which was of a serious character. This was no doubt attributable to an imperfect casting; fortunately the breakage was early discovered, the water shut off at the Chestnut Hill gatehouse, and comparatively small damage sustained.

Pipes are now being laid from Washington street, Ward 16, through Bowdoin and Church streets, to connect with pipes already laid in Hancock street; when completed this line of pipes will be supplied with water from the stand-pipe at the Highlands, and thus houses upon and in the immediate vicinity of Telegraph Hill, South Boston, will be connected with the "high service."

During the coming season connections will be made by means of large-sized pipes through which the Mystic water (by the opening of gates in Charlestown) can be carried to the top of Beacon Hill, if any emergency should arise which would render it temporarily desirable.

This arrangement will be mutually beneficial to the City of Charlestown as well as ourselves.

HIGH SERVICE.

The high-service supply, which was last year connected with Beacon Hill, proves entirely satisfactory.

A considerable portion of territory in Ward 16 will need to be supplied by a connection with the high service; and at a day not far distant it will be necessary to add to our pumping facilities.

DISTRIBUTING RESERVOIRS.

The Beacon Hill reservoir has not been in use during the past year, as the district which it formerly supplied is now

connected with the high service, and the Board are of the opinion that its sale can safely be made without detriment to the works.

The East Boston reservoir is in good condition. The South Boston reservoir is not in perfect order, and within two or three years will need extensive repairs unless its use should be suspended by the introduction of high service in that locality.

WESTERN DIVISION.

This division comprises the Lake and all that portion of the works lying between the Lake and the gate-house at the Brookline reservoir, and its superintendence is in charge of Mr. Albert Stanwood.

The low stage of the water in the Lake revealed the fact that the sea-wall adjoining the gate-house was starting from its position; a portion of the wall has been rebuilt in a thorough and substantial manner, and the balance will be rebuilt at an early day.

In order to keep up the supply during several months of the past year it has been necessary to pump the water from the Lake into the conduit; this has been done by the use of two eighteen-inch pumps driven by two twenty-five horse-power engines.

The usual annual examination of the conduit has been omitted, on account of the scarcity of water.

CHESTNUT HILL RESERVOIR.

This reservoir has been thoroughly tested during the past year, and fully meets the most sanguine expectations of its projectors; as a storage reservoir it is invaluable. Its cost was large, viz., $2,449,982.07; but we believe it to be one of the most essential features of the water works. The combined capacity of the two basins is 731,472,429 gallons.

BROOKLINE RESERVOIR.

The building and lands about this reservoir are in good order.

The importance of keeping our storage reservoirs full has prevented the cleaning out of the basin, as was contemplated.

WATER REGISTRAR'S DEPARTMENT.

The number of water-takers now entered for the year 1872 is 38,716; an increase of 2,584 over the previous year.

The number of cases in which the water has been turned off for non-payment of rates, during the year, is 936; of this number 734 have been turned on again, and a balance of 202 still remain off.

Meters are attached to a variety of establishments, embracing hotels, railroad stables, manufactories, saloons and buildings occupied by several tenants.

Whole number of meters, now in use, 1,091.

The number of the various kinds of water-fixtures, on the premises of water-takers, January 1, 1872, was 145,786; an increase of 17,552 during the year.

CHARLES H. ALLEN, *Pres't.*
NATHANIEL J. BRADLEE,
GEORGE LEWIS,
JOHN A. HAVEN,
LEONARD R. CUTTER,
AMOS L. NOYES,
CHARLES H. HERSEY.

REPORT OF THE CLERK.

OFFICE OF THE COCHITUATE WATER BOARD,
BOSTON, May 6, 1872.

CHARLES H. ALLEN, Esq.,

President of the Cochituate Water Board: —

SIR: The following is a statement of the Expenditures and Receipts of this department for the year commencing May 1, 1871, and ending April 30, 1872: —

EXPENDITURES.

Carting	$276 25
Plumbing shop	32 47
Damage	1,616 17
Taxes	1,289 69
Upper yard	1,557 08
Main pipe	63,380 55
Service pipe	16,478 27
Rent of Eastern Avenue wharf and salary of Agent	2,684 79
Telegraph	218 20
Hydrants	1,874 15
Stopcocks	7,266 64
Tolls and ferriage	33 74
Lake	8,602 72
Proving yard, for stock, etc.	3,199 51
Stable	3,100 04
Raising main pipes	565 16
Amount carried forward,	$112,175 43

Amount brought forward,	$112,175 43
Laying main pipes	289 72
" " " across Chelsea Creek	13,897 77
" service "	117 04
Reservoir — East Boston	407 21
" Beacon Hill	566 41
" South Boston	216 50
" Brookline	932 37
Meters	3,050 02
Repairing stopcocks	801 38
" main pipe	3,882 58
" service pipe	8,513 90
" streets	4,206 04
" hydrants	4,356 13
Travelling expenses	253 50
Fountains	970 62
Postage and expressage	30 97
Blacksmith shop, for stock, etc.	155 06
Tools	3,396 41
Salaries (including clerks in Water Registrar's Department)	22,575 10
Inspectors	10,065 50
Off and on water	9,079 38
Printing (including Water Registrar's and Superintendent's)	981 56
Miscellaneous expenses	2,280 07
Stationery (including Water Registrar's and Superintendent's)	706 38
Wages, — plumbing shop	64 50
" proving yard	8,715 00
" blacksmith's shop	905 32
" laying main pipe	5,188 32
" " service pipe	13,465 47
Amount carried forward,	$232,245 43

Amount brought forward,		$232,245 66
Wages, — high service		3,742 25
Maintaining meters		3,748 44
Aqueduct repairs		1,404 88
Advertising		576 48
Hydrant and stopcock boxes		2,800 70
High service		4,256 88
Repairs at Chestnut Hill reservoir		3,442 36
Pumping works at Lake Cochituate		22,502 46
Chestnut Hill driveway		5,000 00
Water to Deer Island		40,656 34
Wards 13, 14, and 15		14,716 25
Ward 16		137,701 29
Wards 13, 14, 15, and 16		192,955 04
Additional supply of water		2,302 81
Chestnut Hill reservoir		26,210 12
New water pipe, East Boston		12,267 22
New main, " "		24,247 75
Total amount drawn for by the Board		$730,776 93

And which is charged as follows: —

To Water Works	$274,720 11	
" Chestnut Hill reservoir	26,210 12	
" " " driveway	5,000 00	
" Wards 13, 14, and 15	14,716 25	
" Water to Deer Island	40,656 34	
" Ward 16	137,701 29	
" New main, East Boston	24,247 75	
" " water pipe, E. Boston	12,267 22	
" Wards 13, 14, 15, and 16	192,955 04	
" Additional supply of water	2,302 81	
	$730,776 93	
Amount charged to Water Works		$685,120 59
Amount carried forward,		$685,120 59

Amount brought forward,		$685,120 59
RECEIPTS.		
Received for hydrants and maintaining same for Fire Department . . .	$23,892 00	
Received for rollers, old iron, cement pipe, etc., sold on account of C. H. reservoir .	1,265 37	
" " stone sold by E. R. Jones .	20 00	
" " horse sold by A. Stanwood .	40 00	
" " pasturage and rent of land .	187 00	
" " rent of part of Eastern Ave. Wharf . .	300 00	
" " off and on water, for repairs .	2,313 00	
" " fines for waste .	2,008 00	
" " pipe laying, repairing, etc. .	22,240 00	
		$52,265 37
Net amount to Water Works . . .		$632,855 22
The above is credited to —		
Chestnut Hill reservoir .	1,265 37	
Water Works . . .	51,000 00	
		$52,265 37

Amount drawn for the Water Works, not including C. H. reservoir, Wards 13, 14, and 15, Ward 16, water to Deer Island, new main, East Boston, new water pipe, East Boston, additional supply of water, for Wards 13, 14, 15, and 16 . .		$274,720 11
EXTENSION OF THE WORKS.		
Main pipe	$63,380 55	
Wages laying main pipe .	5,188 32	
Laying main pipe, stock, etc.	14,187 49	
		$82,756 36
Amount of expenses from April 30, 1871, to May 1, 1872		$191,963 75

Expenditures and Receipts on Account of the Water Works, to May 1, 1872.

Amount drawn by Commissioners . .		$4,043,718 21
" " " Water Board, in 1850 .		366,163 89
" " " Cochituate Water Board, from January 1, 1851, to May 1, 1871 .		5,962,437 77
Amount drawn from April 30, 1871, to May 1, 1872, for the Water Works . .		685,120 59
		$11,057,440 46
Amount paid the City Treasurer by Commissioners .	$47,648 38	
Amount paid by Water Board, 1850	8,153 52	
Amount paid by Cochituate Water Board, to May 1, 1871	263,524 55	
Amounts carried forward,	$319,326 45	$11,057,440 46

Amounts brought forward,	$319,326 45	$11,057,440 46
Amount paid from April 30, 1871, to May 1, 1872 .	52,265 37	
		371,591 82
Balance		$10,685,848 64

Net amount drawn from the Treasurer, by the Commissioners and Water Boards, for the Water Works	$10,685,848 64
Gross payments (including interest, premium, etc.) for account of the Water Works	$20,312,557 26
Gross receipts	10,709,606 52
Net cost to the city, May 1, 1872 . .	$9,602,950 74

Respectfully submitted,

J. A. WIGGIN,
Clerk Cochituate Water Board.

COST OF THE WORKS TO MAY 1, 1872.

WESTERN DIVISION.

Amount paid Wm. H. Knight for the lake		$100,000 00
" " " " " " " factories, $50,000; less amount on account of the sale of land and machinery, and insurance at the time of the fire		20,818 22
Expense of raising the lake two feet, including damages		28,002 18
Cost of roads, bridges and swamps		38,332 48
Gate-house at the lake		29,907 12
Dam at the outlet of the gate		8,458 20
Dudley pond, lower dam, and making connections with lake		18,982 23
New dam, and improvements at the lake		19,610 90
Total cost of lake dep't, *not including land*		$264,111 33
Land and land damages, less credit for land sold	$225,523 15	
Constructing the brick conduit	817,717 73	
Brookline reservoir, land $58,418 92		
Brookline reservoir, construction 108,301 92		
Brookline reservoir, gate house 33,356 37		
	200,077 21	
Compensating reservoirs, less amount received when sold	66,859 80	
Engineering expenses on the Western Division	69,900 31	
Amounts carried forward,	$1,380,078 20	$264,111 33

Amounts brought forward,	$1,380,078 20	$264,111 33
Miscellaneous expenses on the Western Division . .	83,180 22	
Payments on account of "new supply of water" . .	2,302 81	
Payments on account of "Chestnut Hill reservoir" .	2,449,982 07	
		3,915,543 30
Total cost of the Western Division		$4,179,654 63

EASTERN DIVISION.

Main and service pipes .		$3,058,044 34
Beacon Hill reservoir, land .	$145,107 10	
Beacon Hill reservoir, construction . .	368,426 11	513,533 21
South Boston reservoir, land .	55,103 23	
South Boston reservoir, construction . .	35,804 87	90,908 10
East Boston reservoir, land .	23,862 50	
East Boston reservoir, construction . .	46,328 59	70,191 09
Engineering expenses on the Eastern Division . .		31,403 02
Machine shop and pipe yards .		84,516 90
Hydrants and stopcocks .		113,176 40
Proving pipes . . .		35,983 96
Amount carried forward,		$3,997,757 02

Amount brought forward,		$3,997,757 02	
Meters		121,164 94	
Miscellaneous expenses on the Eastern Division . .		422,999 53	
Payment on account of Wards 13, 14, and 15 . . .		700,983 03	
Payment on acc't of Ward 16		375,000 00	
" " " " " 13, 14, 15, and 16 . . .		192,955 04	
Payment on acc't of new main, East Boston .	24,247 75		
Payment on acc't of new main, E. Boston (last year)	630 33	24,878 08	
Payment on account of new water pipe, E. Boston .		12,267 22	
Total cost of Eastern Division			$5,848,004 86
" " " Eastern Division		$5,848,004 86	
" " " Western "		4,179,654 63	
Total Eastern and Western			$10,027,659 49
Expense of carrying on the works . . .		$1,230,388 07	
Deduct income received above interest paid . . .		305,096 82	
			925,291 25
Total cost on May 1, 1872, over and above income			$10,952,950 74
Deduct amount transferred to the Water Works from the Sinking Fund . .			$1,350,000 00
Net Cost of Water Works to May 1, 1872 .			$9,602,950 74

REPORT OF THE CITY ENGINEER.

OFFICE OF CITY ENGINEER, CITY HALL,
BOSTON, May 6th, 1872.

CHARLES H. ALLEN, Esq.,

President Cochituate Water Board: —

DEAR SIR: In conformity with the ordinance relating to the Engineer's Department the following report is respectfully presented: —

EASTERN DIVISION.

On pages 32–33 the usual tables of the average monthly and yearly heights of water in the several reservoirs, from 1861 to 1871 inclusive, are given, and expressed in feet and decimals of feet above "tide marsh level," or mean high water.

The Brookline record shows the average level during the year to have been $1\frac{56}{100}$ feet lower than in 1870; $1\frac{46}{100}$ feet lower than in 1869; $2\frac{54}{100}$ feet lower than the highest average in 1862, and $1\frac{95}{100}$ feet lower than the average for the previous ten years.

The Chestnut Hill records are given from November, 1870, to December, 1871, both inclusive, the measurements being taken at the lower gate-house and indicating the level of the water in the "Bradlee basin" only until June, 1871, when it had become filled to same level as the "Lawrence meadow basin." By comparison of the Chestnut Hill levels since July, 1871, with those of the Brookline reservoir, it will be seen that, during the months of July, August, September, October and November, the average level of the water in

the Chestnut Hill reservoir was $\frac{7}{100}$ of a foot higher than in the Brookline.

The level of the water in the Brookline reservoir stood, on the 1st of January, 1871, at 4 feet 11 inches above the bottom of the conduit; January 31st, at 6 feet 2 inches; and the highest level reached during the year was 6 feet 4 inches, on the third of February; from March 1st, 1871, to September 1st, the highest level was 5 feet $10\frac{1}{2}$ inches, and it stood on the first day of each month, as follows: — March 1st, 5 feet $10\frac{1}{2}$ inches; April 1st, 5 feet; May 1st, 5 feet 2 inches; June 1st, 5 feet 1 inch; July 1st, 5 feet 7 inches; August 1st, 5 feet 6 inches; September 1st, 5 feet 2 inches. Then began a marked fall, and on the 1st of October the water stood at 3 feet 9 inches; November 1st, 1 foot 3 inches; November 7th the bottom of the conduit was reached; November 9th — the lowest point ever reached — was $6\frac{1}{2}$ inches *below* the bottom of the conduit; November 17th the water stood again level with the bottom of the conduit, and gradually gained to the end of the year, standing at 1 foot 6 inches on the 31st of December.

The Beacon Hill records are given, but are of little value, as the reservoir has been in virtual disuse throughout the year. From January 1st to May 22d, it appears from the returns that the water was almost constantly shut in. On the 22d of May the water was all drawn out for the purpose of cleaning out the reservoir, and it was not let in again until July 11th, from which time until August 26th there was not over 1 foot 8 eight inches of water in depth. From August 26th to December 28th no observations were made, and on that day it appears the filling commenced. On the 31st of December there was 6 feet 8 inches in depth in the reservoir.

The average level of the water in the South Boston reservoir was about the same as for the previous year, and for the greater part of the time the reservoir was disconnected from the general circulation.

The East Boston reservoir has been kept nearly full throughout the entire year, — the average level being only $2\frac{42}{100}$ feet below the waste weir, making the average depth of water $24\frac{58}{100}$ feet.

NEW MAIN PIPE TO EAST BOSTON.

This work, which was in progress at the date of the last year's report, has been successfully completed and the leak in the old line stopped. The new main was continued to the main land on each side before being connected with the old 20-inch line, and is supported by pile work on the flats.

The entire length of the new line is $1{,}463\frac{1}{2}$ feet, 650 feet of which was laid by contract, for the sum of $24,000. The remainder, from the channel, over the flats to the shore connections, which is supported on pile work, was laid by Mr. George H. Norman, the contractor for the flexible portion, and the cost was about $13,000. The leak in the old pipe, as before stated, was successfully stopped by Mr. Norman. The earth was first dredged and dug away, leaving the pipe exposed, when it was found that the crack extended nearly half round the pipe and close to the flange. This crack was filled with pine wedges and covered with an India-rubber band, secured by iron clamps to the pipe and the flange on each side of the crack. The whole work was done by a diver, and about three weeks were occupied in performing it.

Both lines were tested by meters after the completion of the new one, and the repair of the old one, and they were found to be substantially tight.

SOUTH BOSTON AND DORCHESTER HIGH-SERVICE WORKS.

At the date of my last annual report to your Board the surveys of the high-service districts in Dorchester were in progress, under the direction of Mr. W. F. Learned, the assistant having charge of the current work of the extensions in Dorchester, and who had also made the surveys and plan

of the proposed high-service system for South Boston. It was then expected that the surveys would be completed and a map prepared, within a few weeks, showing the location of the several high-service districts, their contours and areas; also the location of all houses in said districts with the elevation of their door-sills; but the work was so much interrupted by the regular duties of Mr. Learned, who had charge of several important works in progress of construction, that the surveys and maps were not finished until the first of October. On the fourth of October I submitted the maps and a report to your Board, and to this report and one previously made (Sept. 7th, 1870), also to one dated March 12th, 1872, I respectfully refer you for my action relative to the South Boston and Dorchester high service.

The work of connecting the South Boston high service with the Dorchester, in accordance with my suggestions, has been commenced, and the 12-inch pipe from Washington street through Bowdoin street to connect with the present 12-inch pipe in Hancock street is nearly completed, and in a few weeks the circuit from the stand-pipe to Telegraphic Hill will be complete.

Sectional plans of Dorchester, on a scale of 100 feet to an inch, have been made by reducing from plans on a scale of 40 feet to an inch, furnished by the City Surveyor and prepared from actual survey. Upon these plans are delineated the location and sizes of all pipes, and the position of the gates and hydrants established up to date.

Tracings of these plans have been furnished Mr. Jones, Superintendent of the Eastern Division.

NEW-48 INCH MAIN.

Levels were taken last season over the route proposed for a new line of 48-inch pipe from Chestnut Hill reservoir to the city via Beacon street. The distance from the Chestnut Hill reservoir to Charles street is 24,070 feet, or about $4\frac{56}{100}$ miles

and the deepest cut, on the summit near the junction of Beacon and Washington streets, in Brookline, is 15 feet. The plan or route which I proposed in my communication to you dated October 10th, 1871, of following Beacon street only as far as Harvard street in Brookline; thence through Harvard street, Longwood Avenue, Parker and Prentiss streets, to connect with the present mains in Tremont street, is, I am more fully than ever satisfied, far preferable to the plan of following Beacon street straight to Charles street, both as regards efficiency and economy. The estimate submitted in the aforesaid communication shows that the Longwood avenue route is 6,910 feet shorter than the other, and that the saving in expense on this 6,910 feet would defray the cost of a new line of 16-inch pipe from the pumping engines to Beacon Hill, and leave a surplus of over $86,000. By laying a new line of 16-inch pipe for the Beacon Hill high service, the present 30-inch main, 14,000 feet in length, extending from the Tremont-street crossing of the Providence Railroad to Beacon Hill, would then be available to reinforce the low-service supply of the 36-inch pipe, and all the lateral branches through the very heart of the city.

Although the present necessities of the city may not urgently demand the laying of this new main, yet the rapid growth of the city, the constant extension of our works in the Highland and Dorchester districts, and the very probable annexation of additional territory, will soon create a demand upon our works that will make a new main an imperative necessity. As before stated, the records of the Beacon Hill reservoir for the past year show that it was practically a useless piece of property, and although it may be deemed safer to retain it a while longer, yet I think no one will argue in favor of its usefulness after the laying of a new line of 48-inch pipe, and it would seem, on the whole, to be sound policy and true economy to have the new main laid as soon as may be, and the reservoir property disposed of, or, in some

manner, made of practical value. The only time during the past year when this reservoir could have been of any practical service was on the first of December, when the screens at the Chestnut Hill reservoir were clogged with ice, and at that time it was nearly empty, and had been so for six months. When full, its total capacity is not more than equivalent to three hours' supply during the hours of ordinary consumption.

HIGH-SERVICE PUMPING WORKS.

The following statement exhibits the operations of the high-service pumping engines for the past year: —

Statement of Operations at the High-Service Pumping Works, for the year 1871.

1871.	Total pumping time.			Daily average pumping time.		Daily average amount pumped.	Hourly average am't pumped.	Average maximum hourly draft.	Average minimum hourly draft.	Greatest hourly draft.	Least hourly draft.	Average No. of revolutions per minute.	Average amount of coal used per day.	Percentage of ashes and clinkers.	Quantity pumped per pound of coal.
	Days.	H'rs.	Min.	H'rs.	Min.	Gallons	Gallons	Gallons	Gallons	Gallons	Gallons		Lbs.		Gallons
January	23	14	10	18	15.8	566,792	31,034	35,200	23,200	42,800	19,100	11.00	2,034	21.40	279
February	20	2	0	17	12.5	467,588	27,163	33,590	20,230	43,200	16,500	9.63	1,689.5	22.13	277
March	24	9	0	18	52.25	504,802	26,750	33,860	18,280	41,300	15,400	9.49	1,592.3	21.14	317
April	23	22	30	19	9	522,898	27,305	34,920	17,400	43,800	15,000	9.68	1,613.1	22.34	324
May	24	8	50	18	52	544,288	28,850	37,510	17,700	51,500	14,700	10.23	1,460	22.00	373
June	23	22	45	19	9.50	562,777	29,375	37,280	19,010	45,100	15,300	10.42	1,515	21.47	372
July	24	3	35	18	41.75	591,683	31,646	40,690	18,920	52,640	15,000	11.22	1,657	20.43	357
August	23	21	30	18	30	577,318	31,210	40,030	19,520	77,200	15,000	11.06	1,664	20.40	347
September	23	21	30	19	7	589,300	30,652	40,060	18,870	46,800	16,000	10.93	1,658	17.80	355
October	24	15	45	19	5.33	625,540	32,770	44,150	20,260	59,000	16,200	11.60	1,707	17.30	366
November	23	21	30	19	7	566,967	29,658	40,330	18,470	55,000	14,800	10.50	1,806	18.60	314
December	25	1	30	19	0	571,652	30,087	41,170	18,470	50,100	13,300	11.21	1,935.5	15.86	317
Totals	285	20	35	18	45.2	557,634	29,708	38,232	19,194			10.60	1,695	20.07	333

From the foregoing statement it appears that the total running time of the engines was 285 days, 20 hours, and 35 minutes; the average running time per day was 18 hours and $45\frac{2}{10}$ minutes; the average number of revolutions of the engine per minute was $10\frac{60}{100}$; the total amount of water pumped was 205,083,297 gallons, the daily average being 557,634 gallons; the average number of gallons pumped per hour of pumping time was 29,708; the average of the maximum hourly drafts was 38,232 gallons; the average of the minimum hourly drafts was 19,194 gallons; the greatest hourly draft during pumping hours was 77,200 gallons; the smallest hourly draft during pumping hours was 13,300 gallons; the total amount of coal consumed during the year was 618,587 pounds; the average amount consumed per day was 1,695 pounds; the average percentage of loss by ashes and clinkers was $20\frac{7}{10}$ per cent; and the average number of gallons pumped per pound of coal was 333.

From the daily records I have compiled the following statement: —

Statement of the average daily number of gallons pumped for the high-service supply on each day of the week during the year 1871, *arranged to illustrate the relative draft on the several days of the week.*

Mouth.	Mondays.	Tuesdays.	Wednesdays	Thursdays.	Fridays.	Saturdays.	Sundays.
January	693,391	610,236	624,479	597,810	559,772	599,015	585,079
February . . .	522,645	472,620	453,098	457,087	447,161	487,672	432,835
March	563,243	495,227	494,153	496,969	501,105	537,135	451,329
April	579,002	512,796	518,429	508,106	525,695	560,550	461,615
May	604,793	549,767	536,625	532,424	547,867	599,485	479,922
June	602,596	579,472	553,696	559,751	572,140	598,615	471,581
July	648,143	575,268	621,963	592,012	605,348	628,080	512,740
August	619,628	585,408	598,554	584,116	615,159	621,093	517,787
September . . .	631,739	600,320	583,176	587,559	580,422	622,524	513,278
October	684,124	629,753	618,955	612,064	614,584	660,467	559,720
November . . .	582,298	529,985	579,628	563,953	563,941	614,055	532,501
December . . .	645,811	557,209	568,103	570,874	565,222	592,055	513,369
Averages . . .	614,784	558,172	562,572	555,227	558,201	593,395	502,638

From the foregoing statement, and a similar one presented in my last annual report to your Board covering the last seven months of 1870, the following arrangement of the days of the week in the order of the greatest average consumption in each year is presented as a matter of interest and curious coincidence : —

Statement showing the days of the week arranged in the order of the greatest average consumption, and the average consumption for those days, for seven months in 1870, and for the whole of the year 1871.

Seven last months of 1870.	Gallons.	Whole of year 1871.	Gallons.
No. 1. — Mondays	720,001	No. 1. — Mondays	614,784
No. 2. — Saturdays	694,935	No. 2. — Saturdays	593,395
No. 3. — Wednesdays	671,573	No. 3. — Wednesdays	562,572
No. 4. — Tuesdays	669,600	No. 4. — Fridays	558,201
No. 5. — Fridays	664,060	No. 5. — Tuesdays	558,172
No. 6. — Thursdays	663,932	No. 6. — Thursdays	555,227
No. 7. — Sundays	603,149	No. 7. — Sundays	502,638

It will be seen by the foregoing statement that the order of relative consumption on the several days of the week is the same for 1871 as for 1870, with the single exception that Tuesdays and Fridays change places ; but observe that there is only a difference of 29 gallons between the Tuesdays and Fridays of 1871, and that if 30 gallons only were added to the Tuesdays of 1871, the relative order of the days would then correspond precisely for both years.

It also appears that the average consumption on Mondays in both years is about $3\frac{6}{10}$ per cent. greater than on Saturdays ; the Monday consumption in 1870 exceeds the average of the Tuesdays, Wednesdays, Thursdays and Fridays by about 8 per cent., and in 1871 it exceeds the average of the same days about 10 per cent. The average of Mondays

exceeds the average of Sundays in 1870 by $19\frac{4}{10}$ per cent., while in 1871 the excess of Monday over Sunday is $22\frac{3}{10}$ per cent.

Another agreeable fact is apparent from a comparison of the averages of the two years, viz., that, notwithstanding our high-service works have been considerably extended during the past year, yet there has been an average *reduction of the amount of water pumped of nearly 16 per cent.* This reduction dates from the thirteenth of January, 1871. For the first twelve days of January the average daily amount pumped was 747,588 gallons; for the last fourteen days of the same month the average amount pumped was 593,240 gallons, — an average daily reduction of 154,348 gallons, or nearly 20 per cent. The increased consumption in the Highland and Dorchester districts is apparent from the fact that, in May, 1870, before the Beacon Hill district was added, the average supply for the Highlands was 82,640 gallons per day, while in January, 1870, the average daily amount pumped for the Highlands was 160,006 gallons, being the average of three days, pumping when the Beacon Hill service was disconnected for repairs.

The engines have worked well during the year, and have shown a range of speed quite unusual for pumps of this character, varying from a minimum of four to a maximum of over forty revolutions per minute. The standard maximum requirement was thirty-five revolutions per minute.

The following is a statement of the cost of pumping for the year 1871. It will be seen that the item of salaries is more than half the whole cost, and that this item would remain the same if the quantity of water pumped were equal to the maximum capacity of the pumps. The cost of pumping per million gallons raised one foot high is, as appears below, 37 cents; which appears large as compared with the cost in other large works in this country. The cost in Philadelphia varies from 23 cents to 11 cents. This variation is not due

to the character of the pumps or engines alone; but depends upon the relative amount of work done as compared with the capacity of the engines. If our pumps were to work to their full capacity, the cost per million gallons would be very materially reduced.

COST OF PUMPING, 1871.

Salaries	$3,612 50
Fuel	2,319 70
Oil	82 15
Cotton waste	41 14
Tallow	16 08
Packing	25 37
Other small supplies	5 28
	$6,102 22
Cost per million gallons, raised one foot high	37

WESTERN DIVISION.

The report of Mr. Stanwood, Superintendent of this division, will furnish you all information as to the condition of the structures and grounds under his care.

The usual annual examination of the conduit has been postponed, so that no report of its present condition can be presented at this time.

On page 46 will be found a statement of the average monthly and yearly heights of the water in the lake above the bottom of the conduit, from 1851 to 1871 inclusive.

It appears that the average height for the past year was 6.50 feet, being 4.46 lower than the average of 1870, and 2.50 feet lower than any year since the works were completed.

The tables on pages 38–39 will show the various depths of the water in the conduit at the lake, the number of days

in each month that the water was running at those depths, and the average depth for each month and for the entire year.

It will be seen that for forty-five days, mostly in May and June, the conduit was run full, and with a head varying from 0 to 1 foot. This was at the time when the lake had reached its highest level and a surplus was run through the conduit to fill the Chestnut Hill reservoir. The average depth for the month of November was the smallest, being only 3 feet 7½ inches. The average for the whole year was 5 feet 2¼ inches, or just six inches lower than the average for the past two years.

The fluctuations of the water at the lake during the year 1871 have been of a most marked character, and during no year since the works were built has there been greater solicitude on account of a threatened water famine than the past.

On the 1st of January, 1871, the surface of the water at the lake stood at 5 feet 9½ inches above the bottom of the conduit; Jan. 14, it had fallen to 5 feet; Jan. 24, it had risen to 5 feet 3½ inches; Feb. 18, it had fallen to 4 feet 10 inches; May 11, it stood at the highest point during the year, — 10 feet 9½ inches; Nov. 10, it had fallen to the lowest point of the year, — 3 feet 2 inches; Nov. 30, 4 feet 4 inches; Dec. 25, 3 feet 7 inches, and on Dec. 31, 4 feet 3 inches. This completes the record for the year 1871; but since January, 1872, the level of the lake has receded to the lowest point ever reached, — 9½ inches above the bottom of the conduit; this was on the 29th of March.

Since that time the water has gained, and on the first of May it stood at 5 feet 3½ inches.

PUMPING AT LAKE COCHITUATE.

The 12th of January, 1871, the water in the lake being then very low, with a prospect of its being much lower, the Water Board were anxious to make some provision for a supply for the city, in case the water level should continue to fall. As

I was at the time confined to the house by sickness, Mr. Wightman, the Asst. City Engineer, advised the Board to procure pumps, to be located in the gate-house, and run by an engine from the outside. The Board thought favorably of the proposition, and requested Mr. Wightman and Mr. Jones, Supt. of the Eastern Division, to examine two pumps owned by the Salem Water Commissioners, which it was thought might be suitable for this purpose.

After obtaining all the information that could be procured, and making a careful examination of the condition of the pumps, a verbal report was made to the Board that they would undoubtedly be of sufficient capacity to lift 14,000,000 gallons in 24 hours, to a height of 4 feet, with a 20-horse power engine.

The pumps were purchased on the 14th of January, and sent to the lake, arriving there the 15th. The 16th, an engine to run pumps was purchased at Lawrence and forwarded to the lake. This machinery was put in running order, but as the water in the lake increased instead of diminishing in height, there was no necessity for using it, and it remained idle until November.

The 4th of November Mr. Wightman was requested by the President of the Water Board to take charge of the pumps and the operation of them. A test of the capacity of the pumps was made on the 7th and 8th, and found to be 11,500,000 in 24 hours, with a lift of 7 ft. 6 in.

The lift was reduced to 6 ft. 3 in., improved discharge pipes attached to the pumps, and on the 11th they commenced pumping the supply for the city. These pumps would have furnished a sufficient quantity for the daily consumption, except in extremely cold weather, but as the reservoirs had been reduced to a very low level, it was deemed necessary to increase the quantity in them to render the supply certain, in case of an accident to the pumps or conduit. A third pump was therefore procured, and the engine at Chestnut

Hill reservoir, used on the stone crusher, sent to the lake to run it. The three pumps were started on the 9th of December, and on the 13th they commenced to run continuously night and day, and not only pumped the supply for the city, but increased the depth of water in the Chestnut Hill reservoir 2 feet.

While these pumps were running, preparations had been made to meet another contingency. The pumps being located inside the gate-house could be used only as long as the water was at sufficient height in the chamber to cover them, and as they were not suction pumps, would be useless in case the water level should fall 3 feet. Piles had therefore been driven in front of the gate-house, platforms constructed, and contracts made for the building and delivery of two twenty-five horse-power engines and two pumps of greater capacity than those in use. One of the engines arrived on the 7th of December, was placed on the platform, and a building erected over it. The first pump did not reach the lake until the 25th of December; on the 30th it was run for the purpose of testing it, and a trial of its capacity in comparison with the three pumps was made January 6th, 1872, and found to be equal to the three. It was not, however, deemed advisable to start this pump until the second one was in position.

The second engine arrived the 14th, the second pump the 15th of January; on the 26th the buildings were completed, the engines and pumps in running order, and they commenced pumping the supply for the city. The pumps which had been in use were stopped, but were left in position ready for service in case of accident to the others. All the pumps used were of the kind known as the "Perry Centrifugal," the ones first run having 12-inch discharge pipes, and the others having 18-inch discharge and 22-inch suction pipes. The latter, with a velocity of 120 revolutions, were each capable of lifting 14,000,000 gallons in 24 hours. This amount could be largely increased by increasing the speed of the

pumps. The supply was furnished by these pumps until the 2d of April, when one of them was stopped; the other one was run until the 13th, at which time, the water having reached a sufficient height to furnish the daily consumption by gravitation, pumping was suspended.

The citizens were saved by this machinery great inconvenience and suffering, as without it the city must have been on an extremely short supply, the water at one time reaching a point but $9\frac{1}{2}$ inches above the bottom of the conduit, and the quantity which would have been furnished by gravitation was less than one half the amount consumed. When it is considered that this machinery was but temporary in its character, hurriedly put up in the depth of winter, and run without cessation four months and a portion of a fifth, furnishing the entire supply for the city, and raising the level of Chestnut Hill reservoir 7 feet $9\frac{3}{4}$ inches, and the Brookline reservoir 3 feet 2 inches, making the quantity pumped for the supply from Dec. 13th, 1,936,654,000 gallons, and that stored in the reservoir 330,000,000 gallons, a total of 2,266,-654, 000 gallons, its performance of this amount of work, with but a single accident, and that a slight one, may well reflect credit upon its arrangement, and the careful manner in which it was run.

On page 45, the usual table exhibiting the rain-fall at the lake, and the proportion collected is given. It appears that the rain-fall at the lake was $45\frac{39}{100}$ inches, — the least since 1864, and $6\frac{14}{100}$ inches less than the average for twenty years. The amount of water drawn from the lake during the year was 5,090,107,000, gallons, none of which was wasted over the dam. The percentage of the rain-fall collected was 32 per cent., amounting to a daily supply of 13,197,800 gallons. The average percentage for the past twenty years collected in the lake has been 45 per cent.

CONSUMPTION OF WATER.

On pages 43 and 44 will be found the table giving the consumption of water by daily averages for each month since 1849. The average daily consumption for the entire year 1871, was 13,945,500 gallons. The greatest daily average of the year was in September, — 16,512,000 gallons; and the least was in December, — 12,564,000 gallons.

RAIN-FALL.

The usual table of the annual amount of rain-fall at Lake Cochituate, Waltham, Lowell, Cambridge, Providence and Boston is to be found on page 40; also, on page 41 is the usual table prepared by Mr. William H. Bradley, Superintendent of Sewers, showing the days upon which snow or rain fell during the year, and the amount on such days.

For the information presented in these tables I desire to express my thanks to the several gentlemen who have so kindly furnished it.

From the records in this office I have prepared tables exhibiting the monthly and annual rain-fall, also the average for each month for the whole term covered by the records. The places of observation were Providence, R. I., Boston, Cambridge, Waltham, Lowell and Lake Cochituate. The Providence observations cover a term of forty years, — from 1832 to 1871 inclusive. The Lake Cochituate records are from 1852 to 1871 inclusive, — twenty years. All the rest cover a term of thirty years, — from 1842 to 1871 inclusive. These tables will be found on pages 52 to 58. On page 59 may be found a table in which the monthly rain-fall from 1842 to 1871 is given, covering all the places of observation embraced in the other tables. This monthly rain-fall is the average of the monthly rain-falls, as given in the preceding tables, at each of the places of obser-

vation, and may be assumed to represent a fair average of the rain-fall for quite a large district, extending from Providence to Lowell in one direction, and from Boston to the lake in the other, covering an area of over 1,000 square miles. From this table it appears that the average annual rain-fall in this large district for thirty years was $45\frac{57}{100}$ inches. The least annual rain-fall was $29\frac{57}{100}$ inches in 1846; the greatest annual rain-fall was $59\frac{11}{100}$ inches in 1863. The monthly averages for the whole term show that August is the wettest month, and February the dryest.

For several years I have published the statement hereinbefore alluded to (page 45), showing the amount of rain-fall on the water-shed of Lake Cochituate; amount of water consumed and wasted; rise or fall of the lake expressed in gallons; total amount of water collected in the lake from its water-shed; average daily amount collected, and the available percentage of the rain-fall collected. This statement is based on the rain-fall of the entire year, and, as it frequently happens that, in the consideration of questions relating to water supply as derived from the rain-fall on a given district, it is desirable to know what proportion of the rain-fall is collectable at different seasons of the year, I have prepared a series of tables (pages 60 to 68), in the same form as the annual statement above referred to; but these tables are monthly statements, and cover the whole term of my official connection with the water works, as City Engineer, from 1863 to 1871 inclusive.

The column in these tables giving the percentage of rain-fall collected each month, presents some apparent absurdities, such as may be found, for instance, in the statement for 1864, where the amount collected in the month of February is greater than the rain-fall, being 159 per cent.; but it must be remembered that the amount falling in one month may be very large, and may be in the form of snow, which does not affect the lake until it melts, which may be in the following

month; thus, in the instance cited, the precipitation of rain and snow in December and January was 8.42 inches, and it was a portion of this that was received into the lake in the following February, when the rain-fall was very small, only $\frac{98}{100}$ of an inch. It thus appears that it is not possible to determine the proportions correctly, for terms so short as monthly periods; but a careful inspection of these monthly statements will show that the year may be divided into two periods, which represent the seasons of the maximum and minimum productiveness of any water-shed. I find that these seasons are as follows: from December 1st to June 1st represents the season of maximum productiveness, and the balance of the year, the season of minimum productiveness. From the preceding tables I have deduced the statements, which appear on pages 69 and 70, showing the several years (1863 to 1871) divided into the seasons of maximum and minimum productiveness. From this table it appears that the law is invariable throughout the whole term, and that it is perfectly safe to assume that the proportion of rain-fall collectable in the six months from December 1st to June 1st will be more than double that collectable from June to December. The average percentage for the whole term, collected between December 1st and June 1st, was 58 per cent.; for the remaining six months it was 22 per cent.

Respectfully submitted,

N. HENRY CRAFTS,

City Engineer.

Average Monthly and Yearly Heights, in feet and decimals, of the Chestnut Hill Reservoirs above

BROOKLINE.
Maximum high-water line, 124.60.

MONTH.	1861.	1862.	1863.	1864.	1865.	1866.	1867.	1868.	1869.	1870.	1871.
January	122.81	122.46	123.64	122.37	123.31	122.28	122.00	123.29	122.58	122.83	121.89
February	122.68	122.85	123.23	122.61	122.82	122.47	123.12	122.79	122.64	122.60	122.54
March	123.32	123.52	123.23	123.62	123.26	123.19	123.05	122.33	122.48	122.77	122.08
April	124.01	124.18	123.85	123.82	123.38	123.45	123.00	123.04	122.60	122.56	122.00
May	124.04	124.00	123.52	123.62	122.65	123.04	123.07	123.04	122.77	122.75	121.79
June	123.68	123.25	123.17	122.66	123.23	123.29	122.34	122.77	121.85	122.64	121.98
July	122.68	123.73	122.76	122.87	123.33	122.97	122.98	122.77	122.10	122.50	122.19
August	123.71	123.70	123.11	122.64	123.39	122.80	122.23	122.75	122.19	122.23	122.06
September	123.76	123.64	123.36	122.03	123.29	122.81	122.52	122.12	122.50	122.35	121.50
October	123.79	123.85	122.26	123.19	123.29	123.03	122.65	122.31	122.58	122.64	119.54
November	123.80	124.07	123.63	122.78	123.38	122.75	122.89	122.56	122.46	122.60	116.94
December	124.00	123.46	122.53	122.29	123.24	122.64	122.37	122.00	122.92	122.50	117.71
Yearly Average	123.52	123.56	123.19	122.87	123.21	122.89	122.69	122.65	122.48	122.58	121.02

BEACON HILL.
Maximum high-water line, 121.53.

MONTH.	1861.	1862.	1863.	1864.	1865.	1866.	1867.	1868.	1869.	1870.	1871.
January	116.61	117.48	118.36	117.72	119.18	119.20	119.11	120.20	118.51	118.63	119.26
February	118.93	119.46	118.18	117.54	118.91	119.65	118.59	120.11	118.72	117.78	118.95
March	119.05	119.18	118.03	116.38	120.58	120.72	119.45	120.57	118.30	118.07	119.38
April	118.91	117.91	117.27	117.21	121.28	120.70	119.86	120.57	118.82	118.34	119.59
May	119.06	117.59	116.33	116.53	120.31	119.53	118.50	118.65	119.68	118.63	119.09
June	117.32	116.39	115.40	115.31	120.56	118.53	118.34	118.45	117.13	118.03	. .
July	116.48	116.46	116.34	115.32	121.23	119.51	119.00	120.24	117.20	119.30	109.63
August	114.18	116.22	116.05	115.19	119.83	119.17	117.70	117.11	117.63	119.59	109.68
September	113.14	116.22	116.12	115.91	119.03	119.39	120.46	118.20	117.45	117.72	. .
October	115.91	. .	115.87	118.17	118.43	119.50	120.46	118.61	118.36	117.80	. .
November	116.74	117.20	116.85	118.55	120.14	119.78	120.84	119.03	118.45	118.61	. .
December	117.45	115.23	118.30	117.35	120.50	119.37	120.02	117.78	118.36	119.38	. .
Yearly Average	116.98	117.21	116.92	116.77	120.00	119.59	119.36	119.11	118.13	118.49	116.51

Water in the Brookline, Beacon Hill, South and East Boston, and "tide marsh level," 1861–71.

SOUTH BOSTON.
Maximum high-water line, 122.86.

MONTH.	1861.	1862.	1863.	1864.	1865.	1866.	1867.	1868.	1869.	1870.	1871.
January	115.03	113.66	115.73	110.63	114.21	114.38	112.46	111.15	111.15	114.46	112.51
February	115.07	114.08	115.54	110.94	113.42	114.44	111.36	111.15	111.34	114.80	112.61
March	115.12	114.12	115.36	111.13	113.64	113.51	111.74	111.11	111.63	114.51	112.74
April	115.32	114.93	114.73	112.07	114.82	114.99	111.88	111.55	111.96	113.57	112.63
May	113.83	115.74	112.71	111.64	115.44	114.90	111.63	111.61	111.78	113.53	112.71
June	112.58	114.22	111.39	109.06	114.91	114.32	111.19	112.15	111.51	113.36	112.44
July	110.91	114.23	109.75	108.57	114.36	113.96	111.53	111.53	111.19	112.21	115.32
August	112.92	114.03	109.80	109.53	113.80	114.07	111.90	111.53	110.65	110.78	114.03
September	112.96	114.04	109.64	110.21	113.69	113.41	111.70	111.44	108.76	110.15	113.13
October	114.68	114.24	109.90	112.49	112.89	112.74	111.29	111.44	113.15	110.01	112.80
November	114.14	115.94	111.25	112.49	112.74	112.03	111.26	111.44	113.76	111.86	112.76
December	113.79	116.35	109.90	113.89	113.78	112.62	111.08	111.11	113.88	112 61	109.26
Yearly Average	113.86	114.63	112.14	111.05	113.97	113.78	111.59	111.44	111.74	112.65	112.74

EAST BOSTON.
Maximum high-water line, 107.60.

MONTH.	1861.	1862.	1863.	1864.	1865.	1866.	1867.	1868.	1869.	1870.	1871.
January	95.37	96.26	95.64	90.22	96.12	93.61	91.89	92.81	99.72	104.45	101.18
February	93.05	94.94	93.86	92.98	97.00	96.61	92.06	92.10	100.56	104.20	104.33
March	94.60	95.75	94.29	93.50	94.83	94.22	91.69	91.14	100.60	100.89	106.12
April	98.07	96.71	95.65	96.16	96.52	96.47	90.91		Shut off for repairs.	104.93	107.14
May	97.85	96.99	93.07	97.68	96.04	95.85	89.63			105.91	106.50
June	96.22	95.99	91.10	94.22	93.91	93.71	91.82	Shut off for repairs.		106.00	106.43
July	95.00	96.13	90.43	92.34	96.82	95.35	94.60			100.60	103.87	106.47
August	97.34	93.96	91.23	92.84	95.78	93.85	94.16			95.08	104.25	105.22
September	95.76	95.57	91.96	95.00	94.52	Shut off for repairs.	99.40			94.87	102.77	104.91
October	95.56	91.80	95.02	97.55	93.38		96.85			96.97	105.20	104.81
November	96.40	93.57	93.36	98.14	92.23		93.47			101.12	104.75	104.56
December	97.37	95.77	89.79	97.27	94.34	92.29	92.57			102.06	105.18	104.58
Yearly Average	96.05	95.29	92.95	94.83	95.12	94.66	93.25	92.02	99.06	104.37	105.18

Average monthly and yearly heights, etc. — Continued.

CHESTNUT HILL.
Maximum high-water line, 125.00.

Month.	1870.	1871.
January	....	102.00
February	....	102.81
March	....	105.19
April	....	110.48
May	....	116.21
June	....	121.46
July	....	122.40
August	....	122.02
September	....	121.44
October	....	119.67
November	100.80	117.08
December	101.29	115.35
Yearly Average	101.04	114.67

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

MONTH.	1849.	1850.	1851.	1852.	1853.	1854.	1855.	1856.	1857.	1858.	1859.
January	1,700,000	5,181,700	7,233,700	8,280,900	8,050,500	10,695,200	9,702,700	12,669,000	15,089,000	12,160,000	14,512,000
February	. . . .	5,214,000	7,221,100	8,790,300	8,643,600	10,654,200	10,349,800	12,791,000	14,175,000	14,399,000	14,769,000
March	1,550,000	4,841,200	6,137,900	8,521,100	8,202,200	9,582,100	10,125,600	12,504,000	13,941,000	14,154,000	14,480,000
April	. . . .	4,961,000	5,365,200	8,048,700	7,903,600	8,738,500	8,540,000	10,800,000	12,454,000	13,465,000	13,760,000
May	3,600,000	5,346,100	6,238,400	8,350,000	8,123,400	9,685,300	9,103,800	10,378,000	12,414,000	11,423,000	11,302,000
June	4,300,000	6,906,500	7,925,000	8,033,100	8,945,900	11,745,200	9,984,400	11,223,000	12,504,000	10,867,000	11,639,000
July	4,800,000	8,514,200	7,180,200	9,608,000	8,809,200	10,613,800	11,056,600	13,167,000	13,551,000	13,621,000	13,219,000
August	4,100,000	8,004,600	7,235,000	9,709,300	8,461,900	10,028,100	11,120,800	12,664,000	13,077,000	13,141,000	12,704,000
September	4,800,000	6,585,500	7,230,600	7,920,000	8,640,700	9,712,400	11,710,800	11,522,000	12,030,000	12,745,000	12,389,000
October	4,550,000	4,504,300	6,716,600	6,930,000	8,871,100	8,769,800	10,771,200	11,891,000	10,864,000	12,969,000	12,026,000
November	3,800,000	4,960,500	6,473,500	6,637,900	8,624,700	8,030,200	10,383,200	11,691,000	11,372,000	12,143,000	12,715,000
December	3,600,000	5,037,000	7,663,400	7,195,800	9,228,400	10,597,600	11,307,200	13,284,000	11,241,000	13,075,000	14,586,000
Average for year . .	3,680,000	5,837,900	6,883,800	8,125,800	8,542,300	9,902,000	10,346,300	12,048,600	12,726,000	12,847,000	13,175,000

Consumption of Water. — Continued.

Month.	1860.	1861.	1862.	1863.	1864.	1865.	1866.	1867.	1868.	869.	1870.	1871.
January	17,862,000	21,106,769	17,000,000	16,112,000	18,954,000	13,412,000	14,850,000	13,511,000	15,992,000	15,426,000	12,525,000	14,110,000
February	18,901,000	20,804,131	17,000,000	17,328,000	18,846,000	13,318,000	13,385,000	13,831,000	16,927,000	14,731,000	14,052,000	15,070,000
March	15,409,000	19,453,344	17,300,000	16,681,000	16,841,000	12,027,000	12,284,000	13,100,000	13,722,000	14,789,000	14,646,000	10,162,000
April	14,621,000	17,151,593	15,300,000	15,125,000	16,506,000	11,975,000	11,251,000	12,770,000	12,636,000	14,650,000	14,703,000	11,814,000
May	14,790,000	16,687,832	14,300,000	15,407,000	16,094,000	13,660,000	11,076,000	12,301,000	13,846,000	13,902,000	13,759,000	12,222,000
June	17,838,000	17,231,984	16,600,000	16,138,000	17,730,000	14,391,000	11,878,000	13,625,000	14,351,000	14,252,000	14,824,000	15,695,000
July	17,239,000	18,897,809	16,400,000	15,954,000	18,112,000	13,207,000	12,668,000	14,250,000	14,676,000	18,378,000	16,392,000	15,748,000
August	19,297,000	18,272,365	17,000,000	16,980,000	16,188,000	13,426,000	12,441,000	14,546,000	14,479,000	17,632,000	17,107,000	16,019,000
September	17,957,000	18,098,259	17,000,000	17,035,000	16,798,000	12,624,000	11,842,000	13,186,000	16,072,000	15,741,000	16,785,000	16,512,000
October	16,938,000	17,987,128	17,300,000	15,779,000	15,479,000	11,273,000	12,396,000	13,518,000	14,954,000	14,096,000	16,528,000	13,856,000
November	16,862,000	16,604,076	17,100,000	16,028,000	14,079,000	11,750,000	11,262,000	12,707,000	13,975,000	13,608,000	14,677,000	13,574,000
December	19,151,000	15,976,362	17,000,000	16,295,000	14,547,000	10,877,000	11,412,000	15,434,000	15,600,000	13,640,000	14,094,000	12,564,000
Average for year .	17,238,000	18,189,304	16,600,000	16,238,500	16,681,000	12,662,000	12,229,000	13,565,000	14,769,167	15,070,400	15,007,700	13,945,500

Statement showing amount of Rainfall on Water-shed of Lake Cochituate, amount of Water consumed and wasted, available amount received into Lake, available percentage of Rainfall, etc., from 1852 to 1871, inclusive. Water-shed of Lake = 12,077 acres.

YEAR.	Rainfall.	Amount of Rainfall on Water-shed of Lake Cochituate.	Amount of Water consumed.	Amount of Water wasted from Lake.	Total amount consumed and wasted.	Rise of Lake during the year.	Fall of Lake during the year.	Total available amount of Rainfall received into Lake.	Available daily average am't of Rainfall rec'd into Lake.	Available percentage of Rainfall rec'd into Lake.
	Inches.	*Gallons.*	*Gallons.*	*Gallons.*	*Gallons.*	*Gallons.*	*Gallons.*	*Gallons.*	*Gallons.*	
1852*	47.93	15,759,207,000	2,974,042,800	4,020,566,885	6,994,609,685	. . . . .	261,360,000	6,733,249,685	18,396.857	43 per cent.
1853	55.86	18,366,561,000	3,117,939,500	3,166,417,500	6,284,357,000	239,580,000	. . . . .	6,523,937,000	17,873,800	35 per cent.
1854	43.15	14,187,562,000	3,614,230,000	4,187,733,020	7,801,963,020	. . . . .	217,800,000	7,584,163,020	20,778,529	53 per cent.
1855	34.96	11,494,719,000	3,776,399,500	No acc't kept.	. . . . .	. . . . .	326,700,000	. . . . .	. . . .	. . . . .
1856	40.80	13,414,892,000	4,409,787,600	No acc't kept.	. . . . .	598,950,000	. . . . .	. . . . .	. . .	. . . . .
1857	63.10	20,747,052,000	4,644,990,000	10,625,900,000	15,270,890,000	32,670,000	. . . . .	15,303,560,000	41,927,562	74 per cent.
1858	48.66	15,999,232,000	4,689,155,000	1,934,500,000	6,623,655,000	. . . . .	141,570,000	6,482,085,000	17,759,013	40 per cent.
1859†	49.02	16,117,602,000	4,808,875,000	7,569,000,000	12,377,875,000	283,140,000	. . . . .	12,661,015,000	34,687,712	78 per cent.
1860	55.44	18,228,471,000	6,309,108,000	None.	6,309,108,000	174,240,000	. . . . .	6,483,348,000	17,714,065	35 per cent.
1861	46.44	15,269,303,000	6,639,095,900	3,377,558,966	10,016,654,866	. . . . .	1,459,260,000	8,557,394,866	23,444,917	56 per cent.
1862	49.69	16,337,890,000	6,059,000,000	33,200,000	6,092,200,000	1,306,800,000	. . . . .	7,399,000,000	20,271,233	45 per cent.
1863	69.30	22,785,586,000	5,927,052,500	2,165,696,470	8,092,748,970	762,300,000	. . . . .	8,855,048,970	24,260,408	39 per cent.
1864	42.60	14,006,726,000	6,105,306,700	1,368,746,000	7,474,052,700	. . . . .	1,848,577,000	5,625,475,700	15,370,152	40 per cent.
1865	49.46	16,262,266,000	4,621,630,000	1,688,120,674	6,309,750,674	743,242,500	. . . . .	7,052,993,174	19,323,270	43 per cent.
1866	62.32	20,490,455,000	4,463,585,000	None.	4,463,585,000	743,242,500	. . . . .	5,206,827,500	14,265,280	25 per cent.
1867	56.25	18,494,795,000	4,951,225,000	2,482,041,000	7,433,266,000	. . . . .	698,811,000	6,734,455,000	18,450.600	36 per cent.
1868	50.06	16,459,544,000	5,405,515,000	2,507,684,000	7,913,199,000	346,371,000	. . . . .	8,259,570,000	22,567,160	50 per cent.
1869	64.34	21,099,808,000	5,500,696,000	1,635,570,000	7,139,321,000	480,882,000	. . . . .	7,620,203,000	20,877,300	36 per cent.
1870	55.89	18,328,694,000	5,477,810,000	4,818,971,000	10,296,781,000	. . . . .	1,736,085,000	8,560,696,000	23,453,900	47 per cent.
1871	45.39	14,885,300,000	5,090.107,000	None.	5.090.107,000	. . . . .	272.903.000	4,817,204,000	13,197,800	32 per cent.
Average . .	51.53	Average daily waste for 18 years . . . . 7,851.100 " " " for 6 years, '52–59 . 14,378,000 " " " last 12 " '60–71. . 4,583,900				Average daily capacity of Lake as a source of supply for 18 years, 21.367,700				45 p. c. av.

* Observations of Rainfall at Lake Cochituate commenced 1852, and these observations are assumed as correct for the whole district. † Lake raised two feet.

Table of the average monthly and yearly heights of water in the Lake above the bottom of the Aqueduct.

Month.	1851.	1852.	1853.	1854.	1855.	1856.	1857.	1858.	1859.*	1860.	1861.	1862.	1863.	1864.	1865.	1866.	1867.	1868.	1869.	1870.	1871.
January .	9.50	10.63	9.51	10.54	10.16	8.06	9.53	10.75	10.80	10.83	11.93	6.06	11.33	13.88	7.41	8.37	12.14	10.29	12.27	13.25	5.29
February .	10.21	10.20	10.78	10.95	10.65	7.59	10.28	10.05	12.17	11.36	12.77	6.57	12.85	13.71	8.24	8.73	13.14	9.75	12.96	13.19	5.40
March . .	10.43	10.49	10.44	10.93	10.68	6.96	10.67	9.35	12.45	12.67	13.21	8.67	13.95	14.33	12.28	10.58	13.57	10.96	13.21	12.81	7.96
April . .	11.17	11.23	10.68	10.66	11.57	10.24	12.30	9.36	12.06	12.72	14.14	12.40	14.59	14.32	14.00	11.96	13.50	13.29	13.40	13.33	9.31
May	11.02	10.94	10.98	10.87	11.35	12.05	12.05	10.67	12.06	11.52	13.88	14.45	14.01	14.26	14.00	12.01	13.44	13.67	13.65	13.12	10.37
June . . .	10.40	10.28	10.62	10.33	10.69	11.78	12.14	11.72	11.96	10.83	12.99	14.43	13.29	13.51	13.41	12.72	13.20	13.37	13.23	13.02	9.27
July . . .	9.76	9.44	9.45	9.00	9.86	10.67	11.41	11.74	10.22	10.42	11.50	14.05	12.82	11.33	12.28	11.84	12.12	12.46	12.62	12.12	7.83
August . .	9.01	8.40	8.64	6.67	9.01	11.59	11.70	11.30	10.24	9.42	10.27	12.97	13.73	9.65	11.18	11.79	12.17	11.70	11.04	10.37	6.27
September	8.00	5.68	7.78	6.64	7.52	10.82	11.72	10.40	9.84	9.42	8.71	11.33	13.43	7.91	10.09	11.59	12.00	11.61	9.73	8.67	5.00
October .	7.55	6.55	7.34	5.90	6.42	10.10	11.10	8.72	10.15	10.35	7.79	10.30	12.94	6.46	9.02	11.72	11.10	11.83	10.58	8.10	3.81
November	8.07	7.74	9.58	6.09	6.28	10.80	11.16	9.01	9.98	10.44	7.22	10.24	13.26	5.48	8.74	11.41	11.03	11.75	11.21	7.10	3.60
December	9.67	8.49	10.57	8.38	7.29	10.97	11.02	9.85	10.54	11.17	6.88	11.70	14.06	5.41	8.48	11.68	10.51	12.33	11.77	6.40	3.83
Yearly av.	9.57	9.17	9.70	9.00	9.29	10.14	11.26	10.24	11.04	10.[illegible]	10.94	11.10	13.52	10.84	10.76	11.20	12.33	11.92	12.15	10.96	6.50

* High-water mark raised two feet.

CONDUIT AT THE LAKE.

The following table shows the varying depths of the water in the conduit at the gate-house, the number of days in each month that the water was running at those depths, and the average depth for each month.

Depths Ft. In.	Jan. Days.	Feb. Days.	Mar. Days.	April. Days.	May. Days.	June. Days.	July. Days.	Aug. Days.	Sept. Days.	Oct. Days.	Nov. Days.	Dec. Days.	To'l. Dys.
2-7¾	. . .	. . .	. . .	1	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	1
3-1	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	1	. . .	1
3-2	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	1	. . .	1
3-3	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	2	. . .	2
3-4	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	1	. . .	1
3-4½	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	2	. . .	2
3-5	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	5	. . .	5
3-5½	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	2	. . .	2
3-6	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	1	. . .	. . .	1
3-6½	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	2	. . .	. . .	2
3-7	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	3	3	. . .	6
3-7½	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	1	1	. . .	2
3-8	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	1	1	. . .	2
3-8½	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	2	. . .	. . .	2
3-9	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	2	1	. . .	3
3-9½	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	1	. . .	. . .	1
3-10	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	4	2	2	8
3-10½	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	3	. . .	1	4
3-11	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	3	2	1	6
3-11½	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	2	. . .	1	3
4-0	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	4	1	2	7
4-0½	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	1	. . .	1	2
4-1	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	1	1	4	6
4-1½	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	1	. . .	1	2
4-2	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	1	. . .	3	2	6
4-2½	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	1	. . .	. . .	. . .	1
4-3	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	2	. . .	. . .	. . .	2
4-3½	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	1	. . .	. . .	. . .	1
4-4	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	1	. . .	. . .	. . .	1
4-4½	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	1	. . .	. . .	. . .	1
4-5½	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	1	. . .	. . .	. . .	1
4-6	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	12	12

Conduit at the

Depths Ft. In.	Jan. Days.	Feb. Days.	Mar. Days.	April. Days.	May. Days.	June. Days.	July. Days.	Aug. Days.	Sept. Days.	Oct. Days.	Nov. Days.	Dec. Days.	Total Days.
4–6½	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	1	. . .	. . .	. . .	1
4–7½	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	1	. . .	. . .	. . .	1
4–8	. . .	. . .	18	. . .	. . .	. . .	. . .	. . .	1	. . .	. . .	1	20
4–9½	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	1	. . .	. . .	. . .	1
4–10	. . .	1	. . .	. . .	. . .	. . .	. . .	1	. . .	. . .	. . .	3	5
4–10½	. . .	1	. . .	. . .	. . .	. . .	. . .	. . .	1	. . .	. . .	. . .	2
4–11	. . .	1	. . .	. . .	. . .	. . .	. . .	. . .	1	. . .	. . .	. . .	2
4–11½	. . .	3	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	3
5–0	2	2	4	. . .	. . .	. . .	. . .	. . .	2	. . .	. . .	. . .	10
5–0½	1	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	1
5–0¾	. . .	1	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	1
5–1	2	3	. . .	. . .	. . .	. . .	. . .	. . .	1	. . .	. . .	. . .	6
5–1½	1	1	. . .	. . .	. . .	. . .	. . .	. . .	1	. . .	. . .	. . .	3
5–1¾	. . .	3	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	3
5–2	4	3	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	7
5–2½	4	. . .	. . .	. . .	. . .	. . .	. . .	. . .	1	. . .	. . .	. . .	5
5–2¾	2	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	2
5–3	5	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	5
5–3¼	2	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	2
5–3½	2	. . .	. . .	. . .	. . .	. . .	. . .	. . .	1	. . .	. . .	. . .	3
5–4	1	. . .	. . .	. . .	. . .	. . .	. . .	10	. . .	. . .	. . .	. . .	11
5–4½	. . .	1	. . .	. . .	. . .	. . .	. . .	. . .	1	. . .	. . .	. . .	2
5–5	2	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	2
5–5½	1	. . .	. . .	. . .	. . .	. . .	. . .	. . .	1	. . .	. . .	. . .	2
5–6	1	. . .	9	15	. . .	. . .	31	20	. . .	. . .	. . .	. . .	76
5–6½	1	. . .	. . .	. . .	. . .	. . .	. . .	. . .	1	. . .	. . .	. . .	2
5–7¼	. . .	. . .	. . .	1	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	1
5–7½	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	1	. . .	. . .	. . .	1
5–8	. . .	1	. . .	5	. . .	. . .	. . .	. . .	1	. . .	. . .	. . .	7
5–8½	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	1	. . .	. . .	. . .	1

Lake — Continued.

Depths Ft. In.	Jan. Days.	Feb. Days,	Mar. Days	April. Days.	May. Days.	June. Days.	July. Days.	Aug. Days.	Sept. Days.	Oct. Days.	Nov. Days.	Dec. Days.	Total Days.
5–9	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	1	. . .	. . .	. . .	1
5–9¼	. . .	. . .	. . .	1	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	1
5–9½	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	1	. . .	. . .	. . .	1
5–10	. . .	1	. . .	7	11	. . .	. . .	. . .	1	. . .	. . .	. . .	20
5–11	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	1	. . .	. . .	. . .	1
5–11½	. . .	1	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	1
6–0	. . .	. . .	. . .	. . .	. . .	8	. . .	. . .	. . .	. . .	. . .	. . .	8
6–0½	. . .	1	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	1
6–2½	. . .	1	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	1
6–4	. . .	. . .	. . .	. . .	5	. . .	. . .	. . .	. . .	. . .	. . .	. . .	5
6–6	. . .	1	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	1
6–7	. . .	. . .	. . .	. . .	1	. . .	. . .	. . .	. . .	. . .	. . .	. . .	1
6–8	. . .	. . .	. . .	. . .	1	. . .	. . .	. . .	. . .	. . .	. . .	. . .	1
6–8½	. . .	1	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	1
6–9	. . .	. . .	. . .	. . .	1	. . .	. . .	. . .	. . .	. . .	. . .	. . .	1
6–10	. . .	. . .	. . .	. . .	1	. . .	. . .	. . .	. . .	. . .	. . .	. . .	1
6–11	. . .	1	. . .	1	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	2
7–0	. . .	. . .	. . .	. . .	2	. . .	. . .	. . .	. . .	. . .	. . .	. . .	2
7–0½	. . .	. . .	. . .	. . .	1	. . .	. . .	. . .	. . .	. . .	. . .	. . .	1
7–1	. . .	. . .	. . .	. . .	1	. . .	. . .	. . .	. . .	. . .	. . .	. . .	1
7–1½	. . .	. . .	. . .	. . .	1	. . .	. . .	. . .	. . .	. . .	. . .	. . .	1
7–2	. . .	. . .	. . .	. . .	1	1	. . .	. . .	. . .	. . .	. . .	. . .	2
7–2½	. . .	. . .	. . .	. . .	1	. . .	. . .	. . .	. . .	. . .	. . .	. . .	1
7–3	. . .	. . .	. . .	. . .	1	. . .	. . .	. . .	. . .	. . .	. . .	. . .	1
7–3½	. . .	. . .	. . .	. . .	1	1	. . .	. . .	. . .	. . .	. . .	. . .	2
7–4	. . .	. . .	. . .	. . .	1	20	. . .	. . .	. . .	. . .	. . .	. . .	21

Average Monthly Depths.

Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Average for the year.
5–2¾	5–4¾	4–11¼	5–6¼	6–5¾	6–11¾	5–6	5–5	5–0	3–9¾	3–7½	4–3¾	5–2¼

Annual amount of Rainfall, in Inches, at Lake Cochituate, Boston and vicinity, 1849 to 1871, inclusive.

YEAR.	PLACES AND OBSERVERS.						
	Lake Cochituate, by Supt. of Western Division, B. W. W.	Boston, by J. P. Hall, to 1865, by W. H. Bradley since.	Cambridge, by the Director of the Observatory.	Waltham, by E. Hobbs and I. R. Scott, Agent Boston Manufacturing Company.	Lowell, by Merrimac Manufacturing Company.	Lowell, by Locks and Canals Co., J. B. Francis.	Providence, by A. Caswell.
1849	. .	40.30	40.97	40.74	51.09	. .	34.69
1850	. .	53.98	54.07	62.13	45.68	. .	51.48
1851	. .	44.31	41.97	41.00	41.00	. .	43.30
1852	*47.93	47.94	40.51	42.24	42.78	. .	38.58
1853	*55.86	48.86	53.83	45.04	43.92	. .	53.27
1854	43.15	45.71	45.17	41.29	42.08	. .	46.25
1855	34.96	44.19	47.59	40.63	44.89	48.41	39.05
1856	40.80	52.16	53.79	42.33	42.49	45.97	40.97
1857	63.10	56.87	57.92	44.04	49.38	52.02	44.74
1858	48.66	52.67	45.46	37.40	37.73	35.80	44.51
1859	49.02	56.70	. .	48.49	47.51	48.41	45.29
1860	55.44	51.46	46.95	. .	46.91	46.67	38.24
1861	46.44	50.07	50.14	. .	43.32	42.95	44.25
1862	49.69	61.06	57.21	. .	44.26	44.61	50.09
1863	69.30	67.72	56.42	53.66	52.37	57.81	54.17
1864	42.60	49.30	. .	36.56	38.11	40.64	36.83
1865	49.46	47.83	43.59	35.84	37.38	38.82	44.69
1866	62.32	50.70	. .	43.46	38.18	41.36	46.04
1867	56.25	55.64	41.71	41.40	45.54	45.87	47.04
1868	50.06	64.11	39.89	44.65	47.96	49.58	53.52
1869	64.34	66.28	47.98	47.30	47.30	48.96	47.70
1870	55.89	59.73	41.53	39.40	46.30	48.71	49.02
1871	45.39	48.33	40.56	36.82	44.45	44.17	47.91

* By J. Vannevar.

Table showing the Rainfall in Boston for the year 1871, and the days on which it occurred, from observations by Wm. H. Bradley, Esq., Superintendent of Sewers.

Days.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	...	.08	.06	...	...	...	...	...	...	...	.06	...
2	...	...	...	.48	...	...	...	...	...	.02	...	...
3	...	...	...	...	...	...	...	...	...	...	...	...
4	...	.02	.12	.03	...	.86	...	...	...	...	...	.42
5	...	...	...	...	3.38	...	.05	.70	...	...	...	...
6	...	...	...	...	1.28	...	...	...	...	.52	...	...
7	.26	...	...	...	.66	...	.10	...	...	.40	...	.03
8	...	.66	...	...	...	.45	...	.18	...	...	...	...
9	...	...	...	...	...	...	...	.04	...	...	...	...
10	...	...	.31	...	.05	...	...	...	...	...	...	...
11	...	...	.40	...	...	.06	.08	...	...	.56	1.52	...
12	...	...	.05	.33	...	.46	...	...	...	3.38	...	...
13	...	1.22	.16	...	...	.33	...	...	...	...	...	...
14	...	...	...	...	...	...	...	...	...	...	...	.43
15	...	1.09	...	...	...	...	...	...	...	...	2.08	...
16	.82	...	.17	.24	...	.06	...	...	1.11	...	.28	...
17	...	...	.04	...	...	.08	...	...	.08	...	.08	...
18	...	.42	.12	...	...	1.00	...	...	...	...	...	.24
19	...	...	...	...	...	.81	...	...	...	...	...	.27
20	...	...	...	1.00	...	.56	.08	...	...	...	...	...
21	.03	.02	2.32	.08	...	.64	...	...	...	...	.02	...
22	...	...	...	.20	...	...	...	...	...	...	.40	...
23	...	...	...	...	.32	...	...	...	...	...	...	.56
24	.34	...	...	...	...	.26	...	.14	...	...	...	.58
25	...	...	...	...	...	.10	...	...	...	...	.70	...
26	...	.16	...	...	...	...	.58	.03	...	...	...	...
27	1.04	.05	.93	...	...	...	.05	.10	.18	.60	.24	.54
28	...	...	...	...	...	...	.16	.52	...	.03	...	...
29	.28	...	...	1.87	...	...	1.36	.32	...	...	...	...
30	...	...	...	...	...	...	.17	...	...	...	...	.06
31	...	...	...	...	...	...	.24	1.28	...	...	...	...
M'nthly Totals.	2.77	3.72	4.63	4.23	5.69	5.67	2.87	3.31	1.37	5.51	5.38	3.13

Total for the year . . . . . 48.33 inches.

PROVIDENCE RAINFALL.

Table showing the monthly and annual rainfall at Providence, from 1832 to 1871, inclusive; also the average for each month for the whole term.

	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
1832	3.87	4.25	3.20	3.33	4.14	0.35	1.82	3.92	3.50	2.01	3.46	5.63	39.46
1833	1.71	1.55	1.97	3.17	0.99	4.11	1.11	2.15	1.53	5.98	4.50	4.67	33.44
1834	1.57	1.13	1.43	3.13	5.61	5.10	7.58	1.15	3.81	4.64	3.80	2.97	41.92
1835	3.50	1.20	4.60	4.06	1.50	1.95	2.84	2.25	0.83	3.26	1.72	3.25	30.96
1836	5.63	3.45	5.00	2.30	2.51	3.25	1.53	0.72	1.03	2.35	5.25	4.85	37.87
1837	1.40	2.65	3.17	4.65	7.28	2.82	1.38	2.00	0.48	1.29	1.95	2.55	31.62
1838	2.70	2.32	2.70	2.70	3.88	3.30	0.63	3.55	6.76	4.61	3.65	1.98	37.88
1839	0.76	1.50	1.50	3.63	3.79	2.31	5.26	5.00	1.83	3.75	2.30	5.12	36.75
1840	2.80	2.05	3.50	3.45	3.35	2.89	3.38	3.20	2.95	5.17	5.35	3.10	41.19
1841	6.45	1.50	2.86	7.78	2.18	0.98	5.13	5.12	2.35	3.20	4.45	5.86	47.86
1842	1.30	4.05	2.07	2.10	3.40	9.65	1.43	3.35	1.40	1.16	3.82	3.93	37.71
1843	0.60	5.27	5.58	4.34	3.50	2.12	1.83	6.23	2.20	6.45	1.35	3.03	42.50
1844	4.32	1.95	4.75	0.67	1.95	1.15	4.42	1.11	2.83	5.80	3.30	2.75	35.00
1845	3.20	2.70	3.53	2.34	2.75	2.32	3.10	5.63	1.63	3.40	9.08	3.48	43.16
1846	1.82	2.08	2.86	1.75	4.58	1.30	1.44	2.73	2.33	1.85	4.62	3.15	30.51
1847	2.13	2.71	3.17	1.72	2.02	6.98	2.28	5.50	8.35	1.95	5.72	5.97	48.50
1848	4.82	3.80	2.40	0.95	5.00	3.80	1.85	3.73	2.45	4.05	3.80	3.83	40.48
1849	0.80	0.60	5.99	1.82	3.43	1.23	2.00	3.39	3.14	6.55	2.42	3.52	34.69
1850	5.60	3.38	5.19	4.67	5.00	2.60	2.35	7.65	5.00	2.10	2.10	5.85	51.49
1851	1.93	3.87	2.00	7.80	3.58	1.90	5.19	3.77	2.47	3.20	5.05	2.62	43.38
1852	2.70	2.00	3.55	6.65	2.00	1.00	1.68	8.00	1.40	1.30	4.60	3.70	38.58
1853	4.27	5.75	1.35	5.05	4.95	0.90	6.37	8.38	3.80	4.15	4.40	3.90	53.27
1854	1.80	4.85	2.85	6.30	3.60	3.60	2.45	0.30	6.10	1.90	9.15	3.35	46.25
1855	6.45	4.05	0.85	2.50	2.55	1.95	3.25	2.02	0.25	5.33	3.75	6.10	39.05
1856	5.25	0.80	1.55	2.80	4.10	2.47	4.20	5.75	5.10	1.15	2.00	5.80	40.97
1857	5.50	2.36	3.35	6.29	4.33	1.90	3.45	4.80	2.27	2.90	2.40	5.20	44.75
1858	3.33	2.80	2.05	3.63	2.35	5.55	4.90	8.20	3.05	2.80	2.40	3.45	44.51
1859	5.75	1.85	8.00	2.28	3.40	7.06	1.14	3.69	3.65	2.62	2.27	3.45	45.16
1860	1.00	3.54	1.80	1.55	1.65	4.02	3.09	5.70	5.38	2.10	3.95	4.66	38.44
1861	4.87	2.95	4.62	7.75	3.22	4.61	2.21	4.50	2.75	2.17	3.20	1.40	44.25

PROVIDENCE RAINFALL. — Continued.

	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
1862	6.06	3.15	4.12	1.60	2.60	6.75	3.52	1.27	7.35	4.77	6.85	2.10	50.14
1863	4.61	4.04	4.88	5.52	2.33	1.90	9.42	4.59	1.74	2.97	7.51	5.66	55.17
1864	4.66	1.53	4.74	2.46	3.15	1.22	1.46	4.05	2.36	2.85	3.42	4.93	36.83
1865	5.29	5.45	5.56	2.98	6.23	1.55	3.91	0.74	0.27	4.60	4.03	4.08	44.69
1866	2.35	5.64	4.27	2.02	5.29	4.42	2.03	3.54	5.75	2.78	3.97	3.96	46.02
1867	5.72	6.80	5.32	2.24	3.94	1.56	3.15	8.23	0.62	4.07	2.59	2.80	47.04
1868	4.56	1.71	4.63	7.02	10.57	4.42	2.09	4.55	5.95	1.23	4.39	2.40	53.52
1869	2.92	5.19	6.34	2.07	5.20	5.63	0.88	1.58	5.08	5.92	2.19	4.70	47.70
1870	6.22	3.34	5.47	5.50	2.55	8.22	2.48	1.71	2.11	5.62	2.83	2.97	49.02
1871	2.35	3.80	5.25	3.81	3.80	5.57	3.63	5.73	1.00	6.68	3.35	2.94	47.91
Av.	3.56	3.09	3.70	3.65	3.71	3.36	3.05	3.99	3.07	3.52	3.92	3.87	42.49

BOSTON RAINFALL.

Table showing the Monthly and Annual Rainfall in Boston, from 1842 to 1871, inclusive; also the averages for each month for the whole term.

	Jan.	Feb.	Mar.	April.	May.	Junę.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
1842	0.80	3.20	3.35	3.50	2.90	5.30	1.82	4.44	3.25	0.80	4.45	5.30	39.11
1843	2.20	6.08	6.17	3.88	1.60	4.61	2.15	6.88	0.98	4.82	3.40	3.92	46.69
1844	3.68	2.42	6.00	0.20	2.72	1.40	2.17	2.62	3.53	5.80	3.15	3.85	37.54
1845	4.58	4.25	3.83	1.23	2.82	2.05	3.28	1.82	2.23	4.00	10.25	5.98	46.32
1846	3.12	2.95	2.73	1.23	2.02	2.25	2.51	1.80	1.30	1.35	4.17	4.52	29.95
1847	3.28	4.70	4.77	2.20	2.03	4.09	2.65	6.45	6.64	1.05	5.12	3.95	46.93
1848	2.30	3.90	4.05	1.40	6.30	1.73	1.35	3.10	3.55	5.10	2.25	5.95	40.98
1849	0.35	1.15	7.35	0.90	3.10	1.45	0.85	6.25	1.25	8.10	5.50	4.05	40.30
1850	4.59	2.52	5.32	4.82	6.63	2.77	2.70	5.30	7.15	2.10	3.32	6.76	53.98
1851	1.30	4.20	3.88	9.37	3.31	1.80	3.09	1.27	3.50	4.43	5.51	2.65	44.31
1852	4.85	2.85	4.45	10.18	1.95	2.35	3.28	7.63	1.65	2.19	3.47	3.09	47.94
1853	2.44	5.30	2.27	3.78	5.63	0.30	3.64	9.40	3.80	3.92	4.43	3.95	48.86
1854	2.91	4.87	2.84	6.63	4.33	2.47	3.70	0.58	3.86	2.08	6.80	4.64	45.71
855	7.22	4.67	1.18	4.28	1.20	3.09	4.15	1.46	1.13	4.61	5.27	5.93	44.19
1856	5.32	0.80	1.33	4.37	7.10	2.90	4.02	11.11	4.90	2.70	3.33	4.28	52.16
1857	5.36	2.45	3.09	10.83	5.57	2.02	5.53	7.18	2.56	4.50	2.52	5.26	56.87
1858	3.28	2.30	2.18	5.18	3.89	8.09	4.56	7.03	5.02	3.03	3.38	4.73	52.67
1859	5.93	4.05	7.64	3.36	3.63	7.89	1.58	4.72	4.40	3.28	3.75	6.47	56.70
1860	1.89	3.85	2.19	1.73	2.35	8.01	5.90	4.30	7.35	2.66	5.37	5.86	51.46
1861	6.04	3.57	7.48	5.89	2.97	3.64	2.76	6.04	1.77	2.66	4.90	2.35	50.07
1862	8.30	3.29	4.70	1.97	2.70	6.78	7.33	4.20	5.61	4.85	8.32	3.01	61.06
1863	4.51	4.54	6.42	9.08	2.82	2.56	12.38	5.64	3.12	3.83	6.48	6.34	67.72
1864	3.87	1.43	11.75	4.72	3.31	1.47	1.90	4.17	2.60	4.80	4.00	5.28	49.30
1865	4.47	5.08	4.83	2.57	6.90	2.83	4.26	1.42	0.62	6.21	4.46	4.18	47.83
1866	3.73	5.28	4.70	2.03	5.04	3.41	5.42	3.87	5.90	2.72	3.74	4.86	50.70
1867	6.06	6.55	6.12	2.52	4.11	2.74	4.76	10.78	0.44	6.76	2.32	2.48	55.64
1868	6.09	1.88	5.04	6.94	10.38	3.79	1.10	7.53	11.95	1.78	5.31	2.32	64.11
1869	4.03	9.98	8.74	2.05	6.88	4.44	3.30	2.19	5.18	6.71	3.74	9.04	66.28
1870	8.16	7.03	4.88	8.42	2.58	7.59	4.01	1.57	0.67	6.80	4.40	3.62	59.73
1871	2.77	3.72	4.68	4.23	5.69	5.67	2.87	3.31	1.37	5.51	5.38	3.13	48.33
Av.	4.11	3.96	4.80	4.32	4.08	3.65	3.63	4.80	3.58	3.97	4.62	4.59	50.11

CAMBRIDGE RAINFALL.

Table showing the Monthly and Annual Rainfall at Cambridge, from 1842 to 1871, inclusive; also the average for each month for the whole term.

	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
1842	0.78	3.18	2.24	3.36	2.33	5.84	1.42	5.60	3.34	1.36	4.14	6.64	40.13
1843	1.60	5.64	5.77	4.17	2.17	5.38	2.47	8.74	1.52	5.81	4.20	3.34	50.81
1844	4.29	2.03	5.84	0.34	1.96	1.77	2.90	3.35	4.50	3.27	1.50	4.23	35.98
1845	1.97	2.73	3.67	1.48	2.63	3.15	4.07	2.53	2.58	4.28	10.43	8.04	47.56
1846	2.60	1.50	1.56	1.50	3.59	2.68	3.19	2.37	2.01	1.63	2.55	5.19	30.37
1847	3.67	3.34	5.91	2.83	1.94	5.49	2.53	5.22	6.54	1.44	4.94	4.37	48.22
1848	2.89	4.00	2.50	1.20	7.68	2.81	2.58	3.50	5.18	6.31	1.16	3.23	43.04
1849	0.72	1.46	6.90	1.18	2.75	1.37	1.17	6.52	2.13	7.56	5.43	3.78	40.97
1850	3.86	2.51	3.27	4.79	7.22	2.97	2.62	7.64	9.82	2.51	3.52	3.34	54.07
1851	1.03	4.22	2.01	9.16	3.92	1.62	3.21	1.20	3.98	4.67	4.96	1.99	41.97
1852	2.22	0.62	2.10	7.94	2.30	4.03	1.86	7.51	2.01	2.92	3.83	3.17	40.51
1853	3.88	5.70	3.31	3.69	6.45	0.55	3.02	8.59	5.95	3.49	4.91	4.29	53.83
1854	1.87	3.97	2.95	4.84	5.45	3.58	3.24	0.35	4.36	2.11	7.98	4.47	45.17
1855	7.26	3.74	1.16	3.99	1.50	3.58	4.84	2.27	1.22	5.51	5.33	7.19	47.59
1856	5.30	0.57	0.97	3.44	6.73	2.87	4.24	14.98	4.66	3.24	2.89	3.90	53.79
1857	7.87	3.72	3.49	8.99	5.16	1.71	6.32	6.67	2.93	3.67	2.56	4.83	57.92
1858	3.44	1.86	1.77	3.81	3.71	7.55	4.36	5.57	5.11	2.87	2.37	3.04	45.46
1859	8.23	6.48	8.44	2.36	2.98	6.81	1.50	5.39	3.11	3.68	4.99	. . .	. . .
1860	1.00	2.21	1.73	1.32	2.26	7.37	5.65	5.24	9.33	1.86	4.23	4.75	46.95
1861	8.93	2.79	6.56	5.89	3.19	2.56	3.59	5.57	1.77	2.68	3.30	3.31	50.14
1862	7.70	2.79	6.21	1.73	2.32	6.29	5.05	6.29	4.66	5.24	6.73	2.20	57.21
1863	4.43	1.63	2.46	7.39	1.67	2.47	12.43	5.57	2.98	3.40	6.53	5.46	56.42
1864	3.34	0.89	5.59	7.81	2.91	0.78	1.20	2.55	1.68	4.60	3.52	4.59	39.46
1865	4.87	4.31	4.25	2.88	6.24	2.20	3.67	1.76	1.00	5.71	3.68	3.02	43.59
1866	. . .	. . .	3.60	1.60	3.91	2.74	3.32	1.73	5.71	0.96	2.38	. . .	. . .
1867	4.36	4.10	4.22	2.08	2.96	1.75	5.45	7.95	0.50	5.02	1.84	1.48	41.71
1868	2.53	0.95	1.85	4.73	7.32	2.50	0.78	4.93	7.07	1.18	4.31	1.74	39.89
1869	3.43	5.80	5.33	2.03	4.94	3.64	2.65	1.55	5.92	5.18	2.43	5.08	47.98
1870	5.69	4.22	4.66	6.13	1.97	3.83	1.20	2.03	1.81	3.76	3.52	2.71	41.53
1871	1.45	2.63	3.70	3.03	3.60	5.35	2.96	3.10	1.08	5.70	4.78	3.18	40.56
Av.	3.83	3.09	3.80	3.86	3.79	3.51	3.45	4.88	3.81	3.72	4.16	4.02	45.92

WALTHAM RAINFALL.

Table showing the monthly and annual rainfall at Waltham, from 1842 to 1871, inclusive; also the averages for each month for the whole term.

	Jan.	Feb.	Mar.	April	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
1842	1.04	3.38	2.51	3.16	2.54	5.90	2.20	4.70	2.86	0.96	3.67	5.32	38.24
1843	2.76	1.64	5.78	4.30	0.82	3.73	2.77	8.60	1.02	5.54	3.50	. . .	. . .
1844	4.14	. . .	4.20	0.24	3.30	1.26	2.44	2.85	4.20	5.86	3.14	2.46	. . .
1845	3.44	1.70	2.84	1.76	2.62	2.63	3.84	3.30	2.55	3.80	10.28	4.28	43.04
1846	2.58	. . .	4.38	1.57	3.66	2.44	2.38	2.18	0.82	1.09	2.04	3.76	. . .
1847	3.08	3.84	3.26	3.10	2.36	5.94	2.36	4.18	6.88	1.72	4.16	3 02	43.90
1848	3.24	1.56	4.08	1.56	5.96	3.10	1.92	2.28	3.32	4.60	1.68	2.93	36.23
1849	1.36	0.40	6.66	1.32	3.62	2.00	2.16	5.36	1.94	8.00	4.60	3.32	40.74
1850	4.96	2.96	4.12	5.45	7.56	3.72	3.48	9.64	9.92	2.64	3.36	4.32	62.13
1851	1.36	3.92	1.20	8.98	3.60	1.64	3.23	0.99	3.64	4.85	5.34	2.25	41.00
1852	1.83	2.27	4.04	7.70	1.68	3.26	2.11	7.69	2.08	2.10	4.15	3.33	42.24
1853	2.18	5.36	2.33	3.34	6.29	0.95	2.72	7.78	4.50	2.30	5.43	1.86	45.04
1854	1.82	4.25	2.80	4.88	4.03	1.87	2.16	0.57	4.36	3.68	6.62	4.25	41.29
1855	6.44	3.56	0.86	4.34	0.93	3.58	5.40	2.08	0.79	4.48	4.12	4.05	40.63
1856	1.30		0.63	3.33	5.17	1.59	4.27	13.97	4.79	2.23	3.09	1.96	42.33
1857	2.68	1.40	2.03	7.78	4.56	1.88	6.99	4.77	2.20	4.60	2.04	3.11	44.04
1858	2.00	1.53	0.86	4.10	3.22	6.42	4.02	4.02	3.86	2.21	2.08	3.08	37.40
1859	5.89	2.83	7.36	2.32	3.84	5.03	1.59	5.64	3.96	2.80	3.05	4.18	48.49
1860	1.46	1.58	1.76	1.06	2.21	6.01	5.08	7.52	7.96	2.01	4.82	4.50	45.97
1861	2.56	3.24	3.07	4.60	2.54	2.20	2.83	5.13	2.14	1.91	4.31	1.98	36.51
1862	5.11	2.15	3.66	1.00	2.45	6.10	7.09	3.65	2.89	4.35	5.72	2.25	46.42
1863	2.34	4.06	2.64	7.82	2.23	2.40	11.66	4.39	2.16	3.04	5.92	5.00	53.66
1864	3.00	0.90	6.84	4.44	2.20	0.70	1.16	2.51	2.30	4.97	4.94	3.50	36.56
1865	1.40	2.63	4.25	2.25	6.28	1.36	3.52	2.45	0.82	5.01	3.91	1.96	35.84
1866	1.20	4.78	3.50	1.36	5.50	3.49	5.70	3.42	6.86	1.94	2.60	3.11	43.46
1867	2.50	2.22	4.88	2.49	3.84	2.15	5.30	8.78	0.74	5.16	1.98	1.36	41.40
1868	3.14	0.70	2.43	5.91	10.00	2.06	2.07	4.45	7 12	2.04	3.67	1.12	44.65
1869	6.44	1.00	5.26	2.03	5.03	3.60	2.90	2.06	6.45	5.95	2.08	4.50	47.30
1870	4.60	4.94	3.72	6.53	1.37	4.46	1.90	0.92	1.40	4.83	2.98	1.70	39.40
1871	1.76	2.64	3.86	3.39	3.28	4.02	2.17	2.52	1.08	5.28	4.70	2.12	36.82
Av.	2.98	2.65	3.53	3.74	3.76	3.18	3.58	4.61	3.52	3.66	3.97	3.12	42.30

LOWELL RAINFALL.

Table showing the monthly and annual rainfall at Lowell, from 1842 to 1871, inclusive; also the average for each month for the whole term.

	Jan.	Feb.	Mar.	April.	May.	Juue.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
1842	0.97	3.99	2.89	2.87	2.38	5.19	1.03	5.43	4.31	1.36	4.95	3.24	38.61
1843	2.14	2.04	5.44	3.14	2.10	4.49	2.39	8.16	1.36	3.68	3.28	1.25	39.47
1844	0.93	1.07	3.45	0.29	3.64	1.87	3.50	6.90	3.55	5.18	2.25	3.08	35.71
1845	1.20	1.80	3.64	1.68	2.75	2.68	3.40	2.58	3.05	3.36	7.97	4.89	39.00
1846	2.44	1.82	3.27	1.31	4.21	2.40	3.59	2.79	0.64	1.61	2.70	1.25	28.03
1847	5.42	3.14	3.46	2.26	2.15	6.75	3.01	3.81	4.85	3.01	3.70	4.70	46.26
1848	2.83	2.10	3.54	1.60	7.41	4.01	2.16	3.15	4.06	5.00	2.68	3.75	42.29
1849	1.13	0.83	5.07	2.06	4.04	1.70	2.20	5.53	2.51	7.34	5.70	3.80	41.91
1850	3.32	4.38	2.75	4.22	7.12	2.23	2.78	7.65	6.21	2.61	2.92	4.90	51.09
1851	2.07	4.43	1.76	7.88	3.29	2.00	4.26	3.29	2.86	6.51	5.30	2.03	45.68
1852	1.44	2.96	3.06	8.86	1.22	3.33	2.31	8.07	1.64	2.14	4.78	2.97	42.78
1853	1.52	6.06	2.05	3.45	5.40	0.60	2.36	8.37	4.32	4.30	3.79	1.70	43.92
1854	2.36	3.53	3.34	4.68	4.31	3.49	2.12	0.78	4.67	4.28	6.28	2.84	42.08
1855	7.81	4.48	1.12	5.04	1.07	3.81	3.99	2.32	0.63	5.78	3.90	4.94	44.89
1856	2.83	1.07	0.90	3.48	5.31	2.09	1.73	12.31	4.79	2.03	2.53	3.42	42.49
1857	3.86	1.63	2.58	8.02	3.58	3.16	5.67	5.68	2.29	5.52	2.26	5.13	49.38
1858	2.58	1.78	1.52	4.21	3.53	5.40	3.24	3.42	3.58	3.10	1.26	4.11	37.73
1859	5.62	2.86	6.24	2.76	3.80	5.83	1.58	3.98	3.80	2.32	3.25	5.47	47.51
1860	0.66	2.06	2.08	1.02	1.91	4.87	6.87	5.03	9.44	2.46	4.65	5.86	46.91
1861	5.01	2.89	4.67	4.52	4.07	1.84	2.98	5.12	2.11	3.67	4.57	1.87	43.32
1862	6.86	3.27	4.85	1.75	1.99	6.04	5.20	2.29	1.87	3.92	4.60	1.62	44.26
1863	3.93	2.91	4.69	4.37	1.91	1.59	9.77	6.07	3.07	3.66	6.02	4.38	52.37
1864	2.44	0.89	8.03	2.56	2.56	1.25	1.62	3.22	2.91	3.79	3.93	4.91	38.11
1865	3.61	3.29	4.24	1.80	5.71	2.54	2.39	2.42	0.56	5.86	2.08	2.88	37.38
1866	1.66	4.68	3.50	2.56	4.22	2.64	4.54	3.52	3.92	1.62	2.32	3.00	38.18
1867	4.34	3.32	4.38	2.60	4.53	3.95	4.28	10.30	0.62	3.32	2.48	1.42	45.54
1868	3.54	1.83	3.04	5.06	7.64	3.62	1.18	4.00	10.96	0.80	4.78	1.46	47.96
1869	2.30	5.62	6.26	1.38	4.92	4.28	1.52	1.60	5.32	6.80	2.80	4.50	47.30
1870	6.41	4.36	4.49	5.94	1.96	6.17	1.41	3.07	3.02	3.64	2.92	2.91	46.30
1871	1.80	2.42	3.93	3.06	3.68	4.50	3.25	6.65	1.22	4.48	7.00	2.46	44.45
Av.	3.10	2.92	3.67	3.48	3.75	3.48	3.21	4.90	3.47	3.77	3.92	3.36	43.03

LAKE COCHITUATE.

Table showing the monthly and annual rainfall at Lake Cochituate from 1852 to 1871 inclusive; also the average for each month for the whole term.

	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
1852	5.80	1.76	4.42	9.60	2.60	2.00	2.16	8.27	2.04	3.40	2.76	3.12	47.93
1853	3.68	6.56	2.92	3.80	6.32	0.56	2.84	7.20	5.44	4.56	5.26	6.59	55.73
1854	2.45	5.16	4.16	5.60	3.92	2.08	2.32	0.28	3.68	3.37	7.79	2.34	43.15
1855	4.52	3.50	1.91	2.65	0.82	1.98	3.86	0.77	0.75	4.16	4.84	5.20	34.96
1856	1.44	0.22	0.66	4.27	7.81	1.77	1.76	11.40	3.13	2.34	1.43	4.57	40.80
1857	2.51	1.30	1.72	10.23	7.15	4.02	8.85	6.62	4.27	7.06	3.07	6.30	63.10
1858	2.61	3.32	3.87	4.39	2.23	10.17	3.46	6.42	5.17	2.12	2.91	1.99	48.66
1859	5.64	2.91	10.95	1.37	3.46	3.16	0.99	7.69	4.56	0.33	3.55	4.41	49.02
1860	1.24	3.80	1.98	2.25	1.98	11.16	6.82	4.89	9.92	1.72	5.97	3.71	55.44
1861	2.51	3.81	2.75	6.44	3.12	2.64	1.62	7.79	2.76	3.20	6.20	2.60	45.44
1862	7.82	1.08	4.18	1.85	2.71	6.58	6.54	1.43	2.62	4.83	7.69	2.36	49.69
1863	4.10	4.38	3.57	11.34	2.66	1.98	14.12	5.61	3.39	4.56	8.54	5.05	69.30
1864	3.37	0.98	8.44	4.02	2.84	0.58	1.06	3.56	1.52	6.50	5.45	4.28	42.60
1865	4.99	4.45	5.48	2.18	8.25	0.91	3.10	3.36	1.66	6.99	4.78	3.31	49.46
1866	1.44	5.80	3.92	1.94	6.46	4.80	13.35	3.98	8.36	3.43	4.52	4.32	62.32
1867	2.76	5.40	5.65	2.43	6.46	2.95	5.36	12.36	1.08	7.27	2.63	1.90	56.25
1868	3.70	1.18	2.51	5.61	8.12	2.95	2.16	7.38	7.69	1.19	6.77	0.45	49.71
1869	3.71	7.07	7.52	2.57	7.59	3.68	2.63	2.34	8.49	9.50	3.26	5.98	64.34
1870	7.85	4.68	6.04	8.81	3.14	4.05	3.10	2.03	0.64	7.96	4.40	3.19	55.89
1871	1.31	2.30	5.02	2.29	5.66	5.96	2.20	3.56	1.46	5.38	7.01	3.24	45.39
Av.	3.67	3.48	4.38	4.68	4.67	3.70	4.42	5.35	3.93	4.49	4.94	3.75	51.46

Table showing the average Monthly Rainfall in the vicinity of Boston, from 1842 to 1871, inclusive. The Rainfall given for each month is the average of the monthly falls in Waltham, Cambridge, Boston, Lowell, and Providence, till 1852, and since then includes Lake Cochituate.

	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
1842	0.98	3.56	2.61	3.00	2.71	6.38	1.59	4.70	3.03	1.11	4.21	4.88	38.76
1843	1.86	4.13	5.75	3.97	2.04	4.07	2.32	7.72	1.41	5.26	3.15	2.88	44.56
1844	3.47	1.87	4.85	0.35	2.71	1.49	3.09	3.37	3.72	5.18	2.67	3.27	36.04
1845	2.88	2.64	3.50	1.70	2.71	2.57	3.54	3.17	2.41	3.77	9.60	5.33	43.82
1846	2.51	2.09	2.96	1.47	3.61	2.22	2.62	2.37	1.42	1.51	3.22	3.57	29.57
1847	3.52	3.55	4.11	2.42	2.10	5.85	2.57	5.03	6.65	1.83	4.73	4.40	46.76
1848	3.22	3.07	3.32	1.34	6.47	3.09	1.97	3.15	3.71	5.01	2.31	3.94	40.60
1849	0.87	0.89	6.39	1.42	3.39	1.55	1.68	5.41	2.19	7.51	4.73	3.69	39.72
1850	4.47	3.15	4.13	4.79	6.70	2.86	2.79	7.58	7.62	2.39	3.04	5.03	54.55
1851	1.54	4.13	2.17	8.64	3.54	1.79	3.80	2.10	3.29	4.73	5.23	2.31	43.27
1852	3.14	2.08	3.61	8.49	1.96	2.66	2.23	7.86	1.80	2.34	3.93	3.23	43.33
1853	2.99	5.79	2.37	3.85	5.84	0.64	3.49	8.29	4.64	3.79	4.70	3.72	50.11
1854	2.20	4.44	3.16	5.49	4.27	2.85	2.66	0.38	4.50	2.90	7.44	3.65	43.94
1855	6.62	4.00	1.18	3.80	1.35	3.00	4.25	1.82	0.79	4.98	4.53	5.57	41.89
1856	4.03	0.69	1.01	3.61	6.04	2.28	3.37	11.59	4.56	2.28	2.54	3.99	45.99
1857	4.63	2.14	2.71	8.69	5.06	2.45	6.14	5.95	2.75	4.71	2.48	4.97	52.68
1858	2.87	2.26	2.04	4.22	3.15	7.20	4.09	5.78	4.30	2.69	2.40	3.40	44.40
1859	6.18	3.50	8.10	2.41	3.52	5.96	1.40	5.18	3.91	2.50	3.48	4.00	50.14
1860	1.21	2.84	1.92	1.49	2.06	6.91	5.57	5.45	8.23	2.13	4.83	4.89	47.53
1861	4.99	3.21	4.86	5.85	3.19	2.91	2.67	5.69	2.22	2.71	4.41	2.25	44.96
1862	6.97	2.62	4.62	1.65	2.46	6.42	5.79	3.19	4.17	4.66	6.65	2.26	51.46
1863	3.99	3.59	4.11	7.59	2.27	2.15	11.63	5.31	2.74	3.58	6.83	5.32	59.11
1864	3.45	1.10	7.57	4.33	2.83	1.00	1.40	3.34	2.23	4.59	4.06	4.58	40.48
1865	4.11	4.20	4.77	2.44	6.60	1.90	3.47	2.03	0.82	5.73	3.82	3.24	43.13
1866	2.08	5.24	3.92	1.92	5.07	3.58	5.73	3.34	6.08	2.24	3.25	3.85	46.30
1867	4.29	4.73	5.09	2.39	4.31	2.52	4.72	9.73	0.66	5.27	2.31	1.91	47.93
1868	3.93	1.38	3.25	5.88	9.01	3.21	1.56	5.47	8.46	1.37	4.87	1.58	49.97
1869	3.80	5.78	6.58	2.02	5.76	4.21	2.31	1.89	6.07	6.68	2.75	5.63	53.48
1870	6.49	4.76	4.88	6.90	2.26	5.72	2.35	1.89	1.61	5.43	3.51	2.85	48.65
1871	1.91	2.92	4.41	3.30	4.29	5.18	2.85	4.14	1.20	5.50	5.37	2.84	43.91
Av.	3.51	3.21	4.00	3.85	3.91	3.49	3.45	4.76	3.57	3.81	4.24	3.77	45.57

Statement showing amount of Rainfall on Water-shed of Lake Cochituate, amount of Water consumed and wasted, available amount received into Lake, available percentage of Rainfall, etc., for the year 1863. Water-shed of Lake = 12,077 acres.

Month.	Rainfall.	Amount of Rainfall on water-shed of Lake Cochituate.	Amount of water consumed.	Amount of water wasted from Lake.	Total amount consumed and wasted.	Rise of Lake dur'g the month.	Fall of Lake dur'g the month.	Total available amount of Rainfall received into Lake.	Available daily average amount of Rainfall received into Lake.	Available percentage of Rainfall received into Lake.
	Inches.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	
January . .	4.10	1,344,563,000	499,472,000	. . . . .	499,472,000	128,339,000	. . . . .	627,811,000	20,252,000	47 per cent.
February .	4.38	1,436,387,000	485,184,000	. . . . .	485,184,000	536,550,000	. . . . .	1,021,734,000	36,490,000	71 "
March . . .	3.57	1,170,754,000	517,111,000	678,960,900	1,196,071,900	21,698,000	. . . . .	1,217,769,900	39,283,000	104 "
April . . .	11.34	3,718,866,000	453,750,000	971,628,000	1,425,378,000	21,698,000	. . . . .	1,447,076,000	48,236,000	39 "
May	2.66	872,327,000	477,617,000	82,187,700	559,804,700	. . . . .	86,384,000	473,420,700	15,272,000	54 "
June	1.98	649,326,000	484,140,000	. . . . .	484,140,000	. . . . .	266,424,000	217,716,000	7,257,000	34 "
July	14.12	4,630,545,000	494,574,000	117,791,000	612,365,000	352,808,000	. . . . .	965,173,000	31,135,000	21 "
August . .	5.61	1,839,756,000	526,380,000	64,381,000	590,761,000	. . . . .	86,384,000	504,377,000	16,270,000	27 "
September .	3.39	1,111,724,000	511,050,000	. . . . .	511,050,000	. . . . .	186,846,000	324,204,000	10,807,000	29 "
October . .	4.56	1,495,417,000	489,149,000	. . . . .	489,149,000	. . . . .	59,867,000	429,282,000	13,848,000	29 "
November .	8.54	2,800,627,000	480,840,000	73,169,800	554,009,000	311,399,000	. . . . .	865,408,000	28,847,000	31 "
December .	5.05	1,656,109,000	505,145,000	212,959,900	718,104,900	. . . . .	. . . . .	718,104,900	23,165,000	43 "

Statement showing the amount of Rainfall, etc., for the year 1864.

Month.	Rainfall.	Amount of Rainfall on watershed of Lake Cochituate.	Amount of water consumed.	Amount of water wasted from Lake.	Total amount consumed and wasted.	Rise of Lake dur'g the month.	Fall of Lake dur'g the month.	Total available amount of Rainfall received into Lake.	Available daily average amount of Rainfall received into Lake.	Available percentage of Rainfall received into Lake.
	Inches.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	
January . .	3.37	1,105,166,000	587,574,000	266,420,600	853,994,600	. . . . .	64,386,000	789,308,600	25,461,000	71 per cent.
February .	.98	321,383,000	546,534,000	7,120,400	553,654,400	. . . . .	42,444,000	511,210,400	17,628,000	159 "
March . . .	8.44	2,767,833,000	522,071,000	582,656,400	1,104,727,400	237,318,000	. . . . .	1,342,045,400	43,292,000	48 "
April . . .	4.02	1,318,328,000	495,180,000	373,482,900	868,662,900	. . . . .	. . . . .	868,662,900	28,955,000	66 "
May	2.84	931,356,000	498,914,000	139,065,700	637,979,700	. . . . .	108,490,000	529,489,700	17,080,000	57 "
June. . . .	.58	190,207,000	531,900,000	. . . . .	531,900,000	. . . . .	372,392,000	159,508,000	5,317,000	84 "
July	1.06	347,619,000	561,472,000	. . . . .	561,472,000	. . . . .	426,443,000	135,029,000	4,356,000	39 "
August . .	3.56	1,167,475,000	501,828,000	. . . . .	501,828,000	. . . . .	280,472,000	221,356,000	7,141,000	19 "
September .	1.52	498,472,000	503,940,000	. . . . .	503,940,000	. . . . .	342,818,000	161,122,000	5,371,000	32 "
October . .	6.50	2,131,625,000	479,849,000	. . . . .	479,849,000	. . . . .	15,545,000	464,304,000	14,978,000	22 "
November .	5.45	1,787,286,000	422,370,000	. . . . .	422,370,000	. . . . .	15,464,000	406,906,000	13,564,000	23 "
December .	4.28	1,403,593,000	450,957,000	. . . . .	450,957,000	. . . . .	15,409,000	435,548,000	14,050,000	31 "

Statement showing amount of Rainfall, etc., for the year 1865.

Month.	Rainfall.	Amount of Rainfall on watershed of Lake Cochituate.	Amount of water consumed.	Amount of water wasted from Lake.	Total amount consumed and wasted.	Rise of Lake dur'g the month.	Fall of Lake dur'g the month.	Total available amount of Rainfall received into Lake.	Available daily average amount of Rainfall received into Lake.	Available percentage of Rainfall received into Lake.
	Inches.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	
January . .	4.99	1,636,432,000	415,772,000	. . . . .	415,772,000	288,531,000	. . . . .	704,303,000	22,720,000	43 per cent.
February .	4.45	1,459,343,000	372,904,000	. . . . .	372,904,000	204,106,000	. . . . .	577,010,000	20,607,000	39 "
March . . .	5.48	1,797,124,000	372,837,000	26,853,000	399,690,000	1,127,983,000	. . . . .	1,527,673,000	49,280,000	85 "
April . . .	2.18	714,914,000	359,250,000	526,626,000	885,876,000	. . . . .	. . . . .	885,876,000	29,529,000	124 "
May	8.25	2,705,524,000	423,460,000	1,134,641,000	1,558,101,000	. . . . .	. . . . .	1,558,101,000	50,261,000	57 "
June. . . .	.91	298,427,000	431,730,000	. . . . .	431,730,000	. . . . .	322,613,000	109,117,000	3,637,000	37 "
July. . . .	3.10	1,016,621,000	409,417,000	. . . . .	409,417,000	. . . . .	259,591,000	149,826,000	4,833,000	15 "
August . .	3.36	1,101,886,000	416,206,000	. . . . .	416,206,000	. . . . .	259,754,000	156,452,000	5,047,000	14 "
September .	1.66	544,284,000	378,720,000	. . . . .	378,720,000	. . . . .	233,536,000	145,184,000	4,839,000	27 "
October . .	6.99	2,292,317,000	349,463,000	. . . . .	349,463,000	. . . . .	121,559,000	227,904,000	7,352,000	10 "
November.	4.78	1,567,564,000	352,500,000	. . . . .	352,500,000	. . . . .	17,043,000	335,457,000	11,182,000	21 "
December .	3.31	1,085,489,000	337,187,000	. . . . .	337,187,000	34,277,000	. . . . .	371,464,000	11,983,000	34 "

Statement showing amount of Rainfall, etc., for the year 1866.

Month.	Rainfall.	Amount of Rainfall on watershed of Lake Cochituate.	Amount of water consumed.	Amount of water wasted from Lake.	Total amount consumed and wasted.	Rise of Lake dur'g the month.	Fall of Lake dur'g the month.	Total available amount of Rainfall received into Lake.	Available daily average amount of Rainfall received into Lake.	Available percentage of Rainfall received into Lake.
	Inches.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	
January . .	1.44	472,237,000	460,350,000	. . . . .	460,350,000	. . . . .	218,154,000	242,196,000	7,813,000	51 per cent.
February .	5.80	1,902,065,000	374,780,000	. . . . .	374,780,000	556,070,000	. . . . .	930,850,000	33,245,000	49 "
March . . .	3.92	1,285,534,000	380,804,000	. . . . .	380,804,000	202,990,000	. . . . .	583,794,000	18,832,000	45 "
April . . .	1.94	636,208,000	337,530,000	. . . . .	337,530,000	193,760,000	. . . . .	531,290,000	17,710,000	84 "
May	6.46	2,118,507,000	343,356,000	. . . . .	343,356,000	81,185,000	. . . . .	424,541,000	13,695,000	20 "
June	4.80	1,574,123,000	356,340,000	. . . . .	356,340,000	. . . . .	. . . . .	356,340,000	11,878,000	23 "
July	13.35	4,378,030,000	392,708,000	. . . . .	392,708,000	20,092,000	. . . . .	412,800,000	13,316,000	9 "
August . .	3.98	1,305,210,000	385,671,000	. . . . .	385,671,000	. . . . .	176,145,000	209,526,000	6,759,000	16 "
September.	8.36	2,741,598,000	355,260,000	. . . . .	355,260,000	76,983,000	. . . . .	432,243,000	14,408,000	16 "
October . .	3.43	1,124,842,000	384,276,000	. . . . .	384,276,000	. . . . .	76,983,000	307,293,000	9,913,000	27 "
November.	4.52	1,482,299,000	337,860,000	. . . . .	337,860,000	. . . . .	18,922,000	318,938,000	10,631,000	22 "
December .	4.32	1,416,711,000	353,772,000	. . . . .	353,772,000	155,019,000	. . . . .	508,791,000	16,413,000	36 "

Statement showing amount of Rainfall, etc., for the year 1867.

Month.	Rainfall.	Amount of Rainfall on watershed of Lake Cochituate.	Amount of water consumed.	Amount of water wasted from Lake.	Total amount consumed and wasted.	Rise of Lake dur'g the month.	Fall of Lake dur'g the month.	Total available amount of Rainfall received into Lake.	Available daily average amount of Rainfall received into Lake.	Available percentage of Rainfall received into Lake.
	Inches.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	
January . .	2.76	905,121,000	418,841,000	. . . . .	418,841,000	. . . . .	59,114,000	359,727,000	11,604,000	40 per cent.
February .	5.40	1,770,888,000	387,268,000	935,741,000	1,323,009,000	394,090,000	. . . . .	1,717,099,000	61,325,000	97 "
March . . .	5.65	1,852,874,000	406,100,000	668,326,000	1,074,426,000	65,094,000	. . . . .	1,139,520,000	36,759,000	62 "
April . . .	2.43	796,900,000	383,100,000	664,492,000	1,047,592,000	. . . . .	108,490,000	939,102,000	31,303,000	118 "
May	6.46	2,118,507,000	381,331,000	311,838,000	693,169,000	21,698,000	. . . . .	714,867,000	23,060,000	34 "
June. . . .	2.95	967,430,000	408,750,000	. . . . .	408,750,000	. . . . .	191,500,000	217,250,000	7,242,000	22 "
July. . . .	5.36	1,757,771,000	441,750,000	. . . . .	441,750,000	. . . . .	257,875,000	183,875,000	5,932,000	11 "
August . .	12.36	4,053,367,000	450,926,000	. . . . .	450,926,000	237,238,000	. . . . .	688,164,000	22,199,000	17 "
September.	1.08	354,178,000	395,580,000	. . . . .	395,580,000	. . . . .	293,594,000	101,986,000	3,399,000	29 "
October . .	7.27	2,384,141,000	419,058,000	. . . . .	419,058,000	. . . . .	74,215,000	344,843,000	11,124,000	14 "
November.	2.63	862,488,000	381,210,000	. . . . .	381,210,000	. . . . .	18,459,000	362,751,000	12,092,000	42 "
December .	1.90	623,090,000	478,454,000	. . . . .	478,454,000	. . . . .	109,880,000	368,574,000	11,889,000	59 "

Statement showing the amount of Rainfall, etc., for the year 1868.

Month.	Rainfall.	Amount of Rainfall on watershed of Lake Cochituate.	Amount of water consumed.	Amount of water wasted from Lake.	Total amount consumed and wasted.	Rise of Lake dur'g the month.	Fall of Lake dur'g the month.	Total available amount of Rainfall received into Lake.	Available daily average amount of Rainfall received into Lake.	Available percentage of Rainfall received into Lake.
	Inches.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	
January . .	3.76	1,213,387,000	495,752,000	. . . . .	495,752,000	. . . . .	90,550,000	405,202,000	13,071,000	33 per cent.
February .	1.18	386,972,000	490,883,000	. . . . .	490,883,000	. . . . .	124,773,000	366,110,000	12,625,000	95 "
March . . .	2.51	823,135,000	425,382,000	. . . . .	425,382,000	837,224,000	. . . . .	1,262,606,000	40,729,000	153 "
April . . .	5.61	1,839,756,000	379,080,000	744,929,000	1,124,009,000	21,426,000	. . . . .	1,145,435,000	38,181,000	62 "
May	8.12	2,662,891,000	429,226,000	1,531,363,000	1,960,589,000	64,958,000	. . . . .	2,025,547,000	65,340,000	76 "
June. . . .	2.95	967,430,000	430,530,000	179,048,000	609,578,000	. . . . .	86,384,000	523,194,000	17,440,000	54 "
July	2.16	708,355,000	454,956,000	. . . . .	454,956,000	. . . . .	305,438,000	149,518,000	4,823,000	21 "
August . .	7.38	2,420,214,000	448,849,000	. . . . .	448,849,000	. . . . .	76,475,000	372,374,000	12,012,000	16 "
September .	7.69	2,521,876,000	482,160,000	. . . . .	482,160,000	115,489,000	. . . . .	397,649,000	19,922,000	24 "
October . .	1.19	390,251,000	463,574,000	. . . . .	463,574,000	. . . . .	152,923,000	310,651,000	10,021,000	80 "
November .	6.77	2,220,169,000	419,250,000	. . . . .	419,250,000	232,501,000	. . . . .	651,751,000	21,725,000	29 "
December .	.45	147,574,000	483,600,000	. . . . .	483,600,000	. . . . .	99,162,000	384,438,000	12,401,000	261 "

Statement showing amount of Rainfall, etc., for the year 1869.

Month.	Rainfall.	Amount of Rainfall on watershed of Lake Cochituate.	Amount of water consumed.	Amount of water wasted from Lake.	Total amount consumed and wasted.	Rise of Lake dur'g the month.	Fall of Lake dur'g the month.	Total available amount of Rainfall received into Lake.	Available daily average amount of Rainfall received into Lake.	Available percentage of Rainfall received into Lake.
	Inches.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallous.	Gallons.	Gallons.	
January . .	3.71	1,216,666,000	478,206,000	. . . . .	478,206,000	119,391,000	. . . . .	597,597,000	19,277,000	49 per cent.
February .	7.07	2,318,552,000	412,468,000	408,790,000	821,258,000	. . . . .	209,605,000	611,653,000	21,844,000	26 "
March . . .	7.52	2,466,126,000	458,459,000	524,969,000	983,428,000	108,490,000	. . . . .	1,091,918,000	35,223,000	44 "
April . . .	2.57	842,812,000	439,500,000	462,201,000	901,701,000	. . . . .	86,792,000	814,909,000	27,164,000	97 "
May	7.59	2,489,082,000	430,962,000	215,309,000	646,271,000	65,094,000	. . . . .	711,365,000	22,947,000	29 "
June	3.68	1,206,828,000	427,560,000	24,301,000	451,861,000	. . . . .	108,354,000	343,507,000	11,450,000	29 "
July	2.63	862,488,000	569,718,000	. . . . .	569,718,000	. . . . .	326,864,000	242,854,000	7,834,000	28 "
August . .	2.34	767,385,000	546,592,000	. . . . .	546,592,000	. . . . .	352,715,000	193,877,000	6,254,000	25 "
September.	8.49	2,784,230,000	472,230,000	. . . . .	472,230,000	. . . . .	108,150,000	364,080,000	12,136,000	13 "
October . .	9.50	3,115,452,000	436,976,000	. . . . .	436,976,000	328,334,000	. . . . .	765,310,000	24,687,000	25 "
November.	3.26	1,069,092,000	408,240,000	. . . . .	408,240,000	18,622,000	. . . . .	426,862,000	14,229,000	40 "
December .	5.98	1,961,095,000	422,840,000	. . . . .	422,840,000	614,221,000	. . . . .	1,037,061,000	33,454,000	53 "

Statement showing amount of Rainfall, etc., for the year 1870.

Month.	Rainfall.	Amount of Rainfall on watershed of Lake Cochituate.	Amount of water consumed.	Amount of water wasted from Lake.	Total amount consumed and wasted.	Rise of Lake dur'g the month.	Fall of Lake dur'g the month.	Total available amount of Rainfall received into Lake.	Available daily average amount of Rainfall received into Lake.	Available percentage of Rainfall received into Lake.
	Inches.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	
January . .	7.85	2,574,347,000	388,275,000	1,316,421,000	1,704,696,000	. . . . .	151,886,000	1,552,810,000	50,091,000	60 per cent.
February .	4.68	1,534,770,000	393,456,000	965,075,000	1,358,531,000	. . . . .	64,278,000	1,294,253,000	46,223,000	84 "
March . . .	6.04	1,980,771,000	454,026,000	501,291,000	955,317,000	151,070,000	. . . . .	1,106,387,000	35,690,000	56 "
April . . .	8.81	2,889,172,000	441,090,000	2,023,899,000	2,464,989,000	. . . . .	214,123,000	2,250,866,000	75,029,000	78 "
May	3.14	1,029,739,000	426,529,000	12,286,000	438,815,000	105,769,000	. . . . .	544,584,000	17,567,000	53 "
June. . . .	4.05	1,328,166,000	444,720,000	. . . . .	444,720,000	. . . . .	126,542,000	318,178,000	10,606,000	24 "
July	3.10	1,016,621,000	508,152,000	. . . . .	508,152,000	. . . . .	332,853,000	175,299,000	5,655,000	17 "
August . .	2.03	665,723,000	530,317,000	. . . . .	530,317,000	. . . . .	399,255,000	131,062,000	4,228,000	20 "
September.	.64	209,883,000	503,550,000	. . . . .	503,550,000	. . . . .	223,217,000	280,333,000	9,344,000	13 "
October . .	7.96	2,610,421,000	512,368,000	. . . . .	512,368,000	. . . . .	148,104,000	364,264,000	11,750,000	14 "
November.	4.40	1,442,946,000	440,310,000	. . . . .	440,310,000	. . . . .	158,341,000	281,969,000	9,399,000	20 "
December.	3.19	1,046,136,000	436,914,000	. . . . .	436,914,000	. . . . .	180,855,006	256,059,000	8,260,000	24 "

Statement showing amount of Rainfall, etc., for the year 1871.

Month.	Rainfall.	Amount of Rainfall on watershed of Lake Cochituate.	Amount of water consumed.	Amount of water wasted from Lake.	Total amount consumed and wasted.	Rise of Lake dur'g the month.	Fall of Lake dur'g the month.	Total available amount of Rainfall received into Lake.	Available daily average amount of Rainfall received into Lake.	Available percentage of Rainfall received into Lake.
	Inches.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	
January. .	1.31	429,604,000	437,410,000	. . . . .	437,410,000	. . . . .	100,053,000	337,357,000	10,883,000	79 per cent.
February .	2.30	754,268,000	421,960,000	. . . . .	421,960,000	327,735,000	. . . . .	749,695,000	26,775,000	99 "
March . . .	5.02	1,646,270,000	315,022,000	. . . . .	315,022,000	430,346,000	. . . . .	745,368,000	24,044,000	45 "
April . . .	2.29	750,988,000	354,420,000	. . . . .	354,420,000	70,131,000	. . . . .	424,551,000	14,152,000	57 "
May	5.66	1,856,153,000	378,885,000	. . . . .	378,885,000	107,131,000	. . . . .	486,016,000	15,678,000	26 "
June. . . .	5.96	1,954,536,000	470,836,000	. . . . .	470,836,000	. . . . .	280,472,000	190,364,000	6,346,000	9 "
July. . . .	2.20	721,473,000	488,188,000	. . . . .	488,188,000	. . . . .	327,136,000	161,052,000	5,195,000	22 "
August . .	3.56	1,167,480,000	496,589,000	. . . . .	496,589,000	. . . . .	198,361,000	298,228,000	9,620,000	26 "
September.	1.46	478,796,000	495,360,000	. . . . .	495,360,000	. . . . .	307,343,000	188,017,000	6,267,000	39 "
October . .	5.38	1,764,330,000	429,524,000	. . . . .	429,524,000	. . . . .	107,403,000	322,121,000	10,391,000	18 "
November.	7.01	2,298,875,000	407,220,000	. . . . .	407,220,000	120,933,000	. . . . .	528,153,000	17,605,000	23 "
December .	3.24	1,062,533,000	389,499,000	. . . . .	389,499,000	13,559,000	. . . . .	403,058,000	13,002,000	38 "

Statement showing amount of Rainfall on Water-shed of Lake Cochituate, amount of Water consumed and wasted, available amount received into Lake, available percentage of Rainfall, etc., for each six months, from 1863 to 1871, both inclusive.

		Rainfall.	Amount of Rainfall on water-shed of Lake Cochituate.	Amount of water consumed.	Amount of water wasted from Lake.	Total amount consumed and wasted.	Rise of Lake during the six months.	Fall of Lake during the six months.	Total available amount of Rainfall received into Lake.	Available daily average amount of Rainfall received into Lake.	Available percentage of Rainfall received into Lake.
		Inches.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	
1863.	From Dec., 1862, to June, 1863.	28.41	9,316,841,000	2,960,134,000	1,732,777,000	4,692,911,000	1,240,725,000	. . . . .	5,933,636,000	32,602,000	64 per cent.
	From June, 1863, to Dec., 1863.	38.20	12,527,395,000	2,986,133,000	255,342,000	3,241,475,000	64,686,000	. . . . .	3,306,161,000	18,066,000	26 "
1864.	From Dec., 1863, to June, 1864.	24.70	8,100,175,000	3,155,418,000	1,581,706,000	4,737,124,000	21,698,000	. . . . .	4,758,822,000	26,004,000	59 "
	From June, 1864, to Dec., 1864.	18.67	6,122,684,000	3,001,359,000	. . . . .	3,001,359,000	. . . . .	1,453,134,000	1,548,225,000	8,460,000	25 "
1865.	From Dec., 1864, to June, 1865.	29.63	9,716,930,000	2,395,180,000	1,688,120,000	4,083,300,000	1,605,211,000	. . . . .	5,688,511,000	31,255,000	59 "
	From June, 1865, to Dec., 1865.	20.80	6,821,199,000	2,338,036,000	. . . . .	2,338,036,000	. . . . .	1,214,096,000	1,123,940,000	6,142,000	16 "
1866.	From Dec., 1865, to June, 1866.	22.87	7,500,040,000	2,234,007,000	. . . . .	2,234,007,000	850,128,000	. . . . .	3,084,135,000	16,946,000	41 "
	From June, 1866, to Dec., 1866.	38.44	12,606,102,000	2,212,115,000	. . . . .	2,212,115,000	. . . . .	174,975,000	2,037,140,000	11,132,000	16 "
1867.	From Dec., 1866, to June, 1867.	27.02	8,861,001,000	2,330,412,000	2,580,397,000	4,910,809,000	468,297,000	. . . . .	5,379,106,000	29,556,000	61 "
	From June, 1867, to Dec., 1867.	31.65	10,379,375,000	2,497,274,000	. . . . .	2,497,274,000	. . . . .	598,405,000	1,898,869,000	10,376,000	18 "

Statement showing amount of Rainfall on Water-shed of Lake Cochituate, etc. — Continued.

		Rainfall.	Amount of Rainfall on water-shed of Lake Cochituate.	Amount of water consumed.	Amount of water wasted from Lake.	Total amount consumed and wasted.	Rise of Lake during the year.	Fall of Lake during the year.	Total available amount of Rainfall received into Lake.	Available daily average amount of Rainfall received into Lake.	Available percentage of Rainfall received into Lake.
		Inches.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	
1868.	From Dec., 1867, to June, 1868.	23.02	7,549,232,000	2,698,777,000	2,276,292,000	4,975,069,000	598,405,000	. . . . .	5,573,474,000	30,456,000	74 per cent.
	From June, 1868, to Dec., 1868.	28.14	9,228,296,000	2,699,319,000	179,048,000	2,878,367,000	. . . . .	273,230,000	2,605,137,000	14,236,000	28 "
1869.	From Dec., 1868, to June, 1869.	28.91	9,480,812,000	2,703,195,000	1,611,268,000	4,314,463,000	. . . . .	102,584,000	4,211,879,000	23,142,000	44 "
	From June, 1869, to Dec., 1869.	29.90	9,805,475,000	2,861,316,000	24,301,000	2,885,617,000	. . . . .	549,127,000	2,336,490,000	12,768,000	24 "
1870.	From Dec., 1869, to June, 1870.	36.50	11,969,894,000	2,526,216,000	4,818,972,000	7,345,188,000	440,773,000	. . . . .	7,785,961,000	42,780,000	65 "
	From June, 1870, to Dec., 1870.	22.18	7,273,760,000	2,939,417,000	. . . . .	2,939,417,000	. . . . .	1,388,312,000	1,551,105,000	8,476,000	21 "
1871.	From Dec., 1870, to June, 1871.	19.77	6,483,419,000	2,344,611,000	. . . . .	2,344,611,000	654,435,000	. . . . .	2,999,046,000	16,478,000	46 "
	From June, 1871, to Dec., 1871.	25.57	8,385,490,000	2,787,717,000	. . . . .	2,787,717,000	. . . . .	1,099,782,000	1,687,935,000	9,224,000	21 "
From December to June, of the years 1863–71, inclusive.		240.83	78,978,344,000	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	45,414,570,000	. . . . .	58 "
From June to December, of the years 1863–71, inclusive.		253.55	83,149,776,000	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	18,095,002,000	. . . . .	22 "

WATER REGISTRAR'S REPORT.

WATER REGISTRAR'S OFFICE,
BOSTON, May 1, 1872.

CHARLES H. ALLEN, ESQ.,

President of the Cochituate Water Board:—

SIR,—I herewith present my annual report, containing the usual classification of water-takers and other matters required by the ordinance providing for the care and management of the Boston Water Works.

The total number of water-takers now entered for the year 1872 is 38,716, being an increase since January 1, 1871, of 2,584.

The total number of cases where the water has been turned off for non-payment of rates during the year is 936. Of this number 734 have been turned on, leaving a balance of 202 still remaining off.

The total amount of water-rates received from April 30, 1871, to May 1, 1872, is . . .		$836,287 09
Less amount paid to the City of Charlestown, as per contract	$47,697 84	
Less amount paid to Mt. Warren Water Company . . .	337 20	
		48,035 04
		$788,252 05
Of this amount there was received for water used in previous years the sum of .	$49,657 75	
Amount carried forward,		$788,252 05

Amount brought forward,		$788,252 05
Leaving the receipts for water furnished during the financial year 1871 and 1872, the sum of	$738,594 30	
In addition to the above there has been received for turning on water in cases where it had been turned off for non-payment of rates, the sum of . . .		1,500 00
		$789,752 05

The increased amount of income for the financial year ending April 30, 1872, over the previous year, is	$62,564 17
The total amount of assessments now made for the present year, is	$600,036 43
The estimated amount of income from the sales of water during the year 1872, is . .	$800,000 00
The expenditures of my office during the year 1871, is	$20,687 96

The items of this expenditure are as follows: —

Paid for Salaries	$19,557 79
" " Printing, ...	600 71
" " Stationery	439 61
" " Horse and Buggy . . .	84 50
" " Postage Stamps	4 00
" " Advertising	1 35
	$20,687 96

METERS.

The total number of meters now applied to the premises of water-takers is 1,091. Of this number 798 are $\frac{5}{8}$-inch, 250 1-inch, 36 2-inch, 5 3-inch, 2 4-inch size; they are attached to a variety of establishments, embracing hotels, railroads, manufactories, stables, confectionery, oyster saloons, and buildings occupied by several tenants.

The following table exhibits the yearly revenue from the sale of Cochituate water since its introduction into the city October 25th, 1848: —

Received by Water Commissioners, as per Auditor's Report, in 1848					$972 81
From January 1,	1849,	to January 1,	1850,	.	71,657 79
" "	1850,	"	1851,	.	99,025 45
" "	1851,	"	1852,	.	161,052 85
" "	1852,	"	1853,	.	179,567 39
" "	1853,	"	1854,	.	196,352 32
" "	1854,	"	1855,	.	217,007 51
" "	1855,	"	1856,	.	266,302 77
" "	1856,	"	1857,	.	282,651 84
" "	1857,	"	1858,	.	289,328 83
" "	1858,	"	1859,	.	302,409 73
" "	1859,	"	1860,	.	314,808 97
" "	1860,	"	1861,	.	334,544 86
" "	1861,	"	1862,	.	365,323 96
" "	1862,	"	1863,	.	373,922 33
" "	1863,	"	1864,	.	394,506 25
" "	1864,	"	1865,	.	430,710 76
" "	1865,	"	1866,	.	450,341 48
" "	1866,	"	1867,	.	486,538 25
" "	1867,	"	1868,	.	522,130 93
" "	1868,	"	1869,	.	553,744 88
Amount carried forward,					$6,292,901 96

Amount brought forward,		$6,292,901 96
From January 1, 1869,	January 1, 1870,	597,328 55
" " 1870,	" 1871,	708,783 68
" " 1871,	" 1872,	774,445 70
" " 1872,	to May 1, 1872,	641,068 53
		$9,014,528 42

Statement showing the number of houses, stores, steam engines, etc., in the City of Boston, supplied with Cochituate water to the 1st of January, 1872, with the amount of water-rates paid for 1871: —

25,294	Dwelling-houses	$375,215 70
10	Boarding-houses	464 50
518	Model-houses	14,509 95
8	Lodging-houses	240 92
15	Hotels	931 00
5,263	Stores and Shops	53,092 59
355	Buildings	13,861 33
532	Offices	4,168 37
23	Printing-offices	366 75
27	Banks	390 67
32	Halls	532 43
1	Theatre	36 50
34	Private Schools	600 08
19	Asylums	1,157 00
1	Hospital	30 00
23	Greenhouses	249 92
88	Churches	1,226 21
3	Markets	739 00
131	Cellars	900 25
504	Restaurants and Saloons	9,980 86
7	Club-houses	159 33
	Amount carried forward,	$478,853 36

Amount brought forward,		$478,853 36
2	Bath-houses	60 00
41	Photographers	1,075 83
8	Packing-houses	290 00
1,393	Stables	10,455 15
25	Factories	948 25
8	Bleacheries	148 00
1	Brewery	75 00
92	Bakeries	729 33
1	Boat-house	49 00
9	Freight-houses	149 00
2	Gasometers	22 00
3	Ship-yards	35 75
3	Dry docks and engines	110 00
63	Shops and engines	3,102 41
17	Stores and "	994 78
2	Foundries "	113 00
9	Factories "	602 39
5	Printing "	324 60
2	Bakeries "	60 00
2	Ship-yards "	70 00
4	Building "	443 89
1	Mill "	152 72
16	Stationary engines	954 72
45	Hoisting and Pile-driving engines	475 25
13	Armories	142 50
1,203	Hand-hose	6,945 00
17	Fountains	180 00
12	Tumbler-washers	157 58
2	Laundries	63 75
	Custom-house	150 00
1	Ice Company (washing ice)	30 00
52	Steamboats	10,270 22
	Office (Harbor Master)	6 00
Amount carried forward,		$518,239 48

	Amount brought forward,	$518,239 48
	Office (City Scales) . . .	11 00
	Probate building	75 00
	House of Reception . . .	10 00
28	Fire-engines, hose and hook and ladder houses	605 00
1,895	Fire-hydrants	34,110 00
96	Reservoirs	1,728 00
349	Public Schools	2,958 00
	City Stables	188 75
	Washing-carts	100 00
	Offal Station	175 00
	Steamer "Henry Morrison" . .	200 00
	Faneuil Hall	40 00
	Public Library	50 00
	do. E. Boston Branch .	8 50
	Paving Department . . .	228 00
	Common Sewer Department . .	250 00
	Deer Park	10 00
	Public Urinals	175 00
	Street sprinkling	500 00
	Public Garden	25 00
	Drinking-fountains . . .	750 00
	Building purposes . . .	5,591 71
	Marine watermen . . .	819 50
	Metered water (9 months) . .	157,586 77
		$724,434 71

Statement showing the number and kind of Water Fixtures contained within the premises of Water-takers in the City of Boston, to January 1, 1872, as compared with previous years.

1869.	1870.	1871.	REMARKS.
5,321	5,893	6,041	Taps. These have no connection with any drain or sewer.
47,476	53,010	58,946	Sinks.
23,113	23,961	27,856	Wash-hand basins.
7,256	8,013	9,130	Bathing-tubs.
9,971	11,319	13,077	Pan water-closets.
10,686	12,235	14,104	Hopper water-closets.
220	250	241	" " " pull.
263	216	258	" " " self-acting.
406	433	434	" " " waste.
580	607	619	" " " door.
2,336	2,447	2,470	Urinals.
8,750	9,615	10,743	Wash-tubs. These are permanently attached to the building.
736	879	741	Shower-baths.
17	13	1	Hydraulic rams.
608	547	468	Private hydrants.
468	523	578	Slop-hoppers.
65	73	79	Foot-baths.
118,272	128,234	145,786	

Respectfully submitted,

WM. F. DAVIS,

Water Registrar.

REPORT OF THE SUPERINTENDENT OF THE EASTERN DIVISION.

Boston, May 1, 1872.

Chas. H. Allen, Esq.,

President of the Cochituate Water Board:

Sir, — My report for the year ending with April 30th is here respectfully submitted.

Last year was a very favorable one for the laying of main and service pipes, as well as for the care and management of those already laid. The weather was remarkably good; we had a large supply of pipes and special castings on hand in the spring, and there was but little delay from such causes as hindered us the few past years. From the commencement of the season to its close, $30\frac{1}{4}$ miles of main pipes were laid, and 2,431 service pipes put in. This amount does not appear in the tables of this report, which shows the record from May to May, whilst that is from March to December. The difference will be accounted for by the fact that this season commenced some five weeks later than last.

Last winter was a long and a severely cold one. I have never in my experience known the frost so deep in the ground and so many pipes frozen. Even now (April 23d) the frost is deep, and hard in many streets and main and service pipes continue to freeze. The record below will give you the number we have thawed out, but the number of those not reported to us must be imagined. The depth the pipes were originally laid was 4 feet; a few years ago 6 inches more was added to that depth. We found last winter the frost in many places from 4 to 5 feet deep, and in some places even more than 5 feet.

The warning I have had will force me to give particular attention to the laying of all new pipes to a proper depth. The whole length of main pipes of all sizes laid from the date of my last report is 133,830 feet, equal to 25⅓ miles, 2,275 service pipes measuring 73,515 feet or about 14 miles. This includes 1,463 feet main pipe laid by Mr. George H. Norman across Chelsea Creek, and 3,162 feet laid by me on Deer Island. The new 20-inch main from Upham's Corner in Dorchester to Telegraph Hill in South Boston was connected with the old line near the reservoir with proper gates in May last, and has given a little better supply to that neighborhood.

The laying of the 12-inch main in Bowdoin street, Dorchester, which is to give the high-service supply, was commenced as early this year as the season would allow, and is still in progress. In the early part of the season the new submerged main across Chelsea Creek, extending on the flats to Condor street, was completed, and at each end the proper connections were made with the old main. The leak on the old pipe was repaired. Twice during the cold weather of last winter the 10-inch pipes that supply Deer Island froze on Winthrop Bridge. The first time 7 of them burst, and the second time 9 of them. In a few days a plan for their better protection at this point will be submitted to the board. The water was let into the line of 48-inch pipes which connect Chestnut Hill reservoir with the mains leading to the city in June last. Two leaks were soon discovered, which proved to be occasioned by two of the pipes being split at the end. I cannot account for these defects, unless it be from the fact of their being laid in the winter; the frost was in the pipes and the ground very uneven and frozen. The pipes are coated, and a check in them not easily seen. On the 15th of March of this year there was a breakage in this line near the railroad. This made the largest leak I have ever known in an iron pipe. A piece of the pipe was

thrown out some 4 feet in length and nearly one half the circumference of it. An examination of the break was made, which showed the pipe to be perfectly sound, except what appeared to be an old check in the bead of the bell, about 2 inches deep. This, however, was so slight as to be hardly perceptible. The probability is, there being a leak in the joint of the pipe next to the one broken, and the gravel washed from under it, made a lever of this pipe that pried out the large piece of the other. Work was commenced this spring, as soon as the frost was out of the ground, of lowering the three large mains on Bradley's Hill, in Brookline. Owing to the scarcity of laborers the work is not progressing as rapily as I could wish. The necessity of lowering these mains is occasioned by the cutting down the grade of Boylston street by the town.

The high service of Beacon Hill still works well, a few leaks have occurred, two of them were in 30-inch gates. These gates were of the original construction and hardly strong enough to stand the pressure of the low service. They have been replaced by new and stronger ones, but there are 5 more of them still in, one on the Common, two in the Beacon Hill reservoir, and two in the gate chamber on Tremont street. I have three new ones on hand to replace the one on the Common and the two in the chambers.

A little more than half of the drinking fountains only were in use last summer, owing to the scarcity of water. The Philadelphia fountain set up last season, that promised so well, proved too fragile for the locality. Shortly after it was set, a teamster drove his breast team against it and broke it down. This accident showed the necessity of some device strong enough to resist any blow that might be made, and I submitted to the board a plan which they allowed me to try as an experiment, — that of a heavy granite trough. This trough is placed in front of one of the Nash pattern fountains, the bowl being taken off, and is supplied through a self-acting

faucet enclosed in the fountain, out of sight and danger of being damaged. The trough is large enough to accommodate four horses at once, and the supply of water kept up without waste. As this trough and fountain has worked so well, and is nearest to the requirements, I would recommend the board to make a similar change in as many of the old ones as the surroundings will allow.

The pipes in the Fort Hill district have all been taken up. There has been no order from the City Government to lay new ones. The new pipes for the Suffolk-street district have mostly been laid. I am still at work there and shall finish in a few days.

Before the closing of last season, I commenced to lay 12-inch pipes in some of the streets of East Boston to take the place of the 6-inch pipes, for the better supply in case of fire. The cold setting in so early forced me to close without accomplishing much. I shall resume operations in a few days. My report of the reservoirs and stand pipes does not differ from last year's report.

The whole number of hydrants now in is 2,433. It has been the custom to add in our reports the number established in each year to the totals of those of former years. Last winter I made a careful examination of the city, and find the above number, which I believe to be correct. The difference between the figures in this year's report and that of last year is accounted for by the fact that many hydrants have been taken out and others abandoned, as the case in the different districts — Fort Hill, Suffolk street and Church street.

Raised.

150 feet 12-inch pipe in Second street, between Dorchester avenue and Athens.

324 feet 6-inch pipe in Dorchester avenue, between First and Second streets.

50 feet 4-inch pipe in Carney place.

Lowered.

50 feet 6-inch pipe in Purchase street, between Pearl and Oliver streets.

300 feet 4-inch pipe in Cliff street, in Boston Highlands.

Taken Up.

136 feet 6-inch pipe in Dorchester avenue, between Dorchester street and Water Wheel Co.'s works.

100 feet 6-inch pipe in Commercial street, between Fleet and North streets.

968 feet 6-inch pipe in Border street, between Sumner street and Central square.

212 feet 6-inch pipe in Purchase street, between Oliver street and Belcher lane.

136 feet 6-inch pipe in Minot street.

349 " " " " " Andover street.

10 " " " " " Broad street, opposite Purchase.

26 " " " " " Washington avenue, Fort Hill.

72 " 4 " " " Belcher lane, Fort Hill.

183 " $1\frac{1}{2}$-inch lead.

942 " " " iron.

65 " 1 " lead.

40 " $\frac{3}{4}$ " "

487 " $\frac{5}{8}$ " "

Extended.

214 feet $\frac{5}{8}$ inch lead.

Statement of Location, Size, and Number of Feet of Pipe Laid in 1871.

In what Street.	Between what Streets.	Diameter of Iron Pipe in Inches.	Feet of Pipe.
	BOSTON PROPER.		
Atlantic Avenue	Long Wharf and T Wharf	12	200
Beacon	Western Avenue and Brighton Avenue . .	"	66
Commercial	Fleet and North side Eastern Avenue . . .	"	100
Gloucester	Beacon and Marlboro'	"	56
	Total, 12-inch	. . . . .	422
Albion	Chapman and Castle	6	244
Claremont Park	Columbus Avenue and Providence R. R. .	"	48
Commonwealth Avenue	Dartmouth and Exeter	"	166
Dartmouth	St. James Ave. and Boston and Alb. R. R.	"	36
Dover	Harrison Avenue and Albany	"	500
Eastern Avenue	Commercial and E. Boston Ferry	"	418
Emerald	Dover and Castle	"	887
Gloucester	Beacon and Marlboro'	"	225
Hereford	" " "	"	225
Holyoke	Columbus Avenue and Providence R. R. .	"	200
Malden	Albany and Harrison Avenue	"	490
Middlesex	Dover and Chapman	"	422
"	Chapman and Castle	"	460
Marlboro'	Dartmouth and Exeter	"	321
"	Fairfield and Hereford	"	550
Newbury	Berkeley and Clarendon	"	171
Oliver	Broad and High	"	153
Purchase	Pearl and Oliver	"	50
Randolph	Harrison Avenue and Albany	"	275
Shawmut Avenue . . .	Dover and Chapman	"	378
" " . . .	Chapman and Castle	"	337
Sawyer	Shawmut Avenue and Lenox	"	238
	Carried forward	. . . . .	6,794

Statement of Location, Size, etc. — Continued.

In what Street.	Between what Streets.	Diameter of Iron Pipe in Inches.	Feet of Pipe.
	Brought forward	. . . . .	6,794
Sturgis	Pearl and Oliver	6	150
Village	Chapman and Castle	"	362
Wellington	Columbus Avenue and Providence R. R. .	"	72
Wareham	Albany and Harrison Avenue	"	457
Yarmouth	Columbus Avenue and Providence R. R. .	"	168
Northampton	Tremont and Providence R. R.	"	712
Indiana Place	Tremont and Washington	"	958
Shawmut Avenue . . .	Indiana Place and Pleasant	"	393
Wheeler's Court	" " " "	"	408
Kirkland	" " " "	"	450
	Total, 6-inch	. . . . .	10,924
Eastern Avenue	At twin Hydrants.	4	50
Tremont Row	Pemberton Square and Howard	"	383
Garland	Washington and Shawmut Avenue	"	191
Carney Place	" " " "	"	170
Gray	Berkeley and Clarendon	"	237
Leverett	North Charles and Bridge	"	134
T Wharf	Atlantic Avenue and end of Wharf	"	100
Passage Way	Rear Tremont, bet. Concord and Wor'ster	"	233
Cherry	Washington and Shawmut Avenue	"	300
Smith Avenue	Kendall and Hammond Park	"	145
Paul	Emerald and Village	"	75
Lucas	Washington and Shawmut Avenue	"	190
St. Charles	Chandler and Boston and Albany R. R. . .	"	233
Greenwich Park . . .	Columbus Avenue and Providence R. R. .	"	45
Ohio Place	Shawmut Avenue and Washington	"	50
	Total, 4-inch	. . . . .	2,536

Statement of Location, Size, etc. — Continued.

In what Street.	Between what Streets.	Diameter of Iron pipe in Inches.	Feet of Pipe.
	SOUTH BOSTON.		
Thomas	Atlantic and the Reservoir	20	140
	Total, 20-inch		140
Dorchester Avenue	Preble and Dorchester Line	12	1,780
Thomas	Pacific and National	"	290
	Total, 12-inch		2,070
Atlantic	Fourth and Thomas	6	40
Broadway	Dorchester Avenue and A	"	178
Dorchester Avenue	First and Silver	"	350
Granite	First and Second	"	240
M	Sixth and Seventh	"	300
Ninth	H and I	"	200
O	Seventh and Ninth	"	359
Sixth	I and K	"	110
Third	Emerson and I	"	347
Fifth	G and H	"	190
	Total, 6-inch		2,314
Beckler Place	K and L	4	250
Bay State Place	First and Second	"	150
Gates	Eighth and Telegraph	"	180
Gold	A and B	"	160
Newman	Lowland and Dorchester	"	228
Second	At Jenny's Oil Works	"	138
Vinton	Dorchester and O. C. and N. R. R.	"	222
	Total, 4-inch		1,328

Statement of Location, Size, etc. — Continued.

In what Street.	Between what Streets.	Diameter of Iron pipe in Inches.	Feet of Pipe.
	EAST BOSTON.		
In Channel	East Boston and Chelsea	24	1,463
	Total, 24-inch		1,463
Border	Sumner and Lexington	12	2,384
	Total, 12-inch		2,384
Deer Island		8	2,938
	Total, 8-inch		2,938
Deer Island		6	139
Bremen	Glendon and Saratoga	"	193
Eagle	Knox and Putnam	"	626
Havre	Marion and Bennington	"	400
	Total, 6-inch		1,358
Deer Island		4	85
	Total, 4-inch		85

Statement of Location, Size, etc. — Continued.

In what Street.	Between what Streets.	Diameter of Iron Pipe in Inches.	Feet of Pipe.
	BOSTON HIGHLANDS.		
Blue Hill Avenue . . .	Stafford and Warren	12	545
Shawmut Avenue . . .	Walnut Avenue and Egleston Square . . .	"	405
Longwood Avenue . . .	Bumstead Lane and Binney	"	721
Parker	Longwood Avenue and Prentiss	"	149
Warren	Blue Hill Avenue and Washington	"	666
Centre	Lamertine and Houghton Place	"	954
Fort Avenue	Cedar and Highland Avenue	"	12
Tremont	Bumstead Lane and Wigglesworth	"	718
	Total, 12-inch	. . . . .	4,170
Wyoming	From Warren	9	9
Quincy	Warren and Blue Hill Avenue	"	29
Westminster Avenue .	Walnut Avenue and Shawmut Avenue . .	"	10
Dale	Wakulla and Rockland	"	9
New Heath	Parker and Day	"	43
Sterling	Shawmut Avenue and Westminster	"	11
Vernon	Hampshire and Simmons	"	11
Highland Park Avenue.	From Fort Avenue	"	8
Laurel	Catawba and Ottawa	"	10
Bowers	Warren and Walnut Avenue	"	28
Catawba	Laurel and Sherman	"	10
Atherton	From Shawmut Avenue	"	11
Bickford	From New Heath	"	11
Hampshire	Clay and Vernon	"	10
Windsor	Westminster and Cabot	"	12
Palmer	Harrison Avenue and Washington	"	10
Mall	Fremont and Dayton Avenues	"	11
Dorr	Lambert Avenue and Highland	"	10
	Total, 9-inch	. . . . .	253

Statement of Location, Size, etc. — Continued.

In what Street.	Between what Streets.	Diameter of Iron Pipe in Inches.	Feet of Pipe.
Dennis	Woodville Square and Blue Hill Avenue	6	354
Crawford	From Warren	"	752
Cobden	Walnut Avenue and Shawmut Avenue	"	305
New Heath	Parker and Day	"	1,430
Parker	New Heath and Centre	"	1,372
Belmont	Ruggles and Vernon	"	11
Mendora	Station and Prentiss	"	17
Prentiss	Tremont and Parker	"	955
Oriole	From Walnut Avenue	"	333
Vale	Marcella and Marcella	"	761
Wyoming	From Warren	"	432
Quincy	Warren and Blue Hill Avenue	"	1,238
Hammond Park	Shawmut Avenue and Warwick	"	416
Westminster Avenue	Walnut Avenue and Shawmut Avenue	"	761
Dale	Walnut Avenue and Rockland	"	542
Harrison Avenue	Dudley and Eustis	"	1,054
Maywood	Warren and Blue Hill Avenue	"	29
Sterling	Shawmut Avenue and Westminster	"	202
Francis	Western Avenue and Binney	"	355
Vernon	Hampshire and Cabot	"	267
Fort Avenue	Cedar and Highland Park Avenue	"	44
Highland Park Avenue	From Fort Avenue	"	445
Thornton	Ellis and Vale	"	212
Codman Avenue	Shawmut Avenue and Amory	"	318
Laurel	Dale and Bowers	"	752
Sherman	Ottawa and Bowers	"	27
Bowers	Warren and Walnut Avenue	"	1,508
Catawba	Laurel and Sherman	"	345
Atherton	From Shawmut Avenue	"	466
Bickford	From New Heath	"	334
Wise Place	From Centre	"	257
Clay	Tremont and Hampshire	"	254
	Carried forward		16,548

Statement of Location, Size, etc. — Continued.

In what Street.	Between what Streets.	Diameter of Iron Pipe in Inches.	Feet of Pipe.
	Brought forward	. . . . .	16,548
Hampshire.	Clay and Vernon	6	641
Windsor	Shawmut Avenue and Cabot.	"	1,040
Palmer	Washington and Winslow	"	407
Mall.	Dearborn and Eustis	"	723
Eustis	Winslow and Harrison Avenue	"	164
Roslin	From Warren.	"	278
Marcella.	Highland and Centre	"	315
Circuit	Shawmut and Regent	"	893
"	Regent and Fountain	"	293
Dorr.	Lambert Avenue and Highland	"	299
Marcella.	Centre and Highland	"	150
	Total, 6-inch.	. . . . .	21,751
Lewis Place	From Dudley	4	199
Gore Avenue	Tremont and Parker	"	514
Walnut Park	Walnut Avenue and Shawmut Avenue . .	"	325
Maiden Lane.	Hampden and Reed	"	245
Lent Park	From Parker	"	873
Pickering Place	From Walnut Avenue	"	200
Hartopp Place	Albany and Chadwick.	"	311
Harrison Avenue . . .	Dudley and Warren	"	173
Smith-street Court. . .	From Smith	"	184
Reed Court	From Yeoman	"	267
Thornton Place	From Thornton	"	110
Delle Avenue	From Parker	"	236
Codman Park	From Shawmut Avenue	"	200
	Total, 4-inch	. . . . .	3,837

Statement of Location, Size, etc. — Continued.

In what Street.	Between what Streets.	Diameter of Iron Pipe in Inches.	Feet of Pipe.
	DORCHESTER.		
Hancock	Commercial and Adams	12	1,435
Commercial	Dorchester Avenue and South	"	4,750
Adams	Hancock and Centre	"	5,394
Neponset Avenue	Adams and Walnut	"	5,757
Walnut	Neponset Avenue and Ericsson	"	2,731
Dorchester Avenue	Boston Line and Centre Avenue	"	8,009
Minot	Neponset Avenue and Adams	"	2,406
Washington	Warren and Welles	"	7,842
Columbia	Hancock and Bird	"	679
Bowdoin	Washington and Green	"	2,293
	Total 12-inch		41,296
Savin Hill Avenue	Dorchester Avenue and Grampian Way	9	114
Dix Place	From Adams	"	10
Centre Avenue	Dorchester Avenue and Centre	"	9
Thornley	Dorchester Avenue and Pleasant	"	11
Pearl	" "	"	10
Park	Dorchester Avenue and Adams	"	11
Buttonwood	Mt. Vernon and Gardner	"	10
Bird	Columbia and Myrtle	"	33
Exchange	Park and Mill	"	21
Newport	Crescent Avenue and Spring Garden	"	19
Spring Garden	Harbor View and Crescent Avenue	"	8
	Total 9-inch		256

Statement of Location, Size, etc. — Continued.

In what Street.	Between what Streets.	Diameter of Iron Pipe in Inches.	Feet of Pipe.
Lincoln	Dorchester Avenue and Adams	6	33
Park	Dorchester Avenue and Commercial	"	1,911
Neponset Avenue	Walnut and Neponset Bridge	"	922
Union	Commercial and Pleasant	"	699
Pleasant	Union and Smith	"	664
Beach	Commercial and Park	"	1,202
Myrtle	Stoughton and Bird	"	240
Ashland	Park and Mill	"	808
Water	Taylor and Fulton	"	708
Ericsson	Walnut and Fulton	"	395
Mill	Commercial and Preston	"	1,378
High	Water and Ericsson	"	1,063
Taylor	Water and Neponset Avenue	"	1,171
Wood	From Walnut	"	495
Chickatawbut	Neponset Avenue and Clyde	"	1,033
Plain	Chickatawbut and Plain	"	631
Humphrey	Stoughton and Cottage	"	661
Albion	Stoughton and Clifton	"	510
Clifton	Albion and Cottage	"	125
Clapp Place	From Boston	"	790
Crescent Avenue	Dorchester Avenue and Spring Garden	"	872
Moseley Avenue	From Crescent Avenue	"	631
Carlton	" "	"	662
Pleasant	Savin Hill Avenue and Creek	"	826
Savin Hill Avenue	Dorchester Avenue and Grampian Way	"	4,868
Dix Place	From Adams	"	572
Elm	Exchange and Everett	"	819
Centre Avenue	Dorchester Avenue and Centre	"	548
Thornley	Dorchester Avenue and Pleasant	"	454
Pearl	" "	"	798
Mt. Vernon	Boston and Buttonwood	"	413
Buttonwood	Dorchester Avenue and Gardner	"	390
Bird	Columbia and Myrtle	"	1,555
	Carried forward		28,847

Statement of Location, Size, etc. — Continued.

In what Street.	Between what Streets.	Diameter of Iron Pipe in Inches.	Feet of Pipe.
	Brought forward		28,847
Exchange	Park and Mill	6	839
Newport	Crescent Avenue and Harbor View	"	680
Spring Garden	" "	"	294
Wesley Avenue	From Savin-Hill Avenue	"	46
Erie Avenue	From Washington	"	270
Harbor View	From Newport	"	352
Howard Avenue	Stoughton and Howard	"	1,195
	Total 6-inch		32,523
Neponset Avenue	Near Neponset Bridge	4	79
Union	From Pleasant	"	297
South	From Commercial	"	223
Humphrey Court	From Humphrey	"	248
Tileston Place	From Neponset Avenue	"	249
Bird-street Place	From Bird	"	191
Oakman Place	From Walnut	"	159
Taylor Avenue	From Stoughton	"	336
	Total 4-inch		1,782

RECAPITULATION.

SECTION.	1871.	DIAMETER IN INCHES.								
		24.	20.	16.	12.	9.	8.	6.	4.	Total.
Boston	Total number of feet laid	....	....	....	422	....	....	10,924	2,536	
	Stopcocks in same	....	....	1	2	....	....	20	18	
South Boston	Total number of feet laid	....	140	....	2,070	....	....	2,314	1,328	
	Stopcocks in same	....	....	....	3	....	....	3	2	
East Boston	Total number of feet laid	1,463	....	....	2,384	....	2,938	1,358	85	
	Stopcocks in same	....	2	1	3	....	....	3	2	
Boston Highlands	Total number of feet laid	....	....	....	4,170	253	....	21,751	3,837	
	Stopcocks in same	....	....	....	6	....	....	39	10	
Dorchester	Total number of feet laid	....	....	....	41,296	256	....	32,523	1,782	
	Stopcocks in same	....	....	....	43	....	....	57	9	
	Sums of Pipe	1,463	140	....	50,342	509	2,938	68,870	9,568	133,830
	Sums of Stopcocks	....	2	2	57	....	....	122	41	224

Statement of the Length of different Sizes of Pipes laid, and the Number of Stopcocks put in, to May 1, 1872.

	Diameter of Pipes in Inches.														Aggregate.
	48.	40.	36.	30.	24.	20.	16.	12.	10.	9.	8.	6.	4.	3.	
Feet of Pipe laid in Brookline, Boston Highlands, and Boston Proper. . . .	7,283	23,166	20,070	26,770	5,773	. . .	7,076	67,705	. . .	. .	2,020	286,157	90,823	. .	
Number of Stopcocks in same	5	5	8	11	10	2	25	130	. . .	. .	5	615	336	. .	
Feet of Pipe laid in Boston Highlands .	. .	. . .	. . .	. . .	7,618	. . .	7,141	54,608	. . .	253	. . .	98,998	21,554	238	
Number of Stopcocks in same	. .	. . .	. . .	1	7	. . .	16	74	. . .	. .	1	194	87	2	
Feet of Pipe laid in South Boston . . .	. .	. . .	. . .	. . .	. . .	13,175	. . .	21,313	. . .	. .	2,871	105,065	32,901	. .	
Number of Stopcocks in same	. .	. . .	. . .	. . .	. . .	5	. . .	34	. . .	. .	2	156	82	. .	
Feet of Pipe laid in East Boston	. .	. . .	. . .	. . .	1,463	15,972	1,523	23,362	9,311	. .	18,584	75,416	5,449	. .	
Number of Stopcocks in same	. .	. . .	. . .	. . .	. . .	8	4	31	1	. .	8	109	34	. .	
Feet of Pipe laid in Dorchester	. .	. . .	. . .	. . .	3,299	3,698	456	56,442	. . .	256	. . .	36,560	1,818	. .	
Number of Stopcocks in same	. .	. . .	. . .	. . .	3	1	1	63	. . .	. .	. . .	66	15	. .	
Feet of Pipe laid in Newton and Needh'm	. .	. . .	1,074	2,140	. . .	. . .	. . .	1,359	. . .	. .	. . .	360	. . .	. .	
Number of Stopcocks in same	. .	. . .	. . .	. . .	. . .	. . .	. . .	2	. . .	. .	. . .	2	. . .	. .	
Totals — Length of Pipe laid . . .	7,283	23,166	21,144	28,910	18,153	32,845	16,196	224,789	9,311	509	23,475	602,556	152,545	238	1,161,120 feet, equal to 219 miles 4,800 feet.
Number of Stopcocks put in . .	5	5	8	12	20	16	46	334	1	. .	16	1,142	554	2	2,161

Statement of Service Pipe laid in 1871.

Diameter in Inches.	Boston.		South Boston.		East Boston.		Boston Highlands.		Dorchester.		Totals.	
	Number of Pipes.	Length in Feet.	Number of Pipes.	Length in Feet.	Number of Pipes.	Length in Feet.	Number of Pipes.	Length in Feet.	Number of Pipes.	Length in Feet.	Number of Pipes.	Length in Feet.
2	2	48	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	2	48
1¼	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	1	161	1	161
1	13	358	3	167	2	140	9	1,549	5	436	32	2,650
¾	7	161	6	224	1	19	9	481	4	210	27	1,095
⅝	396	12,482	380	10,784	146	4,302	506	16,352	410	15,187	1,838	59,107
½	36	899	46	1,317	45	1,231	133	3,544	115	3,463	375	10,454
	Aggregate										2,275	73,515
	Making the total number up to May 1st, 1872											34,970

Repairs of Pipes during the Year 1871.

WHERE.	DIAMETER OF PIPES IN INCHES.																
	48	40	36	30	20	12	10	6	4	3	2	1½	1	¾	⅝	½	Total.
Boston	3	2	1	5	.	10	.	32	58	3	13	80	21	8	788	17	1,041
South Boston	.	.	.	.	1	1	.	7	5	.	.	.	7	2	166	7	196
East Boston	.	.	.	1	10	6	3	2	3	.	.	2	.	.	135	1	163
Boston Highlands	.	.	.	.	1	4	.	7	13	5	5	.	1	1	107	7	151
Dorchester	.	.	.	.	.	7	.	3	.	.	.	.	1	.	3	.	14
Totals	3	2	1	6	12	28	3	51	79	8	18	82	30	11	1,199	32	1,565

Of the leaks that have occurred in pipes of 4 inches and upwards, joints, 98; settling of earth, 13; defective pipe, 7; defective gates, 6; frost, 4; blasting, 1; struck by pick, 3; doubtful, 3. Total, 135.

Stoppages by frost, 49; fish, 1. Total, 50.

Of three inches and in service pipes, joints, 22; settling of earth, 156; defective pipe, 49; defective gate, 1; defective packing, 15; defective coupling, 20; defective faucet, 9; frost, 27; faucet pulled out, 2; faucet broken at main, 2; faucet blown out, 6; faucet loose at main, 9; faucet knocked out, 18; stiff connections, 82; struck by pick, 31; cut by drain diggers, 5; gnawed by rats, 11; blasting, 2; pipes not in use, 17. Total, 484.

Stoppages by frost in street, 338; frost from inside house, 198; fish, 221; dirt, 4; rust, 130; gasket, 5. Total, 896.

Statement of Number of Leaks, 1850–1871.

YEAR.	DIAMETER OF		TOTAL.
	Four Inches and upwards.	Less than four Inches.	
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
1861	109	399	508
1862	117	373	490
1863	97	397	494
1864	95	394	489
1865	111	496	607
1866	139	536	675
1867	122	487	609
1868	82	449	531
1869	82	407	489
1870	157	769	926
1871	185	1,380	1,565

HYDRANTS.

During the year 344 hydrants have been established, as follows: —

In Boston proper — Wilmarth,	. . . .	37
South Boston,	"	14
East Boston,	"	17
Boston Highlands,	" 7, Lowell 6, Lowry 53,	66
Carried forward,	. . . . .	134

Brought forward, ...	134
Dorchester, Lowell 3, Lowry 200,	203
Deer Island, Port hydrants, ...	7
Total, ...	344

Total number of hydrants established up to May 1, 1872 : —

Boston proper	1,058
South Boston	382
East Boston	221
Boston Highlands	485
Dorchester	251
Brookline	3
Charlestown	11
Chelsea	8
Deer Island	14
Total, ...	2,433

44 hydrants have been taken out and replaced by new or repaired ones, and 116 boxes have been taken out and replaced by new ones.

The hydrants have had the usual attention paid them.

STOPCOCKS.

224 new stopcocks have been established this year. 80 boxes have been taken out and replaced by new ones.

All the stopcocks have had the attention of former years paid them.

Statement of Pipes and other Stock on hand, exclusive of Tools, May 1, 1872.

NUMBER OF	DIAMETER IN INCHES.																
	48	40	36	30	24	20	18	16	12	10	9	8	6	4	3	2	1½
Pipes	18	14	10	57	37	33	3	81	2,711	21	233	11	5,803	1,996	7	10	.
Blow-off Branches	.	.	3	. .	4	.	.	. .	20	.	. .	.	. . .	. . .	.	.	.
Y Branches	.	.	.	1	.	.	.	. .	. . .	.	. .	.	2	. . .	.	.	.
4 Way Branches	.	2	1	2	6	5	.	4	25	.	. .	6	8	1	.	.	.
3 Way Branches	1	7	4	7	10	14	.	2	247	.	210	5	83	24	12	6	.
Flange Pipe	.	2	1	1	2	.	.	2	3	.	. .	.	6	2	.	.	.
Sleeves	8	4	11	12	8	11	.	22	22	7	. .	.	91	35	12	20	.
Clamp Sleeves	3	.	9	14½	.	.	.	13½	. . .	.	. .	.	12	10	1	.	.
Caps	1	2	1	4	2	.	.	1	2	.	. .	7	41	47	.	.	.
Reducers	.	3	2	. .	5	4	.	. .	11	.	. .	.	4	17	.	.	.
Bevel Hubs	.	.	.	. .	.	.	.	. .	. . .	.	. .	.	6	2	.	.	.
Curve Pipes	.	1	3	22	8	2	.	11	42	.	. .	1	42	16	.	.	.
Quarter Turns	.	.	2	10	3	5	.	3	22	.	. .	.	70	19	2	4	.
Double Hubs	.	.	.	. .	.	3	.	8	. . .	.	. .	.	27	. . .	.	.	40
Offset Pipes	.	.	.	. .	.	.	.	. .	6	.	. .	.	45	33	.	.	.
Yoke Pipes	.	.	.	. .	.	.	.	. .	6	.	. .	.	13	4	.	.	.
Manhole Pipes	.	2	.	2	.	.	.	. .	. . .	.	. .	.	. . .	. . .	.	.	.
One-eighth Turns	.	.	.	. .	3	.	.	. .	. . .	.	. .	.	12	42	1	.	.
Pieces of Pipes	.	2	2	14	6	6	.	3	3	.	. .	.	14	12	.	.	.
Blow-offs and Manholes		1	.	2	.	.	.	. .	. . .	.	. .	.	. . .	. . .	.	.	.
Plugs	.	.	.	. .	.	.	.	. .	. . .	.	. .	.	8	24	.	.	.
Thawing Clamps	.	.	.	. .	.	.	.	5	9	.	. .	6	18	49	.	.	.
Stopcocks	.	1	2	4	2	2	.	2	19	.	. .	1	125	60	4	.	.

Hydrants. — 87 Lowry, 22 Lowry extensions, 3 Lowry chucks, 70 Lowry frames and covers, 25 Lowry barrels, 12 Lowry caps, 12 round covers, 16 Wilmarth, 5 Wilmarth and 13 Lowell, old.

For Hydrants.—39 bends, 38 lengtheners, 21 covers, 8 old bends, 70 wastes, 52 nipples, 35 socket nuts, 36 rods, 3 wharf hydrants, 17 wharf hydrant cocks, 61 brass tubes, 56 nuts, 45

stuffing boxes, 47 valve seats, 49 rubber valves, 222 leather rings, 47 screws, 12 plungers, 21 caps, 29 ditto for rods, 14 heavy frames, 31 heavy covers, 26 frames, 34 old covers, 3,999 pounds iron castings, 78 pounds composition ditto, 13 pairs straps, 21 pounds Babbitt metal.

For Stopcocks. — 2 36-inch screws, 1 30-inch ditto, 2 24-inch ditto, 1 16-inch ditto, 1 4-inch ditto, for waste weir, 1 ditto, for Brookline reservoir (old), 28 composition screws for 4-inch gates, 25 4-inch valves, 10 6-inch rings, 38 4-inch ditto, 50 rings for valve seats, 4 6-inch stuffing boxes, 33 4-inch ditto, 2 2-inch globe valves, 2,790 pounds iron castings for 6 and 4-inch gates, 36 frames, 42 covers.

Meters in Shop. — 3 3-inch, 5 2-inch, 1 1-inch, 22 $\frac{5}{8}$-inch.

Stock for Meters. — 22 2-inch nipples, 44 1-inch ditto, 75 $\frac{5}{8}$-inch ditto, 2 2-inch connection pieces, 7 1-inch ditto, 28 $\frac{5}{8}$-inch ditto, 24 1-inch cocks, 20 $\frac{5}{8}$-inch ditto, 3 3-inch clocks, 1 2-inch ditto, 10 1-inch ditto, 40 $\frac{5}{8}$-inch ditto, 12 brass spindles, 15 rubber nipples, 13 fish boxes, 36 covers, 24 glasses.

For Service Pipe. — 5 $2\frac{1}{2}$-inch union cocks, 67 1-inch ditto, 122 $\frac{3}{4}$-inch ditto, 659 $\frac{5}{8}$-inch ditto, 534 unfinished ditto, 348 $\frac{1}{2}$-inch ditto, 30 1-inch air cocks, 15 $1\frac{1}{4}$-inch T cocks, 19 1-inch ditto, 47 $\frac{3}{4}$-inch ditto, 72 $\frac{5}{8}$-inch ditto, 24 $\frac{5}{8}$-inch Y cocks, 48 $\frac{5}{8}$-inch thawing cocks, 35 $\frac{5}{8}$-inch angle cocks, 25 2-inch male couplings, 6 3-inch tubes, 45 2-inch ditto, 19 2-inch nuts, 39 1-inch tubes, 59 $\frac{3}{4}$-inch nuts, 44 $1\frac{1}{4}$-inch couplings, 17 $\frac{3}{4}$-inch tubes, 16 $\frac{5}{8}$-inch male couplings, 1,665 $\frac{5}{8}$-inch female ditto, 65 $\frac{5}{8}$-inch thawing couplings, 350 $\frac{1}{2}$-inch couplings, 8 1-inch tubes, 2,500 boxes, 43 T ditto, 12 Y ditto, 7 extension tubes, 2,316 tubes, 2,500 caps, 385 pounds unfinished composition casting, 10 4 x 2 composition reducers, 3 3 x 2 ditto, 42 2 x $\frac{5}{8}$ ditto, 2 4 x 2 Y ditto, 3 4-inch tunnel pipe, 5 3 x 2 iron reducers, with 2-inch composition nipples, 50 1-inch plugs, 70 $\frac{3}{4}$-inch ditto, 41 $\frac{5}{8}$-inch ditto.

Lead Pipe.—1,390 pounds 2-inch lead pipe, 1,625 pounds $1\frac{1}{2}$-inch ditto, 1,120 pounds $1\frac{1}{4}$-inch ditto, 425 pounds 1-

inch ditto, 384 pounds $\frac{3}{4}$-inch ditto, 56,722 pounds $\frac{5}{8}$-inch ditto, 26,607 pounds $\frac{1}{2}$-inch ditto, 698 pounds 1-inch tin lined ditto, 108 pounds $\frac{3}{4}$-inch ditto, 1,864 pounds $\frac{5}{8}$-inch ditto, 420 pounds $\frac{1}{2}$-inch ditto, 198 pounds $\frac{3}{4}$-inch block tin pipe, 60 pounds $\frac{5}{8}$-inch ditto, 75 pounds solder.

Blacksmith Shop. — 1,327 pounds round iron, 797 pounds flat ditto, 247 pounds square ditto, 1,035 pounds working pieces, 450 pounds cast steel, 40 dozen pick blanks, 4,500 pounds Cumberland coal.

Carpenter's Shop. — 87 Lowry hydrant boxes, 10 ditto unfinished, 140 stopcock boxes, 12 ditto unfinished, 23 hydrant boxes, 82 ditto unfinished, 2 meter boxes, 15 ditto unfinished, 600 pounds spikes and nails, 1,600 feet 2-inch spruce plank, 13,000 feet $1\frac{1}{2}$-inch spruce batting, 25 1-foot pieces for raising hydrant boxes, 30 1 foot ditto for stopcock boxes, 20 ditto for Lowry hydrant boxes.

Tools. — 1 steam engine, 1 large hoisting crane, 3 boom derricks, 4 sets shears and rigging for same, 5 tool houses, 3 tool boxes, 2 platform scales, 1 portable blacksmith shop, 1 portable covering for Brewer fountain, 1 hand roller, 1 horse ditto, tools for laying and repairing main and service pipes, 2 engine lathes, 1 foot ditto, 1 hand ditto, 1 Pratt and Whitney taper ditto, 1 chain hoisting gear, 1 upright drilling machine, 3 grindstones, 1 trip hammer, the necessary tools for carrying on the machine, blacksmith, carpenter and plumbing shops, 1 circular saw, 1 fan blower, 1 40-inch proving press, 1 36-inch ditto, 1 small ditto, 4 wheelbarrows, 700 feet old hose, also a large lot of patterns at the foundries where we obtain castings.

Stable. — 11 horses, 8 wagons, 2 buggies, 3 pungs, 1 sled, 1 cart, 9 sets harness, 10 blankets, 1 buffalo robe, 2 sleighs, 2 tons of English hay, 60 bushels grain.

Beacon Hill Reservoir. — 1 large composition cylinder 16-inch jet, 1 6-inch composition jet, 3 composition plates, 9 cast iron plates, 2 4-inch composition jets, 5 swivel pipe

patterns, 1 2-inch copper straight jet, 6 composition jets for small fountains, 6 large composition cylinders.

Miscellaneous — 1 Wood's Philadelphia four-basin fountain (broken), 24 tons pig lead, 30 gallons linseed oil, 2 barrels kerosene oil, 300 tons of furnace coal, 1 freight gravel, 3,700 pounds gasket, 200 paving brick, 500 pounds bolts, 1 keg old ditto, 54 pounds lead washers, 66 pounds iron ditto, 49 set screws for 12-inch caps, lot paving stones, 50 reservoir covers, 26 cords wood, 6 manholes, 5 plates, lot of lumber, lot of wooden pavement, also old machinery from Marlboro'.

Respectfully submitted,

E. R. JONES,

Supt. Eastern Division.

REPORT OF THE SUPERINTENDENT OF THE WESTERN DIVISION.

Chestnut Hill Resevoir,
Brighton, May 1, 1872.

Charles H. Allen, Esq.,
President of the Cochituate Water Board:

Sir: The following report is respectfully submitted: —

No changes have been made around the lake the past year, with the exception of completing the fences, and rebuilding the wall at the gate-house. The wall had started out so much that there was danger of its going over into the lake. The low water was favorable to take up the old wall, and rebuild. It was rebuilt on the north side of the gate-house as far as the old wall extended, and on the south side about fifty feet. The capstones on the wall from the road, to the point, fifty feet from the gate-house on the south-east side, need resetting, and as soon as an opportunity occurs it will be done. The stumps that could be got at have been taken out, and the shores of the lake cleared up. Men have been employed during the winter in deepening the channel between the northern and southern sections of the lake, to enable the water to pass freely into the northern section, as the culvert under the Saxonville Branch Railroad would not admit of the channel to be dug deep enough to keep them on a level, without injury to the foundation, and the water has stood higher in the southern section on that account. The gate-house has been lined with face-brick the past season, as was ordered. The using of soft coal, and the oil from the pumps, have defaced it so much that it will require painting

as soon as the pumps are removed. The engine-house on the north side of the gate-house has been covered with iron plating to protect it from fire. On the 4th of October the tw 12-inch pumps were started. It was very evident that hey were not of sufficient capacity to keep up the supply, and on the 9th of October I reported it to the Board and urged the necessity of at once procuring larger pumps and more power. The Assistant City Engineer, Henry M. Wightman, Esq., decided that the two 12-inch pumps could be made to deliver the amount of water that the city was using and the pumps were put under his direction. In November a third 12-inch pump was put in and the engine that was used at the stone-crusher sent up to drive it. In January two 18-inch pumps were started, driven by two twenty-five horse power engines, and they have kept up the supply for the city, and filled up the Chestnut Hill Reservoir. April 13th, the pump was stopped, and the supply is sufficient by gravitation. The water was let into the lake from Dug and Dudley ponds, August 19th, 1871, and the stop plank have not been put in this spring. The water has not been drawn out of the conduit during the year between the lake and Chestnut Hill Reservoir; the water has been shut off at the lake several times to enable them to set the pumps, but in no case has any been wasted. Between the intermediate gate-house at Chestnut Hill Reservoir and the Brookline Reservoir, the conduit has been drawn off, and that section repaired and the Brookline tunnel cleaned out. The line of conduit has been examined, and the waste weirs, new steps put up at the lower falls, and a new fence built on the line of the road. The annual examination of the conduit has been deferred until later in the season. At the Chestnut Hill Reservoir a repair-shop has been built, suitable for a carpenter's shop, blacksmith, etc. The engine is placed in this building that is used in pumping the water for sprinkling the driveway. The ledge on the

north side of the gate-way has been removed, and a part of the hill on the south side should be removed in order to complete the improvement. No leak has been seen, or anything to indicate that the basin is not perfectly tight. The drive-way needs a covering of gravel, and as we have none on the premises, I would recommend that a gravel bank be purchased on the line of the railroad, and that a turn-out and side-track be put in, as that would be the cheapest way the gravel could be procured. A part of the wall and fence on Dudley street, on the back line of the Brookline Reservoir, has been done, as the men were taken off to excavate for the pipes on Bradley's Hill. It will not be completed until the last of May. The works are in as good condition, as far as it is in my power to know, as they have been for the past two or three years. Yet the section of conduit that was repaired this season was in a very unsafe condition, probably not more so than in many parts of the line, and I would urge the necessity of a new conduit being built, as in my judgment the present one is in an unsafe condition, and cannot be relied upon.

Height of Water at the Bradlee Basin, above the tower floor, at the Effluent Gate-House.

DATE.	Height of Water.	DATE.	Height of Water.	DATE.	Height of Water.	DATE.	Height of Water.
1871.	*Ft. In.*	1871.	*Ft. In.*	1871.	*Ft. In.*	1871.	*Ft. In.*
May 1 . . .	14 2	June 1 . . .	20 5½	July 1	23 9¼	August 1 . .	23 3¾
" 2 . . .	14 3	" 2 . . .	20 7	" 2	23 8¾	" 2 . .	23 3¼
" 3 . . .	14 4	" 3 . . .	20 8½	" 3	23 9	" 3 . .	23 3¼
" 4 . . .	14 6½	" 4 . . .	20 10¼	" 4	23 8¾	" 4 . .	23 3
" 5 . . .	15 0	" 5 . . .	21 0½	" 5	23 9	" 5 . .	23 3¼
" 6 . . .	15 5	" 6 . . .	21 2¼	" 6	23 8½	" 6 . .	23 3
" 7 . . .	15 10	" 7 . . .	21 3¼	" 7	23 8	" 7 . .	23 3
" 8 . . .	16 1	" 8 . . .	21 5¾	" 8	23 7	" 8 . .	23 2¾
" 9 . . .	16 5	" 9 . . .	21 7¼	" 9	23 6½	" 9 . .	23 2
" 10 . . .	16 7½	" 10 . . .	21 8¾	" 10	23 6	" 10 . .	23 1½
" 11 . . .	16 9½	" 11 . . .	21 10½	" 11	23 5¾	" 11 . .	23 1
" 12 . . .	17 0	" 12 . . .	22 0	" 12	23 6	" 12 . .	23 1
" 13 . . .	17 2	" 13 . . .	22 2	" 13	23 5¾	" 13 . .	23 1
" 14 . . .	17 4	" 14 . . .	22 2¾	" 14	23 5	" 14 . .	23 0¾
" 15 . . .	17 6	" 15 . . .	22 4¾	" 15	23 4½	" 15 . .	23 0½
" 16 . . .	17 8	" 16 . . .	22 6	" 16	23 4½	" 16 . .	23 0
" 17 . . .	17 10¼	" 17 . . .	22 8	" 17	23 4¾	" 17 . .	23 0
" 18 . . .	18 1	" 18 . . .	22 10¼	" 18	23 4¼	" 18 . .	22 11½
" 19 . . .	18 3	" 19 . . .	23 2	" 19	23 2¼	" 19 . .	22 11¼
" 20 . . .	18 5½	" 20 . . .	23 5	" 20	23 2¼	" 20 . .	22 10¾
" 21 . . .	18 8	" 21 . . .	23 6¾	" 21	23 1¼	" 21 . .	22 10¾
" 22 . . .	18 10½	" 22 . . .	23 7¾	" 22	23 2	" 22 . .	22 10
" 23 . . .	19 2	" 23 . . .	23 8¼	" 23	23 1½	" 23 . .	22 10½
" 24 . . .	19 4¼	" 24 . . .	23 8½	" 24	23 2	" 24 . .	22 10¼
" 25 . . .	19 6¼	" 25 . . .	23 8¾	" 25	23 1¾	" 25 . .	22 10½
" 26 . . .	19 8½	" 26 . . .	23 9½	" 26	23 2	" 26 . .	22 10
" 27 . . .	19 10	" 27 . . .	23 9¾	" 27	23 1½	" 27 . .	22 10¼
" 28 . . .	19 10¾	" 28 . . .	23 9¾	" 28	23 1¾	" 28 . .	22 10¾
" 29 . . .	19 11½	" 29 . . .	23 10	" 29	23 1½	" 29 . .	22 10½
" 30 . . .	20 1	" 30 . . .	23 9¾	" 30	23 3¼	" 30 . .	22 9¼
" 31 . . .	20 3½	. . . . .	. . .	" 31	23 3¾	" 31 . .	22 10¼

Height of Water at the Bradlee Basin. — Continued.

DATE.	Height of Water.	DATE.	Height of Water.	DATE.	Height of Water.	DATE.	Height of Water.
1871.	*Ft. In.*	1871.	*Ft. In.*	1871.	*Ft. In.*	1871.	*Ft. In.*
Sept. 1 . . .	22 9½	October 1.	21 6	Nov. 1 . . .	19 5½	Dec. 1 . . .	17 0
" 2 . . .	22 9	" 2.	21 6	" 2 . . .	19 4½	" 2 . . .	16 11
" 3 . . .	22 9	" 3.	21 5	" 3 . . .	19 3	" 3 . . .	16 10
" 4 . . .	22 9	" 4.	21 4	" 4 . . .	19 2	" 4 . . .	16 10½
" 5 . . .	22 8½	" 5.	21 2½	" 5 . . .	19 0¾	" 5 . . .	16 10
" 6 . . .	22 8½	" 6.	21 1½	" 6 . . .	19 0	" 6 . . .	16 8
" 7 . . .	22 8	" 7.	21 2	" 7 . . .	18 10½	" 7 . . .	16 6
" 8 . . .	22 7½	" 8.	21 1	" 8 . . .	18 9½	" 8 . . .	16 4½
" 9 . . .	22 7½	" 9.	21 0½	" 9 . . .	18 7½	" 9 . . .	16 4
" 10 . . .	22 7½	" 10.	20 11	" 10 . . .	18 5½	" 10 . . .	16 3
" 11 . . .	22 7	" 11.	20 10	" 11 . . .	18 4¼	" 11 . . .	16 2½
" 12 . . .	22 7½	" 12.	21 0½	" 12 . . .	18 2½	" 12 . . .	16 1
" 13 . . .	22 6½	" 13.	21 0	" 13 . . .	18 0	" 13 . . .	16 0
" 14 . . .	22 6½	" 14.	21 0	" 14 . . .	17 10¾	" 14 . . .	16 0
" 15 . . .	22 6	" 15.	20 11	" 15 . . .	17 9½	" 15 . . .	15 11½
" 16 . . .	22 6	" 16.	20 10½	" 16 . . .	18 0	" 16 . . .	15 11
" 17 . . .	22 7	" 17.	20 9½	" 17 . . .	17 11½	" 17 . . .	15 11½
" 18 . . .	22 6½	" 18.	20 8¼	" 18 . . .	17 10½	" 18 . . .	16 0
" 19 . . .	22 6	" 19.	20 7½	" 19 . . .	17 9	" 19 . . .	16 1
" 20 . . .	22 5	" 20.	20 6½	" 20 . . .	17 8	" 20 . . .	16 2
" 21 . . .	22 4½	" 21.	20 5¼	" 21 . . .	17 6	" 21 . . .	16 2
" 22 . . .	22 3½	" 22.	20 4¼	" 22 . . .	17 5	" 22 . . .	16 1
" 23 . . .	22 3	" 23.	20 3	" 23 . . .	17 4	" 23 . . .	16 0
" 24 . . .	22 3	" 24.	20 2	" 24 . . .	17 3¼	" 24 . . .	16 2
" 25 . . .	22 2¼	" 25.	20 1	" 25 . . .	17 3½	" 25 . . .	16 3½
" 26 . . .	22 1	" 26.	20 0	" 26 . . .	17 3½	" 26 . . .	16 5
" 27 . . .	22 0½	" 27.	19 10½	" 27 . . .	17 4	" 27 . . .	16 6
" 28 . . .	21 10	" 28.	19 10	" 28 . . .	17 3¾	" 28 . . .	16 6
" 29 . . .	21 8¾	" 29.	19 9	" 29 . . .	17 2½	" 29 . . .	16 6
" 30 . . .	21 7¼	" 30.	19 7½	" 30 . . .	17 0	" 30 . . .	16 7
. . . . .	. . .	" 31.	19 6½	. . . . .	. . .	" 31 . . .	16 8

Height of Water at the Bradlee Basin. — Continued.

DATE.	Height of Water.	DATE.	Height of Water.	DATE.	Height of Water.	DATE.	Height of Water.
1872.	*Ft. In.*	1872.	*Ft. In.*	1872.	*Ft. In.*	1872.	*Ft. In.*
January 1.	16 9½	February 1.	19 7	March 1. . .	22 8	April 1. . .	23 8¾
" 2.	16 10½	" 2.	19 9	" 2. . .	22 8½	" 2. . .	23 9¼
" 3.	16 11	" 3.	19 10½	" 3. . .	22 10½	" 3. . .	23 8¼
" 4.	17 0½	" 4.	20 2	" 4. . .	22 11	" 4. . .	23 7½
" 5.	17 2	" 5.	20 4½	" 5. . .	23 1	" 5. . .	23 6¾
" 6.	17 3	" 6.	20 5½	" 6. . .	23 0½	" 6. . .	23 5¾
" 7.	17 4	" 7.	20 7	" 7. . .	23 0¾	" 7. . .	23 5
" 8.	17 5	" 8.	20 8½	" 8. . .	23 0½	" 8. . .	23 5½
" 9.	17 4½	" 9.	20 9½	" 9. . .	23 1	" 9. . .	23 5
" 10.	17 4½	" 10.	20 11	" 10. . .	23 1	" 10. . .	23 5½
" 11.	17 5	" 11.	21 1½	" 11. . .	23 3	" 11. . .	23 5
" 12.	17 6	" 12.	21 2½	" 12. . .	23 4	" 12. . .	23 4½
" 13.	17 7	" 13.	21 4	" 13. . .	23 5¼	" 13. . .	23 4
" 14.	17 8	" 14.	21 6	" 14. . .	23 6¼	" 14. . .	23 4½
" 15.	17 9	" 15.	21 8	" 15. . .	23 6½	" 15. . .	23 4½
" 16.	17 9	" 16.	21 9½	" 16. . .	23 5½	" 16. . .	23 4½
" 17.	17 9½	" 17.	21 11	" 17. . .	23 5½	" 17. . .	23 5
" 18.	17 10½	" 18.	22 0	" 18. . .	23 6	" 18. . .	23 5¼
" 19.	17 11	" 19.	22 1½	" 19. . .	23 6	" 19. . .	23 5½
" 20.	18 1	" 20.	22 3	" 20. . .	23 6	" 20. . .	23 6
" 21.	18 2½	" 21.	22 4½	" 21. . .	23 5¾	" 21. . .	23 6
" 22.	18 4½	" 22.	22 4½	" 22. . .	23 5¼	" 22. . .	23 6¾
" 23.	18 5½	" 23.	22 3½	" 23. . .	23 5	" 23. . .	23 7
" 24.	18 6½	" 24.	22 3½	" 24. . .	23 5¼	" 24. . .	23 7¼
" 25.	18 7	" 25.	22 5	" 25. . .	23 6	" 25. . .	23 7½
" 26.	18 7½	" 26.	22 6	" 26. . .	23 6	" 26. . .	23 8
" 27.	18 8	" 27.	22 7	" 27. . .	23 6	" 27. . .	23 8¼
" 28.	18 9	" 28.	22 7	" 28. . .	23 6¼	" 28. . .	23 8½
" 29.	18 11	" 29.	22 7½	" 29. . .	23 6½	" 29. . .	23 8
" 30.	19 2	. . . . .	. . .	" 30. . .	23 7	" 30. . .	23 5
" 31.	19 4½	. . . . .	. . .	" 31. . .	23 7½	. . . . .	. . .

Schedule of Property at Chestnut Hill Reservoir.

1 two-horse express-wagon.
1 single " " "
1 water cart, with shafts.
2 two-horse water carts.
2 " " " (new).
2 " iron rollers.
1 single horse pung.
1 two " "
1 horse truck.
1 horse power.
1 hay wagon.
2 hand carts.
1 ox truck.
1 ox sling.
1 pair large wheels.
3 clay mills and shafting.
1 large water cistern.
6 screens.
40 ox tie chains.
2 7-inch rotary pumps.
2 4 " " "
3 Joyce force "
1 house " "
1 stone-crushing machine and castings.
2 blacksmiths' forges and tools.
1 portable forge.
1 derrick and rigging.
4 clay knives.
1 manhead.
32 grub axes.
139 picks.
shovels.
10 spades.
3 hoes.

39 iron bars.
9 stone hammers.
11 striking hammers.
15 iron rakes.
5 scuffling hoes.
4 border knives.
1 root-puller.
1 pair grass shears.
5 scythes and snaiths.
2 lawn-mowers.
1 garden engine.
4 hay forks.
2 manure forks.
8 lanterns.
8 peat knives.
13 tin dippers.
23 tin candlesticks.
4 reflector lanterns.
1 bushel grass seed.
8 barrels cement.
15 short drills.
3 long "
5 birch brooms.
2 rattan brushes.
9 wooden rammers.
2 grindstones.
3 jack screws.
12 feet 18-inch Scotch pipe.
42 " 15 " " "
15 " 30 " cement pipe.
2 new whitewash brushes.
8 " paint brushes.
1 window brush.
3 telegraph batteries.
2 horses.

1 Concord wagon.
1 covered "
1 safe.
6 stoves.
2 harnesses.
1 rain gauge.
1 set scales.

Property at Lake Cochituate.

1 extension table.
1 parlor table.
18 dining-room chairs.
1 mirror.
1 wash-bowl.
1 map.
1 oil-cloth carpet.
1 straw carpet.
1 cooking range.
1 telegraph battery.
1 horse.
1 single harness.
1 beach wagon.
1 cart.
1 cart harness.
1 express wagon (new).
1 " " (old).
1 sleigh.
1 buffalo robe.
1 pair steelyards.
1 rain gauge.
2 boats.
1 haycutter.
12 picks.
6 shovels.
2 long-handled shovels.

2 spades.
2 iron rakes.
6 iron bars.
1 hand saw.
1 axe.
2 hatchets.
1 spirit level.
1 grindstone.
2 hoes.
6 fang hoes.
1 manure fork.
2 hay forks.
2 hay rakes.
2 scythes.
1 hedge shears.
2 grass hooks.
6 wheelbarrows.
1 gravel screen.
2 stop-plank hooks.
2 ice tongs.
2 stone hammers.
2 whitewash brushes.
4 ox chains.
1 twenty-horse power engine.
2 12-inch pumps.
2 18-inch pumps.
2 twenty-five horse power engines.

At Brookline Reservoir.

3 settees.
1 desk.
3 pails.
2 picks.
3 scuffle hoes.
2 hay rakes.

2 iron rakes.
1 iron bar.
1 broom.
2 towels.
1 scythe.
5 shovels.
1 wheelbarrow.
2 ladders.
1 brush.
1 large stove.

Respectfully submitted.

ALBERT STANWOOD,

Sup't Western Division.

ADDITIONAL SUPPLY. ENGINEER'S REPORT, MAY 1st, 1872.

ENGINEER'S OFFICE, WATER DEPARTMENT,
BOSTON, May 1, 1872.

CHAS. H. ALLEN, Esq.,

President of the Cochituate Water Board:

SIR: Your instructions of the 22d November last (at which date I began my duties as Engineer of your Board) required me to make surveys and prepare plans and estimates for a scheme of works to furnish an additional supply of pure water to the city of Boston.

Although the work required for a full compliance with your orders is not yet completed, it seems proper that now, — the time of your annual report to the City Council, — there should be presented a statement of the progress made.

The first point to be determined was the best *source* of supply, and in deciding upon this, I was instructed to examine all the feasible sources within 50 miles of the city, and to have in view:

First, — The quality or purity of the water.

Second, — The probable growth of the city and its future wants.

Third, — The cost of the requisite works for storing, purifying and conveying the water either to the Chestnut Hill or Brookline reservoir.

Fourth, — The immediate need of a temporary additional supply to avert the threatened deficiency of the coming season.

This last requirement involved the obtaining of an act of

the Legislature during the winter session, authorizing the city to take such additional water, and to build the necessary works for conveying it to the reservoirs, and therefore demanded the selection of a source of supply at an early day.

As the season of the year was unfavorable for field work, the time brief, and the emergency pressing, it was decided to forego the usual preliminary surveys, and to make the selection by the consideration of such data as could be obtained by simple reconnoissance of the grounds and collected from maps, existing surveys, and the testimony of persons acquainted with the various localities.

The following sources have been examined: —

Flax and Sluice ponds, in Lynn.

The Ipswich and Saugus rivers, in Essex Co.

Mystic lake, in Medfield.

Merrimac river, at and below Lowell.

Nagog pond, in Acton and Littleton.

Sudbury river, at and above Framingham.

Assabet river.

Nashua river, in Boylston.

Lake Quinsigamond, in Worcester.

Charles river, at and above Newton.

Neponset river, Dorchester.

Monponset and other ponds in Halifax and Hanson.

Taunton river.

Long, Assawampset and Great and Little Quittacus, in Middleton.

Other sources were considered in connection with the above, but were treated as auxiliary only.

For such sources as were not rejected, either for insufficiency or impurity of supply, approximate estimates of cost of works required in each case for collecting and conveying the water were prepared, which were sufficiently accurate for the object in view.

On February 13th a verbal report was made to your

Board, and it was then decided to ask for a charter granting the right to take water either from the Charles or the Sudbury river, as might thereafter be thought preferable.

The considerations that led to the choice of these two sources will be given in detail in a future report, but may be briefly stated in this.

The works required for the introduction of the water were cheaper for these than for any other sources that would furnish anything like an adequate supply.

Being convenient to the existing works, they offered opportunities for relieving the pressing want of the city for an early addition to the present supply.

The Charles river works could be built at a comparatively small cost, or at least, at a somewhat less cost than the others, and would be situated near to the city, which last condition, while always one of value, is more especially so where, as in this case, pumping is required.

At certain seasons of the year the water in this river has a decidedly objectionable color, that renders it unsuited for many purposes for which its use would be required, but reasons existed for the belief that this color might be destroyed either by exposure to the air in large storing basins, or, as a last resort, by filtration.

The Sudbury river would furnish water of the desired purity, which could be conveyed to the city by gravitation. The relief from pumping thus afforded would, in great part, offset the large cost of works due to greater distance from the city as compared with the Charles river.

The Sudbury works would be in the direct line of further extensions, should they ever be needed, and the conduit can now be built of sufficient capacity to meet the requirements of such extensions, without greatly increasing its cost.

It was thought best to leave the choice between these two sources, until careful surveys and more accurate estimates should be made; but during the hearing before the Legisla-

tive Committee, to which was referred the petition of the city for a charter, a strong opposition to granting authority to Boston to take water from the Charles river (at least without conditions that were considered very objectionable) was made by various towns and proprietors of mills upon this stream, and by request of the committee, and to insure the early passage of the bill the petition was limited to the Sudbury alone.

An act was passed, April 6, authorizing the city to take water from the Sudbury river and Farm pond, in Framingham, and to convey the same into Lake Cochituate, or into any of the city's reservoirs, and at that date you instructed me to begin at once upon the work of turning the waters of the river and pond into the lake.

This work is now progressing, under the direction of Mr. Albert Stanwood, as rapidly as the attending circumstances will admit, and it is expected that it will be so nearly completed by the middle of June that it will then be of use in maintaining the supply to the city.

The Sudbury river — the new source of supply to the city — rises in the town of Westboro', and from thence flows through Southboro', Hopkinton, Framingham and other towns to Concord, where it joins the Assabet. The union of these two rivers forms the Concord, which flows in a northerly direction to Lowell, and there discharges into the Merrimac.

A little over a quarter of a mile to the south of the Sudbury, in the village of South Framingham, lies the body of water known as Farm pond. It has a water surface of nearly 200 acres in area, and empties into the river through an outlet brook which flows in a northwesterly direction.

From the south end of the pond, after crossing the Boston and Albany Railroad, a low swamp extends to the Guinea Meadows, and through these meadows flows the principal tributary to Lake Cochituate, namely, Beaver Dam brook.

In the summer season, the surface of water in the pond stands two to three feet higher than that in the river, but during the fall and spring freshets the river rises sufficiently to reverse the flow in the outlet, which then becomes a feeder to the pond; and in times of great floods the water from the river has been known to pass through the pond, overflow the swamp, and find its way to Lake Cochituate through various ditches and the before-mentioned tributary brook.

It is evident, therefore, that by building a dam of moderate height in the river below the pond outlet, and by cutting a ditch or water-course through the swamp, the river may at all seasons be made to discharge into the lake.

This is the work that is now in progress.

An examination of the accompanying map will show the positions of the river, pond and lake, and the course of the ditch and Beaver Dam brook.

Preparations are being made to build a dam across the river at a point a few hundred feet below the bridge of the Boston and Clinton Railroad (see A on the map). This dam will be constructed entirely of wood. It is to have an overfall of about 120 feet in length and a flume 20 feet wide at its north end. The body of the dam above the foundation will consist of strong frames, set 6 feet apart across the river, with the spaces between filled with stop-planks 4 inches thick. This part is 8 feet high, but can readily be lowered $2\frac{1}{2}$ feet by the removal of the upper stop-planks.

The width of the river in this part of its course rarely exceeds 60 feet, but at times the water overflows its banks from 2 to 4 feet in depth, and the rate of flow is increased to 2,000 cubic feet per second, and upwards. It is in view of this fact that the great length of the dam and its somewhat peculiar construction has been decided upon.

The bed of the river is composed of a layer of gravel and sand from two to three feet thick, underlaid by a deep stratum of fine sand. The building of a dam on such a

foundation is always attended with more or less risk, but a location where the conditions in this respect were more favorable was not discovered.

In preparing the foundation unusual precautions will be taken to prevent the water from reaching the underlying sand, in a manner that will tend to wash it out. The bed of the river will be covered with a floor of closely laid plank for a width up and down stream of about 30 feet, and three rows of sheet piling will be placed or driven across stream, to as great a depth as practicable. The tendency to wash will be further guarded against by earth filling on the up stream side, extending some distance along the river bottom.

It is the usual practice to hold wooden dams in place by loading them with stones and earth, but the design of this is such, that it can be only in part thus secured, and to make good the deficiency in holding power, three rows of round piles will be driven from ten to twelve feet into the bed of the river, to which the plank flooring and upright frames will be securely fastened.

The dam will raise the water in the river sufficiently to cause it to flow into the pond and reverse the current in its outlet brook. This brook requires to be widened and deepened to meet the new conditions; also, to be provided with a dam (to be built at the point marked B on the map,) for the purpose of controlling the level of water in Farm pond.

This dam will have an overfall of 30 feet in length, and be of similar construction to that already described, omitting the round piling. It will be used to prevent freshets from filling the pond to a height that would do damage in South Framingham, and that might cause trouble in regulating the flow through the new water-course leading to the lake.

The swamp to the south of the pond consists of a thick bed of peat and muck, varying in depth from a few feet at the

edges to perhaps 40 feet at the centre, covered with a dense growth of bushes, cedars, and other trees.

The new water-course is to be cut through this swamp for a distance of about 2,000 feet, and here will be in the shape of a ditch varying in depth from five to nine feet, and nine feet wide, with its sides closely planked to prevent caving or falling in.

It is to start from the pond at a point on the western shore a few rods to the north of the Boston and Albany Railroad, where the bottom is gravelly and clean, and from thence will run along the shore of the pond to the railroad, under which it will be conducted in a wooden flume, provided with gates or stop-planks to regulate and control the flow. The piles for supporting the track at this point have been driven and the caps and stringers will soon be in place. This part of the work is done under the direction, and according to the plans, of Mr. Fitz Gerald, Engineer of the Boston and Albany Railroad.

A short distance to the south of the railroad the water-course passes under the Ashland road, and here a wooden culvert will be built. After passing through the swamp it will cross the Milford road in a stone culvert, and the Milford Railroad in a wooden flume. At this point an old ditch is reached, which leads to Beaver Dam brook. This ditch, as well as the brook, for a distance of about $2\frac{1}{2}$ miles, is to be deepened and widened, and where the latter passes under the Sherborn road and a highway in Natick, new stone culverts will be required.

Below the Milford Branch Railroad the work, except the rebuilding of the culverts, is nearly completed; that required to support the track of the railroad is finished, and, as in the case of the Albany road, was done under the direction of Mr. Fitz Gerald.

Some progress has been made on the new ditch in the swamp, but work here cannot proceed much further till a

steam pump is obtained, to lower the water level. This pump will soon be in place.

The water-course, when flowing three feet deep, will pass thirty millions of gallons daily, and with a depth of four feet its capacity is forty-five millions.

When completed, it practically will increase the water-shed of Lake Cochituate from 19 square miles to 90, but only a small part of the benefit to be derived from this increase can be realized until capacious storage basins or reservoirs are built upon the Sudbury river.

A few remarks on this question of storage basins may not be out of place here, although it is intended to give it a more thorough consideration in the report upon a scheme for a *permanent* additional supply.

The drainage area of the Sudbury, above the proposed site for the dam, is, as computed from the State map, 73 square miles. Its slopes are steep and of a character that will insure a quick access to the streams of the rains falling upon them, hence it will be safe to assume that a large percentage of the rainfall will be drained off by the river.

These conditions, while favorable for the collection of a large quantity of water, render the flow of the river very unequal from month to month.

During an average year the flow must be at the rate of fully seventy millions of gallons per day, but it will be very unequally distributed through the year. In March and April it will be at the rate of several hundred millions of gallons daily, while in August and September it usually will not exceed from twelve to fifteen millions, and in a season of light rains may be reduced to even one-half this amount.

It will be seen, therefore, that some means must be provided for holding back the surplus waters of March and April, and other wet months, for use in the summer season. This can only be done by building immense storage basins, or in other words, by forming artificial lakes.

Fortunately in the case of the Sudbury and its tributaries, this can readily be done by constructing dams across the narrow valleys in which they run, and if a capacity to store from one hundred and thirty to one hundred and forty days' supply be given them, the daily flow will be very nearly equalized throughout the year.

Were it practicable to secure a capacity for these basins that would equalize the daily flow, not only for a single year, but also for a series of dry and wet years, then the available daily yield of this river might safely be placed at seventy millions gallons; but as this is not the case, the conditions that exist during a year of drought must be taken as the basis for estimating the supply to be derived.

The rainfall of this district, while averaging about 44 inches per year, is sometimes as low as 30. Of this it is found that under the most unfavorable distribution of the rains, about 12 inches will reach the streams, and may be made available in a water-shed of the character of that of the Sudbury.

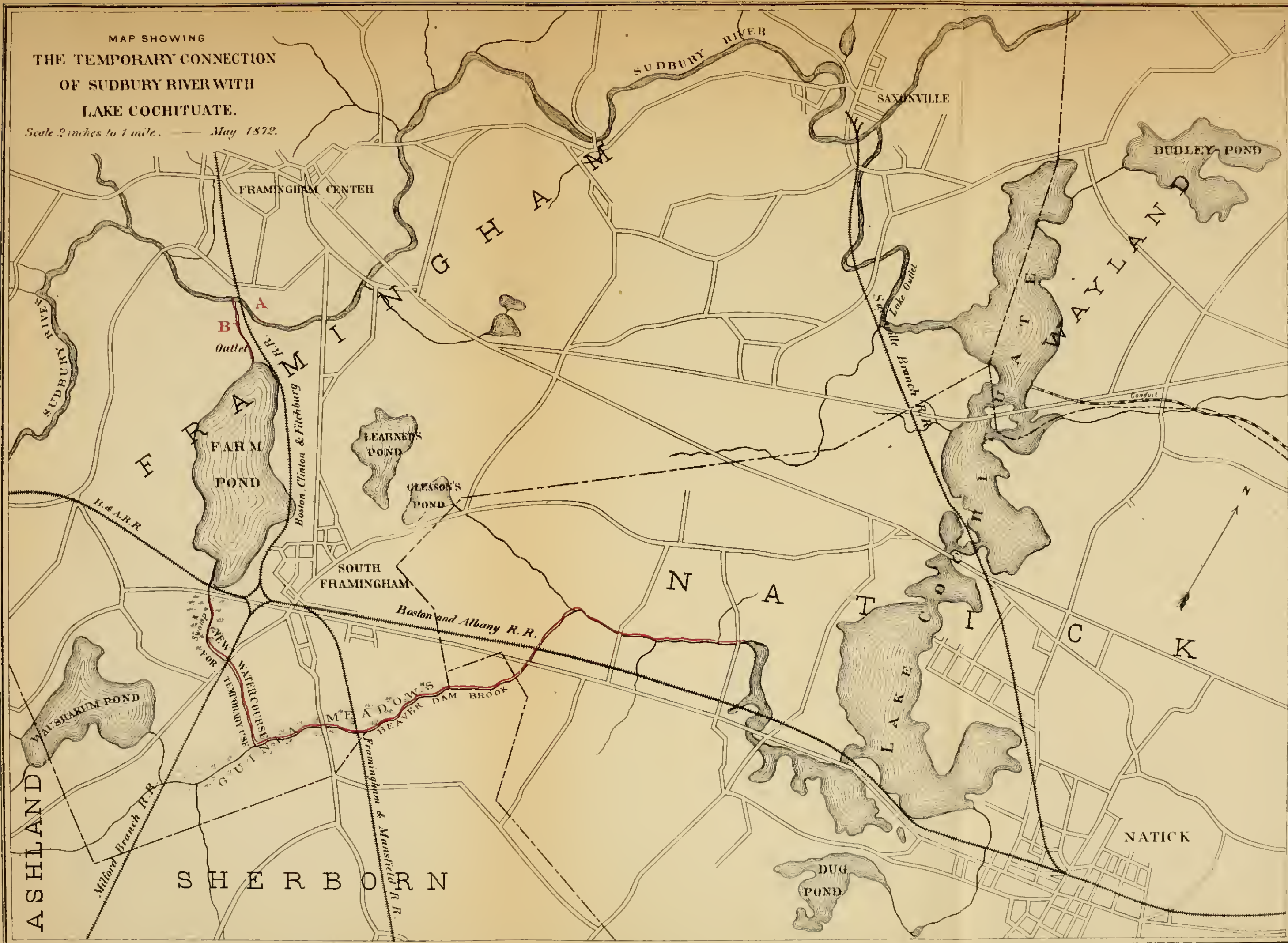
A yearly collection of 12 inches of rain upon 70 square miles of area, gives a daily yield of a little over forty millions of gallons; and it is this quantity only, that should be considered in estimating the value of the Sudbury river as a source of water supply.

Nothing has yet been done towards making the surveys for the permanent additional supply, but a party for that purpose will be organized by the 1st of June.

I am indebted to Mr. Wilbur Learned and party, of the City Engineer's Department, for the surveys and instrumental work that have been required in connection with the work for the temporary supply.

Respectfully submitted.

JOS. P. DAVIS.



MAP SHOWING
THE TEMPORARY CONNECTION
OF SUDBURY RIVER WITH
LAKE COCHITUATE.
Scale 2 inches to 1 mile. — May 1872.
SUDBURY RIVER
SAXONVILLE
FRAMINGHAM CENTER
FRAMINGHAM
DUDLEY POND
WAYLAND
A
B
Outlet
FARM POND
LEARNED'S POND
GLEASON'S POND
Boston, Clinton & Fitchburg R.R.
B. & A. R.R.
Saxonville Branch R.R.
Lake Outlet
Conduit
COCHITUATE
SOUTH FRAMINGHAM
Boston and Albany R.R.
NATICK
LAKE
NEW WATERCOURSE
TEMPORARY USE
FOR
Swamp
BEAVER DAM BROOK
GUINEA MEADOWS
WAUSHAKUM POND
Framingham & Mansfield R.R.
Milford Branch R.R.
ASHLAND
SHERBORN
DUG POND
N

CIVIL ORGANIZATION OF THE WATER WORKS FROM THEIR COMMENCEMENT, TO MAY 1, 1872.

Water Commissioners:

Nathan Hale, James F. Baldwin, Thomas B. Curtis. From May 4, 1846, to January 4, 1850.

Engineers for the Construction.

John B. Jervis, of New York, Consulting Engineer. From May, 1846, to November, 1848.

E. S. Chesbrough, Chief Engineer of the Western Division. From May, 1846, to January 4, 1850.

William S. Whitwell, Chief Engineer of the Eastern Division. From May, 1846, to January 4, 1850.

City Engineers having charge of the Works.

E. S. Chesbrough, Engineer. From November 18, 1850, to October 1, 1855.

George H. Bailey, Assistant Engineer. From January 27, 1851, to July 19, 1852.

H. S. McKean, Assistant Engineer. From July 19, 1852, to October 1, 1855.

James Slade, Engineer. From October 1, 1855, to April 1, 1863.

N. Henry Crafts, Assistant Engineer. From October 1, 1855, to April 1, 1863.

N. Henry Crafts, City Engineer. From April 1, 1863, to the present time.

Thomas W. Davis, Assistant Engineer. From April 1, 1863, to December 8, 1866.

Henry M. Wightman, Resident Engineer at C. H. Reservoir. From Febuary 14, 1866, to the present time.

After January 4, 1850, Messrs. E. S. Chesbrough, W. S. Whitwell, and J. Avery Richards, were elected a Water Board, subject to the direction of a Joint Standing Committee of the City Council, by an ordinance passed December 31, 1849, which was limited to keep in force one year; and in 1851 the Cochituate Water Board was established.

COCHITUATE WATER BOARD.

Presidents of the Board.

Thomas Wetmore, elected in 1851, and resigned April 7, 1856 * * . . . . Five years.

John H. Wilkins, elected in 1856, and resigned June 5, 1860 * * . . . . Four years.

Ebenezer Johnson, elected in 1860, term expired April 3, 1865 . . . . Five years.

Otis Norcross, elected in 1865, and resigned January 15, 1867 . . One year and nine months.

John H. Thorndike, elected in 1867, term expired April 6, 1868 . One year and three months.

Nathaniel J. Bradlee, elected April 6, 1868, and resigned Jan. 4, 1871 . Two years and nine months.

Charles H. Allen, elected from January 4, 1871, to present time.

Members of the Board.

THOMAS WETMORE, 1851, 52, 53, 54 and 55 * *	Five years.
JOHN H. WILKINS, 1851, 52, 53, *56, 57, 58, and 59 * *	Eight years.
HENRY B. ROGERS, 1851, 52, 53, *54 and 55	Five years.
JONATHAN PRESTON, 1851, 52, 53 and 56	Four years.
JAMES W. SEVER, 1851	One year.
SAMUEL A. ELIOT, 1851 * *	
JOHN T. HEARD, 1851	One year.
ADAM W. THAXTER, Jr., 1852, 53, 54 and 55 * *	Four years.
SAMPSON REED, 1852 and 1853	Two years.
EZRA LINCOLN, 1852 * *	One year.
THOMAS SPRAGUE, 1853, 54 and 55	Three years.
SAMUEL HATCH, 1854, 55, 56, 57, 58 and 61	Six years.
CHARLES STODDARD,* 1854, 55, 56 and 57	Four years.
WILLIAM WASHBURN, 1854 and 55	Two years.
TISDALE DRAKE, 1856, 57, 58 and 59 * *	Four years.
THOMAS P. RICH, 1856, 57 and 58	Three years.
JOHN T. DINGLEY, 1856 and 59	Two years.
JOSEPH SMITH, 1856	Two months.
EBENEZER JOHNSON, 1857, 58, 59, 60, 61, 62, 63 and 64	Eight years.
SAMUEL HALL, 1857, 58, 59, 60 and 61 * *	Five years.
GEORGE P. FRENCH, 1859, 69, 61, 62 and 63	Five years.
EBENEZER ATKINS, 1859 * *	One year.
GEORGE DENNIE, 1860, 61, 62, 63, 64 and 65	Six years.
CLEMENT WILLIS, 1860	One year.
G. E. PIERCE, 1860	One year.
JABEZ FREDERICK, 1861, 62 and 63 * *	Three years.
GEORGE HINMAN, 1862 and 63	Two years.
JOHN F. PRAY, 1862	One year.

J. C. J. Brown, 1862	One year.
Jonas Fitch, 1864, 65 and 66	Three years.
Otis Norcross,* 1865 and 66	Two years.
L. Miles Standish, 1860, 61, 63, 64, 65, 66 and 67	Seven years.
John H. Thorndike, 1864, 65, 66 and 67	Four years.
Charles R. McLean, 1867	One year.
Benjamin F. Stevens, 1866, 67 and 68	Three years.
William S. Hills, 1867	One year.
Charles R. Train, 1868	One year.
Joseph M. Wightman, 1868 and 69	Two years.
Benjamin James,* 1858, 68 and 69	Three years.
Francis A. Osborn, 1869	One year.
Walter E. Hawes, 1870	One year.
John O. Poor, 1870	One year.
Hollis R. Gray, 1870	One year.
Nathaniel J. Bradlee, 1863, 64, 65, 66, 67, 68, 69, 70, 71	Nine years.
George Lewis, 1868, 69, 70, 71	Four years.
Sidney Squires, 1871	One year.
Charles H. Allen, 1869, 70, 71, 72	*Present Board.*
Alexander Wadsworth,* 1864, 65, 66, 67, 68, 69, 72	
John A. Haven, 1870, 71, 72	
Edward A. White, 1872	
Leonard R. Cutter, 1871, 72	
Amos L. Noyes, 1871, 72	
Charles H. Hersey, 1872	

* Mr. John H. Wilkins resigned Nov. 15, 1854, and Charles Stoddard was elected to fill the vacancy. Mr. Henry B. Rogers resigned Oct. 22, 1865. Mr. Wilkins was re-elected Feb., 1856, and chosen President of the Board, which office he held until his resignation on June 5, 1860, when Mr. Ebenezer Johnson was elected President, and on July 2, Mr. Miles Standish was elected to fill the vacancy occasioned by the resignation of Mr. Wilkins. Otis Norcross resigned Jan. 15, 1867, having been elected Mayor of the city. Benjamin James served one year, in 1858, and was re-elected in 1868. Alexander Wadsworth served six years, 1864–69, and was re-elected in 1872.

* * Deceased.

COCHITUATE WATER BOARD, 1872.

Charles H. Allen, President.

Leonard R. Cutter, of the Board of Aldermen.

Amos L. Noyes,
Chas. H. Hersey, } Of the Common Council.

AT LARGE.

For One Year.	For Two Years.
Charles H. Allen,	John A. Haven,
Alexander Wadsworth.	Edward A. White.

Clerk.
Joseph A. Wiggin.

Assistant Clerk and Clerk of Committees.
Samuel N. Dyer.

Superintendent of the Eastern Division.
Ezekiel R. Jones.

Superintendent of the Western Division.
Albert Stanwood.

Water Registrar.
William F. Davis.

City Engineer.
N. Henry Crafts.

Engineer on New Supply.
Joseph P. Davis.

STANDING COMMITTEES OF THE BOARD.

Eastern Division.

JOHN A. HAVEN, Chairman.
CHAS. H. HERSEY, EDWARD A. WHITE.

Western Division.

ALEXANDER WADSWORTH, Chairman.
LEONARD R. CUTTER, AMOS L. NOYES.

Water Registrar's Department.

EDWARD A. WHITE, Chairman.
CHAS. H. HERSEY, CHAS. H. ALLEN.

On Chestnut Hill Reservoir.

LEONARD R. CUTTER, Chairman.
AMOS L. NOYES, JOHN A. HAVEN.

On New Supply.

CHAS. H. ALLEN, Chairman.
JOHN A. HAVEN, ALEXANDER WADSWORTH.

LEGISLATIVE ACT.

[Chap. 177.]

An Act to authorize the City of Boston to obtain an additional Supply of Pure Water.

Be it enacted, &c., as follows: —

Sect. 1. The City of Boston is hereby authorized, by and through the agency of the Cochituate Water Board, to take, hold, and convey to, into and through said city, all the water of Sudbury River, so called, said water to be taken at any point or points within the town of Framingham, or higher up on said river, and the water of Farm Pond, so called, in said town of Framingham, and the waters which may flow into and from said river and pond, and to take any water rights in or upon said river or pond, in or above the town of Framingham, or connected therewith.

Said city may also take and hold, by purchase or otherwise, in connection with the said sources of supply, any lands and real estate necessary for increasing or preserving the purity of the water, or for laying, building and maintaining aqueducts, water-courses, reservoirs, dams, buildings, machinery and other structures and appliances, with their accessories, for conducting, elevating, purifying, storing, discharging, disposing of and distributing water; and may also take and hold any land, excepting any in the town of Framingham heretofore taken or purchased by any railroad company, on the margin of said sources of supply, not exceeding five rods in width from the high-water line of said river, storage, reservoirs or pond, so far as may be necessary in the opinion of said Cochituate Water Board, for the preservation and purity of the same, for the purpose of furnishing a supply of pure water for the City of Boston.

Sect. 2. For the purposes of this act, the said city may make and build one or more permanent aqueducts from the aforesaid water sources to Chestnut Hill reservoir, so called, or to any other reservoir owned by said city, and secure and maintain the same by

any works suitable therefor; may connect the said water sources with Lake Cochituate; may erect and maintain dams, or may increase the height of, and strengthen and maintain existing dams to raise the water above the same, or to form storage reservoirs; may make and maintain reservoirs within and without said city; may erect and maintain buildings and machinery for elevating the water, and lay down pipes for conducting the same; may build and maintain filters, or other means of purifying the water. And the said city may, for the purposes aforesaid, carry and conduct any aqueduct, or other work, by it to be made and constructed, under or over any water-course, or any street, turnpike road, railroad, highway or other way, in such manner as not to unnecessarily obstruct or impede travel thereon; and may enter upon and dig up any such road, street or way, for the purpose of laying down pipes beneath the surface thereof, and for maintaining and repairing the same; and, in general, may do any other acts and things necessary or convenient and proper for the purposes of this act.

Said City of Boston, in entering upon and digging up any such road, street or way of public travel, shall be subject to such reasonable regulations as shall be made by the selectmen of the towns wherein such work shall be performed, for the protection of their rights of drainage and sewerage therein.

Sect. 3. The City of Boston is hereby further authorized, by and through the agency of said Cochituate Water Board, if said Board shall deem expedient, to store and distribute water for maintaining and equalizing the flow of water in the river selected by said city as its source of supply, or in the rivers into which said river may discharge, and for this purpose said city may take and hold such land and real estate as may be necessary for building and maintaining dams, reservoirs or other structures and appliances for storing and discharging water. And the said city may, through the same agency, make and build such dams, reservoirs and other structures and appliances, at any point or points upon the Sudbury River, and upon any and all streams flowing into the same.

Sect. 4. Nothing contained in this act shall be so construed as to authorize the City of Boston to reduce the water in Sudbury River below a sufficient height to maintain at all times a running stream therein, which shall flow at least one and one-half million

gallons a day for each and every day in the year, or to draw from Farm Pond or Sudbury River into Lake Cochituate when the water runs over the dam at Lake Cochituate, or to prevent the inhabitants of the towns of Framingham, Ashland, Southborough, Hudson and Westborough from taking from the Sudbury or Assabet Rivers or Farm Pond so much of the water hereby granted as shall be necessary for extinguishing fires, and for all ordinary domestic and household purposes, and for the generation of steam, or from cutting and carrying away ice from said pond, or as to prevent the Boston and Albany Railroad Company, or the Mansfield and Framingham Railroad Company, or the Boston, Clinton and Fitchburg Railroad Company from taking water from Farm Pond, for use in locomotive or other engines, or for other railroad purposes, under such regulations of the City Council of the City of Boston as may be essential for the preservation of the purity of the same.

Sect. 5. The City of Boston shall be liable to pay all damages that shall be sustained by any persons in their property, by the taking of or injury to any land, real estate, water or water rights, or by the flowage of the lands of any persons, or by the interference with or injury to any use or enjoyment of the water of said river to which any person, at the time of such taking, is legally entitled, or by any other doings under this act; and in regard to such taking, injury, interference and flowage, and the ascertainment and payment of all such damages, the said City of Boston, and all persons claiming damages, shall have all the rights, immunities and remedies, and be subject to all the duties, liabilities and regulations which are provided in the one hundred and sixty-seventh chapter of the Acts of the year eighteen hundred and forty-six, and the three hundred and sixteenth chapter of the Acts of the year eighteen hundred and fifty.

Sect. 6. Whenever the City of Boston shall dig up any street or way, as aforesaid, it shall restore the same in as good order and condition as the same shall be in when such digging commenced; and the City of Boston shall, at all times, indemnify and save harmless the several towns within which such street or way may be, against all damages which may be recovered against them respectively, and shall reimburse to them all expenses which they shall incur by reason of any defect or want of repair in any street

or way caused by the construction of any of said works, or laying of said pipes, or by the maintaining or repairing the same: *provided*, that said city shall have due and reasonable notice of all claims for such damages or injury, and opportunity to make a legal defence thereto.

Sect. 7. If any person or persons shall wantonly or maliciously divert the water, or any part thereof, of any of the rivers, ponds, streams or water sources, which shall be taken by the city, pursuant to the provisions of this act, or shall corrupt the same, or render it impure, or destroy or injure any dam, aqueduct, pipe, conduit, hydrant, machinery or other property held, owned or used by the said city, by the authority and for the purposes of this act, every such person or persons shall forfeit and pay to the said city three times the amount of the damages that shall be assessed therefor, to be recovered by any proper action. And every such person or persons may, moreover, on indictment and conviction of either of the wanton and malicious acts aforesaid, be punished by fine not exceeding one thousand dollars, and imprisonment not exceeding one year, or by confinement to hard labor in the state prison for a term not exceeding ten years.

Sect. 8. The City of Boston is authorized, if said city shall deem it expedient so to do, to supply the towns of Framingham, Newton, West Roxbury, Brighton and Brookline, or either of them, with water, in such quantities, under such conditions, and upon such terms as may be agreed upon between said city and said towns, or either of them; and such towns shall respectively have power to distribute the water so supplied among the inhabitants of said towns.

Sect. 9. The Commonwealth may take and convey water from said Sudbury River, or any of the reservoirs to be constructed by said city, to and for the use of the State Normal School buildings, in said town of Framingham.

Sect. 10. This act shall take effect upon its passage. [*Approved April* 5, 1872.]

BOSTON PUBLIC LIBRARY.

CENTRAL LIBRARY.

ABBREVIATED REGULATIONS.

One volume can be had at a time, in home use, from the Lower Hall, and one from the Bates Hall, and this volume must always be returned with the applicant's library card, within such hours as the rules prescribe. No book can be taken from the Lower Hall of this Library, while the applicant has one from any Branch.

Books can be kept out 14 days, but may be renewed *within* that time, by presenting a new slip with the card; after 14 days a fine of *two* cents for *each* day is incurred, and after 21 days the book will be sent for at the borrower's cost, who cannot take another book until all charges are paid.

No book is to be lent out of the household of the borrower; nor is it to be kept by transfers in one household more than one month, and it must remain in the Library one week before it can be again drawn in the same household.

The Library hours for the delivery and return of books are from 9 o'clock, A. M., to 8 o'clock, P. M., in the *Lower Hall;* and from 9 o'clock, A. M., until 6 o'clock, P. M., from October to March, and until 7 o'clock, from April to September, in the *Bates Hall.*

Borrowers finding this book mutilated or unwarrantably defaced, are expected to report it; and also any undue delay in the delivery of books.

***No claim can be established because of the failure of any Library notice to reach, through the mail, the person addressed.

[50,000, Nov., 1870.]