

CHAPTER IX.
TABLES OF COST.

THROUGH the courtesy of Mr. Dexter Brackett, C. E., Superintendent Eastern Division of Boston Water-Works, I am able to present detailed dimensions of the cast-iron water-pipes used in that city, together with a table showing the cost of pipe-laying under Boston's methods and conditions :

Weights and Dimensions of Cast-Iron Water-Pipes, Boston Water-Works.

Diameter, in.	Class.	DIMENSIONS IN INCHES.						Total length.		Total weight of pipes.	Weight per running foot laid.
		a	b	c	d	t	l	Feet.	Inch.	Lbs.	Lbs.
4	B	1.50	1.30	0.65	4.0	0.45	0.40	12	4	260	21.7
6	B	1.50	1.40	0.70	4.0	0.50	0.40	12	4	418	34.8
8	B	1.50	1.50	0.75	4.0	0.55	0.40	12	4	601	50.1
10	B	1.50	1.60	0.80	4.5	0.60	0.40	12	4½	815	67.9
12	A	1.50	1.60	0.80	4.5	0.58	0.40	12	4½	935	77.9
12	B	1.50	1.70	0.85	4.5	0.65	0.40	12	4½	1,050	87.5
16	A	1.75	1.70	0.85	5.0	0.66	0.50	12	5	1,413	117.7
16	B	1.75	1.90	0.95	5.0	0.75	0.50	12	5	1,615	134.6
20	A	1.75	1.90	0.95	5.0	0.73	0.50	12	5	1,945	162.1
20	B	1.75	1.90	0.95	5.0	0.85	0.50	12	5	2,252	187.7
24	A	2.00	2.10	1.05	5.0	0.81	0.50	12	5	2,583	215.7
24	B	2.00	2.10	1.05	5.0	0.94	0.50	12	5	2,985	248.8
30	A	2.00	2.30	1.15	5.0	0.93	0.50	12	5	3,690	307.5
30	B	2.00	2.30	1.15	5.0	1.10	0.50	12	5	4,336	361.3
36	A	2.00	2.50	1.25	5.0	1.04	0.50	12	5	4,929	410.7
36	B	2.00	2.50	1.25	5.0	1.25	0.50	12	5	5,882	490.2
40	A	2.00	2.70	1.35	5.0	1.12	0.50	12	5	5,897	491.4
40	B	2.00	2.70	1.35	5.0	1.35	0.50	12	5	7,055	587.9
48		2.00	2.70	1.35	4.0	1.00	0.50	12	4	6,266	522.1
48		2.00	3.00	1.50	5.5	1.25	0.50	12	5½	7,917	659.7
60		2.25	3.40	1.70	6.0	1.375	0.50	12	6	10,959	913.2

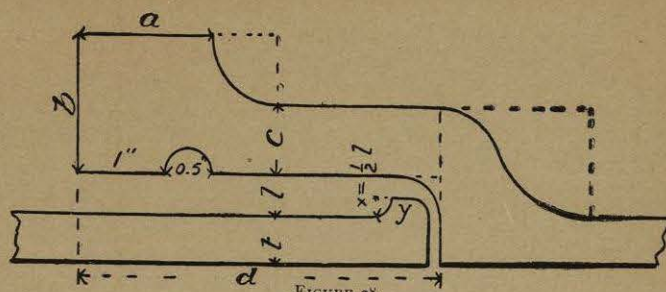


FIGURE 28.
y = for 4-inch, 6-inch and 8-inch pipes 0.6 inch.
" 10 inch and 12-inch " 0.8 "
" larger sizes " 0.85 "

"The pipe-joints are composed of hemp gasket and lead the lead being about 2½ inches in depth and thoroughly calked. The quantity of lead required for different sizes of pipe can be expressed by the formula $l = 2d$, in which $l =$ pounds of lead per joint, and $d =$ diameter of pipe in inches, and as the pipes are usually twelve feet in length, the quantity of lead required per lineal foot of pipe equals one-sixth of the diameter of the pipe in inches."

The average cost per lineal foot of water-pipe laid in Boston is shown in the table on page 92.

The centre of pipe is laid five feet below surface of ground. Labor at \$2 per day. Pipe, 1½ cents per pound. Special castings, 3 cents; lead, 5 cents per pound. Cost of rock excavation, \$3.50 to \$5.50 per cubic yard, measured to neat lines.

By permission of Mr. Eliot C. Clarke, C.E., we are able to present the following useful tables of cost of excavation and brick-work. These tables, with others, were calculated especially for sewer-work, but apply, of course, to water-conduits as well, and the compilation of them was made for use during

surveys made for the Massachusetts Drainage Commission in 1885:

Cost of Handling Water per 100 Linear Feet of Trench.

	5 feet Deep.	10 feet Deep.	15 feet Deep.	20 feet Deep.	25 feet Deep.
SLIGHTLY WET—Hand-pump.....	\$6 00	\$7 00	\$9 50	\$12 00	\$18 00
QUITE WET—One steam-pump; one line 8-inch pipe at 20c. per foot; wells every 500 feet; moving engine, etc., every 500 feet; rent of pump and engine, \$3 per day; one engineer, \$2 50 per day; fuel..	71 50	73 50	76 50	103 45	127 45
VERY WET—Two steam pumps; 12-inch pipe at 36c. per foot; wells every 250 feet; two engines; three engineers; fuel.....	117 00	119 00	126 00	164 00	226 00

Average Cost per Lineal Foot of Water Pipe Laid in Boston.

Diameter of Pipe, Inches.	Thickness, Inches.	Weight, Pounds.	Lead used, Pounds.	Cost of Pipe and Specials.	Lead Gasket and Blocking	Teaming.	Labor, Trenching, and Laying.	Total Cost.
4	0.45	21.7	0.70	\$0 38	\$0 05	\$0 02	\$0 25	\$0 70
6	0.50	35.	1.00	57	6	3	27	93
8	0.55	50.	1.35	83	8	5	30	1 26
10	0.60	68.	1.70	1 10	10	6	34	1 60
12	0.58-.65	78-88	2.00	1 27-1 42	13	7	37	1 84-1 99
16	0.66-.75	118-135	2.70	1 87-2 12	17	8	45	2 57-2 82
20	0.73-.85	162-188	3.35	2 55-2 94	21	9	55	3 40-3 79
24	0.81-.94	216-250	4.00	3 44-3 95	25	10	68	4 47-4 98
30	0 93	308	5.00	4 92	29	11	80	6 12
36	1.04	410	6.00	6 58	34	12	1 00	8 04
40	1.12	490	6.70	7 80	40	15	1 30	9 65
48	1.25	660	8.00	10 40	48	20	1 75	12 83

TABLE SHOWING THE COST OF CLOSE SHEETING PER 100 LINEAR FEET OF TRENCH.

Includes lumber, bracing, driving, and plank-pulling. Lumber used four times.

WIDTH OF TRENCH.	DEPTH OF TRENCH.											
	6 feet.	8 feet.	10 feet.	12 feet.	14 feet.	16 feet.	18 feet.	20 feet.	22 feet.	24 feet.		
3 feet.....	\$45 67	\$55 65	\$65 61	\$74 10	\$83 10	\$98 10	\$119 50	\$146 13	\$155 81	\$165 50		
4 ".....	45 80	55 80	65 82	74 75	83 40	98 60	120 25	146 53	156 23	165 95		
5 ".....	45 93	56 10	66 20	74 95	83 75	99 10	121 05	147 19	156 79	166 50		
6 ".....	46 06	56 35	66 60	75 35	84 12	99 60	121 85	147 85	157 40	166 95		
7 ".....	46 19	56 60	67 00	75 95	84 50	99 90	122 40	148 51	158 01	167 50		
8 ".....	46 32	56 85	67 40	76 50	85 00	100 25	122 75	149 17	158 77	168 40		
9 ".....	46 45	57 12	67 80	77 10	85 52	100 60	123 40	149 83	159 80	169 75		
10 ".....	46 58	57 40	68 20	77 55	86 05	101 15	124 10	150 49	160 25	170 75		
11 ".....	46 75	57 75	68 75	77 95	86 60	101 65	124 80	151 25	160 80	171 85		
12 ".....	47 10	58 20	69 30	78 20	87 10	102 25	125 50	152 00	162 60	173 20		

In a letter to the writer Mr. Clarke says: "It should be understood that they (the foregoing tables) were made for a special purpose and are of limited applicability. Roughly approximate results were all we needed. Tables were based on then (1885) existing Boston prices for materials and labor, and average conditions affecting work." With this guiding statement the tables may be safely used in making preliminary estimates.

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Some details of water-works

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