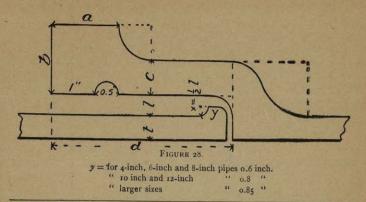
# CHAPTER IX.

## TABLES OF COST.

THROUGH the courtesy of Mr. Dexter Brackett, C. F., Superintendent Eastern Division of Boston Water-Works, I am able to present detailed dimensions of the castiron 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.

eter, in.	Class.	DIMENSIONS IN INCHES.						Total length.		Total weight of pipes.	Weight per running foot laid.
Diameter,		a	ъ	c	d	t	Z	Feet.	Inch.	Lbs.	Lbs.
4	В	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
468	B	1.50	1.50	0.75	4.0	0.55	0.40	12	4.	601	50.1
TO	В	1.50	1.60	0.80	4.5	c.60	0.40	12	4/2	815	67.9
12	A	1.50	1.60	0.80	4.5	0.58	0.40	12	41/2	935	77-9
12	В.	1.50	1.70	0.85	4.5	0.65	0.40	12	41/2	1.050	87.5
16	A	1.75	1.70	0.85	5 4	0.66	0.50	12	5	1,413	117.7
16	В	1.75	1.90	0.95	5.0	0.75	C.50	12	5	1,615	134.6
20	A	1.75	1.90	0.95	5.0	0.73	C.50	12	5	1,945	
20	В	1.75	1.90	0.95	5.0	c.85	0.50	12	5	2,252	187.7
24	A	2.00	2.10	I -5	5.0	C.81	0.50	12	5	2,583	215.7
24	В	2.00	2.10	1.05	5.0	0.94	0.50	12	5	2,985	248.8
30	A	2.00	2.30	::.15	5.0	0.93	0.50	12	5	3,690	307.5
30	В	2.00	2.30	1.15	5.0	I.IO	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 5.882	410.7
36 35	B	2.00	2.50	1.25	5.0	1.25	0.50	12	55555555555	5,897	490.2
40	A	2.00	2.70	1.35	5.0	1 12	0.50	12			587.9
40	В	2.00	2.70	1.35	5.0	1.35	0.50	12	5	7.055 6,266	507.9
48		2.00	2.70	I.35	0.0	1.00	0.50	12		7,917	659.7
48		2.00	3.00	1.50	5.5	1.25	0.50	12	51/2		913.2
60	1 8	2.25	3.40	1.70	6.0	1.375	0.50	12	0	10,959	913.2



"The pipe-joints are composed of hemp gasket and lead the lead being about  $2\frac{1}{2}$  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

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159 80

168 40

167 50 166 95 166 50 165 95

157 40 156 79 156 23

124 124

151 150 49

160 160

173 20 171 85 170 75 169 75

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

surveys made for the Massachusetts Drainage Commission in 1885:

### Cost of Handling Water per 100 Linear Feet of Trench.

	5 feet Deep.	no feet Deep,	15 feet Deep.	20 feet Deep.	25 feet Deep.
SLIGHTLY WET-Hand-pump	\$6 oo	\$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 perday; fuel	<b>71</b> 50	<b>7</b> 3 50	76 <u>5</u> 0	103 45	127 45
VERY WET—Two steam pumps; 12-inch pipe at 36c. per foot; wellsevery 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	\$o 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	0.5865	78-38	2.00	1 27-1 42	13	7	37	1 84-1 99
16	0.6675	118-135	2.70	1 87-2 12	17	8	45	2 57-2 82
20	0.7385	162-188	3-35	2 55-2 94	21	9	55	3 40-3 79
24	0.8194	216-250	4.00	3 44-3 95	25	Io	68	4 47-4 98
30	0 93	308	5.00	4 92	29	11	80	f. 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

#### WIDTH OF TRENCH. Includes lumber, bracing, driving, and plank pulling. Lumber used four times. 46 45 46 32 46 19 46 58 46 06 45 93 45 feet. 67 56 85 56 35 57 57 56 56 12 65 80 IO \$65 67 68 67 67 66 66 65 feet. 60 82 19 40 12 \$74 76 75 75 77 77 78 77 74 74 feet. 95 35 95 50 75 IO DEPTH OF TRENCH. 14 feet. 84 12 85 84 50 83 75 83 40 IO 16 OOI 100 99 99 99 10 98 feet. 90 60 60 10 \$119 50 18 121 05 123 40 122 121 120 25 122 feet. 85 75 40 \$146 13 20 fcet. 149 83 147 85 147 19 149 17 148 51 146 53 22

\$165

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TABLE SHOWING COST OF BRICK MASONRY IN EGG SHAPED CONDUITS PER 100 LINEAR FEET.

94

	DIME	NSIONS OF	DIMENSIONS OF CONDUIT.		3 feet x z feet.	3 feet X 2 feet.	, x, 4	, x x y	+×.º	****	, ×, w
		Thickness.	less.		4-inch.	8-inch.	4-inch.	8-inch.	4-inch.	8-inch.	8-inch.
Number	of bricks	at 25 i	n each cu	Number of bricks at 25 in each cubic foot	7,317	16,706	8,559	18,893	629'6	20,459	23.320
Barrels c	ement-	-I ceme	nt; I san	Barrels cement—I cement; I sand	15.45	35.27	18.07	39.89	20.44	43.19	49.15
2	:		11/2	11/2 "	12.74	29.09	14.90	32.90	16.85	35.62	40.54
	*	, 1		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	10.84	24.75	12.68	27.99	14.35	30.31	34.49
Cubic yar	n jo sp.	nasonry		Cubic yards of masonry	10.84	24.75	12 68	27.99	14.34	30.31	34.49
Cost of m	tasonry	at \$10	oo per cut	Cost of masonry at \$10 00 per cubic yard \$108 40 \$247 50 \$126 80 \$279 90 \$143 40 \$303 10	\$108 40	\$247 50	\$126 80	\$279 90	\$143 40	\$303 10	\$344 90
	*	12 50	50		135 50	309 38	158 50	349 86	179 25	179 25 378 88	431 13
	*	15	00		162 62	371 25		190 20 419 85		215 10 454 65	517 35

Manholes, average about \$3.50 for each foot in height. Iron covers and frames cost about \$10 per set. Wrought-iron steps about 40 cents each.

Cost at \$10 00 per cubic yard..... Cubic yards of masonry..... Barrels of cement-1: 1..... Number of bricks.... 12 50 DIAMETER OF CONDUIT. 15 00 Thickness. I: 2..... 1:11/2..... ..... \$398 70 54-INCH. 598 05 498 37 39.87 39.87 8-Inch. 46.86 56.82 26,812 \$439 60 60-INCH. 659 40 43.96 549 50 43.96 51.67 62.65 8-Inch. 29,673 \$554 10 \$814 50 8-Inch. 72-INCH. 692 62 1,018 13 55.41 831 15 1,221 75 55.41 65.12 78.96 37,402 72-INCH. 84-INCH. 116.1 12-Inch. 81.45 81.45 95.73 54 979 \$594 71 59.47 892 05 1,396 20 1,483 50 1,800 90 743 37 1,163 50 1,236 25 8-Inch. 59.47 69.89 84.75 40,142 \$930 80 84-INCH. 109.4 132.6 93.08 93.08 12 Inch. 62,829 \$989 00 \$1,200 60 140.I 116.2 90-INCH 98.90 98.90 12-Inch. 66,758 1,500 75 141.1 120.06 108-INCH. 12 Inch

TABLE SHOWING THE COST OF BRICK MASONRY IN CIRCULAR CONDUITS PER 100 LINEAR FEET.

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.

# CAPILLA ALFONSINA U. A. N. L.

Esta publicación deberá ser devuelta antes de la última fecha abajo indicada.

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AUTOR

BILLINGS, William R.

Some details of water-works

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