

District Steam Supply.

HEATING BUILDINGS BY STEAM,

FROM

A CENTRAL SOURCE.

BY

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The following Report of Mr. Birdsill Holly was published at Lockport on May 18th, 1878 :

" During the past winter, an equivalent of 65 houses, * on nearly three miles of underground pipe, have been heated, and an accurate record has been kept from day to day of the amount of coal consumed.

" From well-understood facts, and from tests actually made to ascertain the amount of condensation in the houses, also 12 hour tests upon the main line with all the houses shut off, it is demonstrated what amount of condensation is due to the buildings, and how much to the pipe underground.

" The details for cost of constructing works, and the cost of fuel are applicable to this city, and will be varied somewhat, according to location and circumstances.

" The following tables show the cost of heating by this system, and the comparisons made with other systems of heating will, upon perusal, speak for themselves.

* NOTE.—12,000 cubic feet of space being taken as an average for dwelling-houses in Lockport.

(For convenience both American and Sterling costs are given, the Dollar being taken equal to 4s. 1½d. or Exchange at 9½ per cent. Premium.)

J. H. B.

ESTIMATED COST OF CONSTRUCTION AND OPERATION FOR
A DISTRICT OF 400 DWELLINGS ON TWO MILES OF
STREET-MAINS, HEATING THE SAME FOR 240 DAYS,
FROM SEPT. 15TH TO MAY 15TH.

Construction of Works.

	\$	£	s.	d.
Boiler house and chimney stack.....	6,000 00	1,232	17	6½
Six Loilers, 5 x 16 feet, set, with feed water heaters.....	12,000 00	2,465	15	1
Two miles mains, average 3 inch, at \$1.40 (5s. 9d.) per ft.....	14,784 00	3,037	16	2
Superintendence and incidentals.....	1,216 00	249	17	3
Total.....	<u>\$34,000 00</u>	<u>£6,986</u>	<u>6</u>	<u>0½</u>

Operating Expenses for 240 Days.

	\$	£	s.	d.
2,000 tons of coal, at \$4.00 (16s. 5¼d.)....	8,000 00	1,643	16	8½
Two fireman and extra labor.....	800 00	164	7	8
Repairs and depreciation.....	800 00	164	7	8
Office expenses.....	1,500 00	308	4	4½
Taxes.....	400 00	82	3	10
Water bill.....	100 00	20	10	11½
Dividend of 20 per cent. on \$34,000.....	6,800 00	1,397	5	2½
Total.....	\$18,400 00	£3,780	16	5
400 Consumers at \$46.00 = £9 9s. 0½d. =	\$18,400 00	£3,780	16	5

COST OF A DISTRICT EQUIVALENT TO 1,000 DWELLINGS, PARTLY COMPOSED OF BUSINESS BLOCKS AND PUBLIC BUILDINGS.

Construction of Works.

	\$	£	s.	d.
Boiler house and chimney stack.....	8,000 00	1,643	16	8½
Twelve boilers, 5 x 16 feet, set, with feed water heaters.....	24,000 00	4,931	10	5
Four miles of mains, average 3 inch, at \$1.40 = (5s. 9d.) per foot.....	29,568 00	6,075	12	7½
Superintendence and incidentals.....	2,432 00	499	14	6
Total.....	\$64,000 00	£13,150	14	2

Yearly Expenses, Heating, 240 Days.

	\$	£	s.	d.
5,000 tons of coal at \$4.00 (= 16s. 5¼d.) per ton.....	20,000 00	4,109	11	9½
Fireman and extra labor.....	2,000 00	410	19	2½
Repairs and depreciation, and sinking fund.....	2,000 00	410	19	2½
Office expenses.....	1,500 00	308	4	4½
Taxes.....	1,200 00	246	11	6
Water bill.....	300 00	61	12	10½
Dividend of 20 per cent. on \$64,000.....	12,800 00	2,630	2	9
Total.....	\$39,800 00	£8,178	1	8½
1,000 Consumers at \$39.80 = £8 3s. 6½d. =	\$39,800 00	£8,178	1	8½

STATEMENT OF COST.

INDIVIDUAL FURNACE SYSTEM.

One Furnace will Cost \$275 = £56 10s. 1d.

	\$	£	s.	d.
One consumer will use 10 tons, at \$5.00.....	50 00	10	5	5¾
Depreciation and repairs 10 per cent. on \$275..	27 50	5	13	0¾
Five cents = 2½d. per day for attendance	12 00	2	9	3¾
Interest, 7 per cent., on investment, \$275.....	19 25	3	19	1¾
Unreduced insurance.....	5 00	1	0	6½
Total.....	<u>813 75</u>	<u>£23</u>	<u>7</u>	<u>5½</u>

INDIVIDUAL STEAM SYSTEM.

One Boiler and Fixtures will Cost \$800 = £164 7s. 8d.

Running Expenses.

	\$	£	s.	d.
Twelve tons of coal, at \$5.00	60 00	12	6	7
Depreciation and repairs 5 per cent. on \$800....	40 00	8	4	4½
Fifteen cents = 7½d. per day for attendance	36 00	7	7	11¾
Seven per cent. interest on investment	56 00	11	10	1¾
Unreduced insurance.....	5 00	1	0	6½
Total.....	<u>817 00</u>	<u>£40</u>	<u>9</u>	<u>7</u>

District System with 400 Consumers.

	\$	£	s.	d.
Seven per cent. interest on cost of fixtures = \$200 = £41 1s. 11d.	14 00	2	17	6½
Two per cent. depreciation and repairs.....	4 00	16	5¾	
Heat bills, for steam supplied.....	46 00	9	9	0½
Total.....	<u>864 00</u>	<u>13</u>	<u>3</u>	<u>0¾</u>

District System with 1,000 Consumers.

	\$	£	s.	d.
Seven per cent. interest on cost of fixtures = \$200	14 00	2	17	6½
Two per cent. depreciation and repairs.....	4 00	16	5¾	
Heat bills, for steam supplied.....	39 80	8	3	6½
Total.....	<u>857 80</u>	<u>11</u>	<u>17</u>	<u>6¾</u>

Comparison of Cost.

	\$	£	s.	d.
Individual Furnace system	113 75	23	7	5½
Individual Steam system.....	197 00	40	9	7
District system with 400 consumers.....	64 00	13	3	0¾
District system with 1,000 consumers.....	57 80	11	17	6¾

This result has not as yet been realized in actual practice, but none of the systems have had so large a number of consumers on so short a main.

DEVELOPMENTS AND CAUSES OF FAILURE.

The winter's experiment, at Lockport, in 1877-78, having proved the practicability of the system, and the consumers being so well satisfied, several other towns at once took the matter up, and had systems in operation for the following winter. The first meters did not work well, and the only way of charging for heat was by bargain, based upon the previous coal bills of the consumer. The companies suffered severely in these bargains, but the greatest loss was caused by having long lines of main, with only a few consumers drawing steam,—the loss by condensation being then very great. In many cases the trenches were not properly drained; and the system was adopted before sufficient time had been given to perfect all details. The result of all this being the failure of several of the companies.

DUPLEX SYSTEM AT LYNN, MASS.

At Lynn, Mass., a duplex system was put in, for first supplying high pressure steam, through one main, to drive large mill engines—these engines, exhausting into a low pressure main, from which steam was supplied for heating, &c. The idea being to utilize the power first and leave sufficient pressure for heating purposes.

The boiler house here was situated on very low land, which was subject to inundation, during extreme high tides; the consequence being, that near the boiler house the steam mains were sometimes under water, and as few of the streets in Lynn are sewered, the ground was constantly damp in many of them, and a very large amount of condensation took place. The steam supply was discontinued, and the works sold and utilized for other purposes, although the steam works were fully paying expenses at the time of selling out.