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The Manual

OF

American Water-Works

COMPILED FROM SPECIAL RETURNS.

Containing the History, Distribution, Consumption, Revenue and Expenses, Cost, Debt and Sinking Fund, etc., etc., of the Water-Works of the United States and Canada.

WITH SUMMARIES
For Each State and Group of States,

AND CLASSIFICATION.
By Size of Towns Having Works.

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lines will be found of interest, the figures for railways being taken from the last issue of "Poor's Manual of Railroads":

Group.	Water-works, miles mains.	Railways, miles.	Pacific	Water-works, miles mains.	Railways, miles.
N. England.....	6,212	6,841	.....	2,449	12,020
Middle.....	9,628	20,116			
S. Atlantic.....	1,111	17,308			
S. Central.....	1,157	13,388	T'tal U. S.....	32,423	166,817
N. Central.....	7,176	36,945	Canada.....	1,425	*21,624
Northwestern.....	2,343	36,194	Total U. S. and Canada	33,848	*188,441
Southwestern.....	2,347	24,006			

* Including Newfoundland.

It will be seen from the above that in the New England group alone does the mileage of water mains approach that of railway lines, the figures being 6,212, against 6,841. For the whole United States there are 32,423 miles of water mains, against 166,817 miles of railways, the former being nearly one-fifth of the latter. There is no comparison, however, between the two except as a matter of curiosity. "Poor's Manual" gives the total investment in railways for 1890 as \$10,122,635,900, this sum being the total of the stock and bonds of the various lines at par value, and the total cost as about \$8,970,000,000, this total being based on the "Cost of Road and Equipment" per mile of completed road," and therefore being somewhat excessive. This cost must include some watered stock, as it is only about \$1,200,000,000, or about 12 per cent. less than the total investment given above, while the estimated cost of water-works in the United States, as given in Table 2-S, \$542,770,143, is for the most part actual cost of construction. But taking the cost of railways as given, the cost of water-works is about 6 per cent. as much, a surprising percentage when we consider the magnitude of our railway interests and the prodigal waste in connection with their construction.

GROWTH BY NUMBER OF WORKS AND POPULATION SUPPLIED.

At the close of the last century there were in the United States but 16 cities or towns having water-works, while in Canada there were none, the first works in Canada having been built at Montreal in 1801 by a company. The Montreal works were bought by the city in 1845. The 16 works built in the United States prior to the close of 1801, together with the date built, builders and present owners—that is, whether company, individual or city—are as follows:

	Date.	Original owner-ship.	Present owner-ship.
Boston, Mass.....	1652	Co.	City.
Bethlehem, Pa.....	1761	Co.	City.
Providence, R. I.....	1772	Co.	City.
Morristown, N. J.....	1779	Co.	Co.
Geneva, N. Y.....	1787	Co.	Co.
Peabody, Mass.....	1790	Co.	City.
Plymouth, Mass.....	1798	Co.	City.
Worcester, Mass.....	1798	Indv.†	City.
Hartford, Conn.....	1797*	Co.	City.
Portsmouth, N. H.....	1798	Co.	Co.
Salem, Mass.....	1799	Co.	City.
New York, N. Y.....	1799†	Co.	City.
Lynchburg, Va.....	1799	Co.	City.
Newark, N. J.....	1800	Co.	City.
Albany, N. Y.....	Prior to 1800	Co.	City.
Winchester, Va.....	Prior to 1800	City.	City.

* Probable date.

† Individual.

‡ Works started by city in 1774, but stopped by Revolutionary War.

As will be seen from the foregoing Boston was the first city supplied, by over 100 years, and Bethlehem, Pa., next. The Boston supply was from springs, by gravity to a box, or tank, while the Bethlehem supply was pumped from a creek to a tank. The Boston works were designed for domestic use and fire protection, but it cannot be stated at this time whether water was distributed to consumers, or was conveyed from the tank in buckets or barrels. At Bethlehem water was distributed at least as early as 1769, as at that date some of the pitch pine distributing logs were renewed, and in 1786 some were replaced with lead pipe. The works in this city were built in 1799 by the Manhattan Co., which was organized to do a banking business and supply water. The city subscribed for 2,000 shares of the company's stock. The charter of the company provided that it must keep a tank filled with water in order to hold its charter, and although the company long since stopped supplying water it still keeps a tank filled, on or near Centre St., the same company now conducting the Manhattan Bank.

Starting with 16 works at the close of 1800 there were in the United States 50 years later but 67 in addition, or 83 in all, while Canada then had but 4 works. The growth of water-works has, therefore, been almost wholly in the last 40 years, and largely in the last 10 or 10½ years, there having been but 598 works in this country at the close of 1860, while at the close of 1890 there were 1,878, and on July 1, 1891, 2,087 works had been completed or put under construction, including 14 of unknown date.

The details of this wonderful growth are shown by Table 3-S, the first, or upper, part of which gives the number of works built in each state, the United States and Canada for each half decade from 1801 to 1870, and for each year and half decade from 1871 to date. The lower part of the table shows the number of works at the end of each decade.

TABLE 3-S.

UNITED STATES AND CANADIAN WATER-WORKS—SUMMARY OF DATES OF CONSTRUCTION BY GROUPS OF STATES FOR EACH HALF DECADE UNTIL 1870, AND FOR EACH YEAR FROM 1871 TO AND INCLUDING THE PARTIAL YEAR 1891.

	N. E.	Mid. S.	Atl. S. C.	N. C.	N. W.	S. W.	Pac.	Total U. S.	U.S. & Can. Tot'l	
									Can.	Tot'l
Before 1801...	8	6	2	..	..	..	..	16	..	16
1801-5.....	3	4	..	..	..	..	..	7	1	8
1806-10.....	..	3	..	..	..	..	..	3	..	3
1811-15.....	..	..	..	..	..	..	..	..	..	..
1816-20.....	1	2	..	..	1	..	..	4	..	4
1821-5.....	..	1	..	1	..	..	..	2	..	2
1826-30.....	1	5	3	..	1	..	1	12	..	12
1831-5.....	1	3	2	3	1	..	..	10	..	10
1836-40.....	1	4	1	2	2	..	..	10	1	11
1841-5.....	1	2	..	1	2	..	..	6	1	7
1846-50.....	3	9	..	..	1	..	..	13	1	14
1851-5.....	2	14	1	..	2	..	4	23	2	25
1856-60.....	6	13	2	1	3	..	5	30	2	32
1861-5.....	5	9	..	1	1	..	10	26	..	26
1866-70.....	20	30	1	3	16	3	8	81	..	81
1871.....	2	14	1	..	6	2	1	31	..	31
1872.....	6	12	1	2	8	..	1	33	1	34
1873.....	15	8	..	2	8	..	2	49	3	42
1874.....	8	11	1	..	9	2	..	36	2	38
1875.....	6	14	2	..	9	1	3	40	4	44
Total, '71-5..	37	59	5	4	40	5	7	179	10	189
1876.....	9	11	1	1	9	6	1	45	3	48
1877.....	1	5	1	..	5	2	..	17	1	18
1878.....	7	11	3	2	5	4	3	38	2	40
1879.....	10	9	..	1	10	1	6	39	2	41
1880.....	8	10	1	..	5	3	5	37	4	41
Total, '76-80.	35	46	6	5	34	16	15	176	12	188

TABLE 3-S.—Continued.

	N. E.	Mid. S.	Atl. S. C.	N. C.	N. W.	S. W.	Pac.	Total U. S.	Can.	U.S. & Can. Tot'l	
1881.....	5	12	..	1	6	5	4	3	36	2	38
1882.....	10	17	4	1	21	13	9	7	82	4	86
1883.....	8	18	4	2	17	18	14	4	85	5	90
1884.....	21	21	2	..	17	20	17	7	105	4	109
1885.....	17	28	5	2	25	15	12	3	107	1	108
Total, '81-5..	61	96	15	6	86	71	56	24	415	16	431
1886.....	15	31	7	4	35	24	10	7	133	5	138
1887.....	29	36	7	4	34	38	19	14	181	6	187
1888.....	13	33	11	8	47	47	18	21	198	9	207
1889.....	23	40	16	12	37	41	17	14	200	7	207
1890.....	14	25	12	1	33	32	11	25	153	6	159
Total, '86-90.	94	165	53	29	186	182	75	81	865	23	888
Unknown.....	4	..	..	1	..	..	3	6	14	2	16
*1891.....	11	23	15	13	25	24	17	17	145	14	159
Total.....	290	498	106	70	401	301	174	197	2,037	95	2,132

NUMBER OF WORKS AT THE END OF EACH HALF DECADE.

1800.....	6	6	2	..	..	..	..	..	16	..	16
1805.....	11	10	2	..	..	..	..	..	23	1	24
1810.....	11	13	2	..	..	..	..	..	26	1	27
1815.....	11	13	2	..	..	..	..	..	26	1	27
1820.....	12	15	2	..	1	..	..	..	30	1	31
1825.....	12	16	2	1	1	..	..	..	32	1	33
1830.....	13	21	5	1	2	..	1	1	44	1	45
1835.....	14	24	7	4	3	..	1	1	54	1	55
1840.....	15	23	8	6	5	..	1	1	64	2	66
1845.....	16	30	8	7	7	..	1	1	70	3	73
1850.....	19	39	8	7	8	..	1	1	83	4	87
1855.....	21	53	9	7	10	..	1	5	106	6	112
1860.....	27	66	11	8	13	..	1	10	136	8	144
1865.....	32	75	11	9	14	..	1	20	162	8	170
1870.....	52	105	12	12	30	3	1	28	243	8	251
1875.....	89	164	18	16	70	8	3	50	422	18	440
1880.....	124	210	23	21	104	24	23	69	508	30	538
1885.....	185	308	38	27	190	95	79	93	1,013	46	1,059
1890.....	279	471	91	36	376	277	154	174	1,878	79	1,957
Unknown.....	(4)	..	..	(1)	..	..	(3)	(6)	(14)	(2)	(16)
*1891.....	290	475	106	70	401	301	174	197	2,037	95	2,132

* Completed or under construction prior to July 1.

This table needs little comment. It will be seen that at the close of 1800 there were works in only the New England, Middle and South Atlantic groups of states, 16 in all, being those already named above. Prior to 1820 these three groups were the only ones having works, while not until the decade 1866-70 does the Northwest appear in the table, and then with but three works at the close of 1870. In the Southwest one town, St. Louis, Mo., was supplied between 1826 and 1830, but not another until after 1870. Since the latter date both of these groups have built works at a rapid rate, as will be seen from the following comparison, to which has been added corresponding figures for the United States:

	Northwest.		Southwest.*		United States.*	
	No. w'ks.	(Inc.) No. p. c.	No. w'ks.	(Inc.) No. p. c.	No. w'ks.	(Inc.) No. p. c.
Close of '70.....	3	..	1	..	243	..
" '75.....	8	5 80	8	7 875	422	179 74
" '80.....	24	16 200	23	15 135	596	176 42
" '85.....	95	71 338	79	56 244	1,013	415 69
" '90.....	277	182 192	154	75 95	1,878	865 85
July 1, '91*.....	301	24 48	171	17 11	2,023	145 7

* Three of unknown date not included in Southwest and 14 not included in United States.

† Completed or under construction.

Looking at the column, just above, giving the total number of works for the United States, we see that 415 works were added during the five years 1881-5, and 865 during the five years 1886-90. This increase was continual year by year, until 1890 (see table 3-S), when there was a falling