JOURNAL OF THE AMERICAN WATER WORKS ASSOCIATION

VOL. 37, NO. 9 SEPTEMBER 1945

In this Issue

Published Monthly
at Prince and Lemon Streets, Lancaster, Pa.
by the
AMERICAN WATER WORKS ASSOCIATION
Incorporated
500 FIFTH AVENUE, NEW YORK 18, N. Y.

Utica, New York—Survival and Retirement Experience With Water Works Facilities

As of December 31, 1940

THE Utica Board of Water Supply is in charge of the operation of the municipally-owned water system serving the city of Utica and contiguous area. The city is an important trading and industrial center located in the central part of the state on the banks of the Mohawk River. In addition to large textile mills the principal industries include the manufacture of metal and wood products, heating and ventilating equipment, clothing and fire arms. The State Barge Canal parallels the Mohawk River through the city.

The population of the city, as of the federal census of 1940, was 100,518. The water system serves a considerable area of surrounding territory, including the communities of Whitesboro, New Hartford, Oriskany, New York Mills, Yorkville, Frankfort and Deerfield and the towns of Marcy, Trenton and Schuyler. The population served at the date of the study was estimated to be 120,000. The consumption during 1940 averaged 12.8 mgd. or about 100 gpd. per capita.

Development of the Existing System

The forerunner of the present water system in Utica was created as the Utica Aqueduct Company by an act of the state legislature in April 1802. The supply was obtained from springs within the present city and conveyed through a log aqueduct to a central point. This aqueduct continued to supply part of the inhabitants until 1824 when it was severed and the supp[ly] off by the construction of the [Erie] Canal. From 1824 to 1834 [the] springs and wells were the only so[urce] of water. In 1832 the Utica [Water] Works Association was formed [and] in 1834, the association laid a [line] 2½-in. pipe from springs to the [center] part of the city. This served [the] a part of the city until 1850 [when] was abandoned.

In 1845 the Utica Water [Works] Company was formed. In 184[9] tracts were let for the construct[ion] a complete water works system. [The] supply was secured from a [well] Starch Factory Creek and was [con]veyed through a 12-in. brick [conduit] about 9,000 ft. long, to a reserv[oir] the city. Transmission from the [reser]voir was through a 12-, 8- and [6-in.] cast-iron main branching into a [num]ber of 3- to 5-in. distribution [mains]. These works were completed [and] placed in operation in 1849. [The] supply works, brick conduit and [reser]voir have been retired, many [of the] distribution mains, hydrants and [valves] are still in service.

In 1854, the 800,000-gpd. [consump]tion from the spring was found [inade]quate and the present No. 1 Res[ervoir] was constructed. Other impo[unding] and distribution reservoirs [have] been constructed from time to time, [some] which have been retired over the [years].

In 1938 the Consolidated [Water] Company, successor to the Utica [Water] Works Company, in existence [since] 1945

Distribution Storage Facilities of Northern Supply System

Name	*Supplied From*	*Supplies*
[Hinck]ley Equalizing Standpipe	Hinckley	Reservoir Nos. 6 and 11
[Hill] Marcy Distributing	Hinckley	Intermediate and low service
[Hill] Bacot Distributing }	Hinckley and Reels Creek	Low service
[Hill] Bacot Forebay }		
[Hill] Hill Standpipe	Reservoir Nos. 6 and 7	Turnbull Heights
[Hill] Whites Town Distributing	Intermediate service	Whitesboro low service
[Whites]boro Equalizing Standpipe	Low service	Whitesboro low service
[Oris]kany Standpipe	Low service	Oriskany low service
[Oris]kany Standpipe	Low service	Oriskany low service

[Hinckley] was purchased by the city. The [present] supply is by gravity from im[pounding] reservoirs grouped in two [main] systems on opposite sides north [and] south of the city. Distribution is [by] three services, the low service, which [embraces] the major portion and the [highest] section of the city, and the [relatively] minor intermediate and high [services].

[The] northern or West Canada [Creek] supply system, developed since [1916] consists essentially of the Hinck[ley] Reservoir on West Canada Creek [and] the Tracy Reservoir on Black [Creek]. The Hinckley Reservoir, 18 [miles] northeast of the city, was con[structed] by the state in 1916 to serve [primarily] as a feeder for the State Barge [Canal]. The city has the right to take [50] mgd. from this reservoir. The [Tracy] Reservoir, constructed in 1906–[07], 10 mi. southeast of the Hinckley [Reservoir], provides reserve storage to compensate for the supply taken from the Hinckley Reservoir when the flow of West Canada Creek is reduced to below the necessary requirements. Another small source in this system is the Reels Creek intake which diverts water from a small stream into two distributing reservoirs during a part of the year.

The southern supply system consists mainly of the Graefenberg Reservoir and Savage intake. The Graefenberg Reservoir, known as Reservoir No. 1, located about 2 mi. southeast of the city, was originally built in 1854 and raised in 1864–1865. It serves the high-service area on the south side of the territory with water secured from a small drainage area and wells. The Savage intake diverts water from natural drainage and springs and furnishes the supply to Reservoir Nos. 2, 4 and 5, the latter two of which also receive some natural drainage.

Distribution Storage Facilities of Southern Supply System

Name	*Supplied From*	*Supplies*
[Hop]per Settled Storage	Reservoir Nos. 3, 4 and 5	Pumped to high or low service
[Gol]den Distributing	Natural drainage and Reservoir No. 3	Low service and Reservoir Nos. 2 and 5
[Cas]cade Settled Storage	Natural drainage and Reservoir Nos. 3 and 4	Pumped to high or low service
[New] Hartford Equalizer	Reservoir Nos. 1 and 11	Intermediate service and pumped to high service
[Hart]ford Tanks	Reservoir No. 1 or pumped from No. 8	New Hartford high service

Except in certain emergencies, or at times of low flows in the supply streams, the entire service is by gravity. At the Hinckley Reservoir there is located a 13-mgd. motor-driven booster pump used when the reservoir is considerably drawn down for Barge Canal use. At Reservoir No. 2 is a booster station in which are located two 5-mgd. and one 1-mgd. pumps, the first two of which pump from Reservoir Nos. 2 or 5 into Reservoir No. 4 or to low service or by operation in series into the high service. The 1-mgd. pump discharges into the high-service area.

From the terminus of a state-owned 42-in. pipe below Hinckley a 24-in. cast-iron line extends about 12 mi. to the Marcy standpipe, thence another 2 mi. to the Marcy Reservoir (distributing) and continuing about 2 mi. farther to the southwestern intermediate service. From the Marcy standpipe a 16-in. line extends 2.2 mi. to a connection with the 24-in. intermediate-service line and continues easterly as parallel 16- and 24-in. lines 2.5 mi. to the Bacot-Deerfield Reservoir Nos. 6 and 7. Reels Creek is connected to these reservoirs through a 20-in. main 1.5 mi. long. From these distributing reservoirs, Nos. 6 and 7, located a little over a mile outside the city limits, parallel 20- and 30-in. mains extend southerly into the city

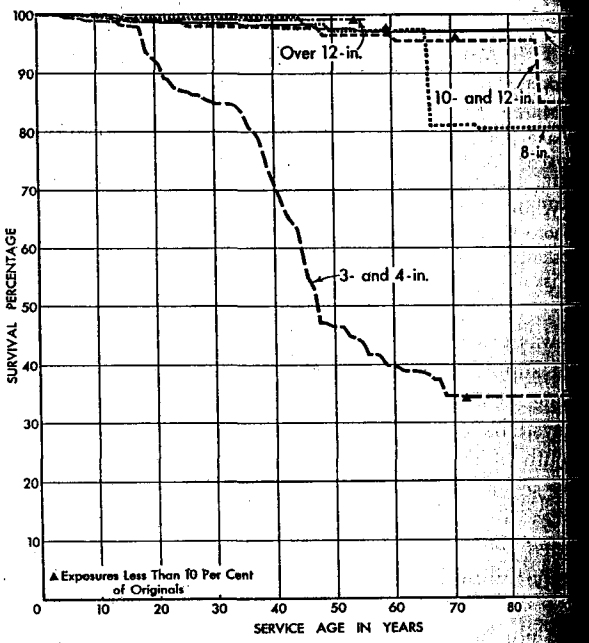

FIG. 1. Mortality Survival Curve—3–42-in. Cast-Iron Unlined Mains—Utica, New York

BASE: Feet	SURVIVAL: 1849–1940	RETIRE
SIZE *in.*	EXPOSURES *ft.*	
3 and 4	90,597	55.9
6	596,806	10.9
8	135,949	11.3
10 and 12	131,384	3.0
Over 12	205,064	1.5

gested area.

From the southern system a main from No. 1, Graefenberg voir, extends 1.2 mi. north to the service area. A 20-in. main 1.5 mi. from Savage intake to voir No. 4 at the southerly city

In the congested portion of the service area the pressures now range from 60 to 80 psi. In the mediate- and high-service area pressures range from 100 to The weights of the pipe in the

vary from Class C to 250-lb. gal cast-iron pipe. Prior to 1927 the distribution pipe laid ed of Class B (since the adopsuch standard), and since 1927 150-lb. cement-lined cast-iron pipe has been standard. Pipes are laid with a cover of from 4 to 4½ ft. Unlined pipe shows a moderate amount of tuberculation.

TABLE 1

SUMMARY OF MAINS
UTICA, NEW YORK

Kind	No. of Feet Installed	Percentage of Total	No. of Feet Retired	Percentage of Total	No. of Feet in Service	Percentage of Total	Year of First Installation	Average Age, *yr.*
	27,552	2.34	22,632	28.31	4,920	0.46	1849	66.9
	63,045	5.36	32,625	40.81	30,420	2.78	1849	62.9
	596,806	50.77	10,972	13.73	585,834	53.46	1849	37.7
	135,949	11.57	3,175	3.97	132,774	12.12	1849	38.6
Cast-iron	37,773	3.22	2,399	3.00	35,374	3.24	1849	50.3
unlined	93,611	7.96	847	1.06	92,764	8.47	1849	28.3
	31,979	2.72	0	0	31,979	2.92	1886	36.1
	54,776	4.66	1,371	1.71	53,405	4.88	1885	41.2
	112,694	9.59	186	0.24	112,508	10.27	1885	31.8
	5,615	0.48	0	0	5,615	0.51	1924	16.5
	900	0.08	0	0	900	0.08	1912	28.5
Cast-iron	5,069	0.43	0	0	5,069	0.46	1934	5.6
cement	26	0.00	0	0	26	0.00	1938	2.5
lined	1,216	0.10	0	0	1,216	0.11	1934	6.0
Steel	128	0.01	0	0	128	0.01	1934	6.5
Steel	500	0.04	0	0	500	0.04	1913	27.5
Lead	28	0.00	0	0	28	0.00	1913	27.5
Lead	148	0.01	0	0	148	0.01	1898	41.8
	63	0.01	0	0	63	0.01	1913	27.5
Wrought-	442	0.04	409	0.51	33	0.00	1891	49.5
iron	1,210	0.10	1,210	1.51	0	0.00	1860	
	1,702	0.14	1,239	1.55	463	0.04	1851	29.4
	2,877	0.24	2,877	3.60	0	0.00	1902	
	31	0.00	0	0	31	0.00	1935	5.5
	226	0.02	0	0	226	0.02	1935	5.5
Copper	158	0.01	0	0	158	0.01	1935	5.5
	4	0.00	0	0	4	0.00	1938	2.5
Galvanized steel lead-	98	0.01	0	0	98	0.01	1913	27.5
lined	128	0.01	0	0	128	0.01	1913	27.5
Steel, bituminous								
lined and	470	0.04	0	0	470	0.04	1940	0.5
coated	45	0.00	0	0	45	0.00	1937	3.5
Ingot-iron	500	0.04	0	0	500	0.04	1913	27.5
	1,175,769	100.00	79,942	100.00	1,095,827	100.00		53.11
ge of Total	100.0		6.80		93.2			
Size, *in.*	9.46		4.60		9.81			

TABLE 1 (contd.)

Mortality Survival Ratios

Cast-Iron Unlined Pipe

Size, *in.*	No. of Feet	Period Covered, *yr.*	Percentage
3 and 4	90,597	91.5	33.902
6	596,806	91.5	89.945
8	135,949	91.5	74.214
10 and 12	131,384	91.5	84.752
Over 12	205,064	55.5	99.222
Total	1,159,800		

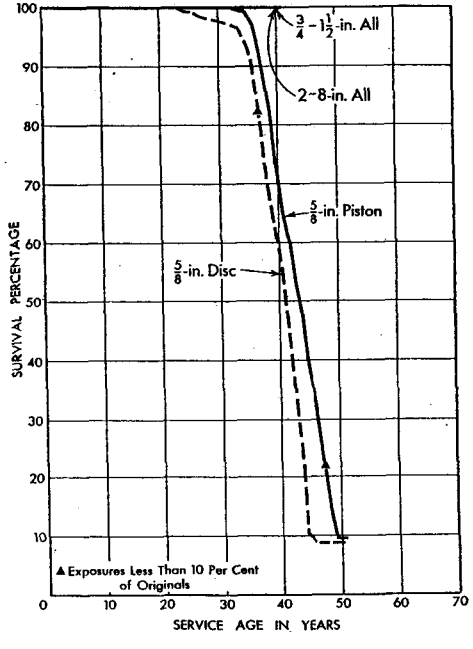

FIG. 2. Mortality Survival Curve—⅝-8-in. Meters—Utica, New York

BASE: Unit SURVIVAL: 1890–1940

SIZE *in.*	KIND	EXPOSURES *Units*	RETIREMENTS *Units*
⅝	Disc	18,219	1,055
⅝	Piston	2,660	1,378
¾–1½	All	776	0
2–8	All	377	0

As of the date of this study, [illegible] were in the system 25,575 service [illegible] nections, 3,874 valves, 1,884 hydr[illegible] and 21,622 meters. Active ser[illegible] were approximately 100 per cent [illegible] tered with 80 per cent of the [illegible] water served being accounted [illegible] through the distribution meters.

Basis of Study

The records of installation and [illegible] tirement of pipe within the city, [illegible] minor exceptions, are complete [illegible] 1849 to date and are kept in a [illegible] record book. Other record book[illegible] the early history and for the pe[illegible] 1874–1888 and 1888 and 1902 [illegible] available for checks. The main [illegible] ply lines are included in the study [illegible] pipe but not the minor amount of [illegible] tribution pipe outside the city limi[illegible]

The records of installation and [illegible] tirement of valves have not been [illegible] curately kept up to date, so no [illegible] of these was initiated.

The records of meters are sub[illegible] tially complete from 1891 to date [illegible] are kept in card index form. Re[illegible] meter cards are retained in a sep[illegible] file. From about 1882, when m[illegible] were first installed, through 1890 [illegible] records are not complete.

TABLE 2

SUMMARY OF METERS

UTICA, NEW YORK

Kind	Number Installed	Number Retired	Number in Service	Average Age, *yr.*
Disc	18,219	1,055	17,164	23.3
	422	0	422	26.6
	237	0	237	23.5
	19	0	19	24.1
	56	0	56	24.2
	51	0	51	20.1
Compound	112	0	112	21.0
	35	0	35	22.0
	48	0	48	20.9
	28	0	28	15.6
	8	0	8	14.4
Crest	4	0	4	33.2
Crest	5	0	5	34.9
	4	0	4	36.5
Current	2	0	2	31.0
	1	0	1	34.5
Detector	3	0	3	17.8
Piston	2,660	1,378	1,282	30.2
Piston	2	0	2	42.0
	5	0	5	20.7
Protectus	36	0	36	20.3
	24	0	24	20.3
	8	0	8	18.0
Valve	2	0	2	22.0
	37	0	37	12.1
	4	0	4	20.0
TOTAL	22,032	2,433	19,599	23.8

Mortality Survival Ratios

Size, *in.*	Kind	Period Covered, *yr.*	Percentage
⅝	Disc	50.5	8.984
⅝	Piston	50.5	9.732
¾–1	All	43.5	100.000
2–8	All	43.5	100.000

TABLE 3

SUMMARY OF HYDRANTS

UTICA, NEW YORK

Kind	Number Installed	Number Retired	Number in Service	Average Age, *yr.*	Period Covered, *yr.*	Mortality Survival Ratio, %
All	1,726	150	1,576	28.5	91.5	42.510

The records of hydrant installation and retirement are quite complete in card index form from 1849 to the present. Prior to about 1870 there were some discrepancies in retirements and between that date and 1910, some shifting of hydrants from one location to another. Since 1910 the record is definite and complete.

The installation and retirement of Class B facilities from 1849 to date are quite definite as to size, age, general detail and retirement of those taken out of service.

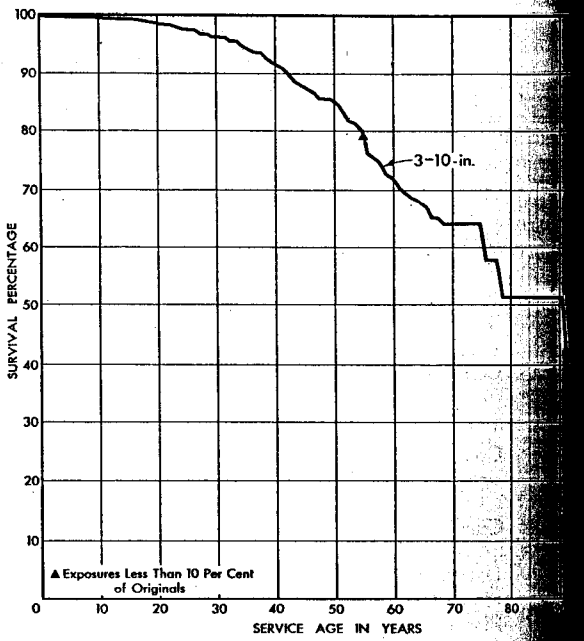

FIG. 3. Mortality Survival Curve—3–10-in. Hydra
Utica, New York

BASE: Unit	SURVIVAL: 1849–19	RETI
SIZE *in.*	EXPOSURES *Units*	
3–10	1,726	

Mortality Survival Study

Mortality studies were made of mains, meters and hydrants. Table 1 gives a summary of the pipe installed and retired and the amount remaining in service, as well as the average age, size, length of record and grouped mortality survival ratios. Figure 1 shows the mortality survival curves covering the record of the pipe grouped as shown.

Tables 2 and 3 are similar summaries of meters and hydrants, with Figs. 2 and 3 representing the applicable mortality survival curves.

Given below is a brief summary of Class B facilities, with the exception of pumping equipment which is minor in character, from 1849 to the present time, with the reasons for retirement for those facilities which have been retired.

Causes of Retirement

With minor exceptions record not kept of, nor was it possibl termine, the causes of retirem mains, meters and hydrants. was it determinable whether suc ties were abandoned or whethe was salvage and re-use of certa

Acknowledgments

The collection and compilation data in Utica were done by an the direction of J. Walter Ack a member of the Committee o vival and Retirement Experien Water Works Facilities, with operation of the Utica Board o Supply of which H. B. Miles eral Manager.

SUMMARY OF CLASS B FACILITIES
UTICA, NEW YORK

Impounding Reservoirs

Reservoir—Ambursen concrete dam Creek, approximately 345 ft. long, 1,200 mil.gal. from a watershed sq.mi. Constructed in 1906–1907 service.

Reservoir—Constructed by the State Barge Canal regulation, from city has the right to draw 50 mgd., the storage available in Tracy is used for compensation to provide minimum amount for the Barge Reservoir of 25,000-mil.gal. capacity by an earthen dam with concrete on West Canada Creek; drainage sq.mi. Dam 3,700 ft. long with illway; maximum height 93 ft. from top of core wall. Constructed in still in service.

Distribution Reservoirs

Graefenberg Reservoir—Earth em- dam, 28-mil.gal. capacity; maxi- 50 ft.; area about seven acres. constructed in 1854, raised 6 ft. 865 and still in service.

Hopper Storage Reservoir—Earth puddled core wall; 36-mil.gal. rea, about 12.6 acres. Originally in 1868, enlarged and deepened still in service.

Earth embankment reservoir, 228- capacity, maximum depth 59 ft.; 26 acres. Constructed in 1873 in 1902 because of failure of em-

Golden Reservoir—Earth embank- voir, capacity 282 mil.gal.; puddled average depth 24 ft.; area 34 acres. in 1886, raised 10 ft. in 1896 in service.

Cascade Reservoir—Earth embank- voir, capacity 187 mil.gal.; puddled verage depth 24 ft.; area 23 acres. in 1896, reinforced in 1902, and vice.

Bacot Reservoir—Earth embank- voir, capacity 98 mil.gal.; puddled imum depth 43 ft.; area 14 acres. in 1900, embankment reinforced and still in service.

Bacot Forebay—Earth embankment capacity 6.5 mil.gal.; puddled core; maximum depth 15 ft.; area 1.7 acres. Constructed in 1900, and still in service.

No. 8—New Hartford Reservoir—Earth embankment reservoir, capacity 1.5 mil.gal.; maximum depth 8 ft.; area 1.4 acres. Constructed in 1895 and still in service.

No. 9—Earth embankment reservoir, capacity 2.5 mil.gal.; maximum depth 10 ft.; area 1.2 acres. Constructed in 1895 and abandoned in 1925 due to diminishing supply and increasing pollution.

No. 10—Whites Town Reservoir—Earth embankment reservoir, capacity 3.5 mil.gal.; area 1.7 acres. Constructed in 1898; not in use but held in reserve.

No. 11—Marcy Reservoir—Earth embankment reservoir, capacity 15 mil.gal.; concrete cut-off wall; maximum depth 30 ft.; area 3.5 acres. Constructed in 1913, and still in service.

Original Reservoir—Unknown construction and size. Constructed in 1849 and abandoned in 1868 because of low pressure due to low elevation.

Elevated Tanks and Standpipes

Old Oriskany Standpipe—Open steel standpipe, 30 ft. in diameter, 50 ft. high; 250,000-gal. capacity. Constructed in 1916–1917 and still in service.

New Oriskany Standpipe—Open steel standpipe, 26 ft. in diameter, 50 ft. high; 200,000-gal. capacity. Constructed in 1934 and still in service.

Whites Town Standpipe—Open steel standpipe, 29 ft. in diameter, 49 ft. high; 250,000-gal. capacity. Constructed in 1935 and still in service.

New Hartford Elevated Tank—Covered steel elevated tank, hemispherical bottom; 32 ft. in diameter, 47 ft. deep, 99 ft. to flow line; 250,000-gal. capacity. Constructed in 1928 and still in service.

South Hill Standpipe—Covered steel standpipe, 48 ft. in diameter, 19 ft. high; 266,000-gal. capacity. Constructed in 1928 and still in service.

Old New Hartford Elevated Tank—Covered steel elevated tank, hemispherical bottom; 19 ft. in diameter, 17½ ft. deep; 50,000-gal. capacity. Constructed in 1916 and retired in 1928 because it was below required pressure and small size.

Summary of Installations and Retirements
Utica, New York

MAINS

3-in. Cast-Iron Unlined Mains

Year Installed	Feet		
	Installed	In Service	Retired
1849	10,260	0	10,260
1850	2,658	0	2,658
1851	1,534	0	1,534
1852	271	0	271
1853	1,430	0	1,430
1854	240	0	240
1859	100	0	100
1860	151	116	35
1861	150	110	40
1863	372	0	372
1864	72	0	72
1866	20	0	20
1867	440	0	440
1868	1,163	290	873
1869	5,934	2,519	3,415
1871	900	900	0
1872	390	0	390
1875	406	36	370
1886	100	0	100
1888	135	135	0
1889	195	195	0
1894	379	379	0
1896	170	170	0
1898	12	0	12
1901	70	70	0
1940	0	0	0
Total	27,552	4,920	22,632

Retirements by Years

Year Installed	Feet	Year	Feet	Year	Feet	Year
1849	410	1868	2,390	1887	275	1889
	1,770	1890	240	1892	1,230	1893
	900	1894	3,045	1896		
1850	115	1887	662	1889	350	1892
	275	1893	491	1895	241	1897
	222	1899	142	1910	160	1914
1851	307	1887	175	1890	298	1894
	188	1897	265	1905	301	1917
1852	271	1889				
1853	200	1857	500	1871	140	1889
	420	1892	170	1913		
1854	240	1893				
1859	100	1888				
1860	35	1890				
1861	40	1929				
1863	130	1907	122	1908		
1864	72	1893				
1866	20	1892				
1867	440	1907				
1868	150	1874	176	1888		
	108	1910	58	1913		
1869	940	1887	460	1890		
	1,153	1914	642	1915		
	97	1929	34	1934		
1872	390	1907				
1875	370	1917				
1886	100	1914				
1898	12	1910				

4-in. Cast-Iron Unlined Mains

Year Installed	Feet		
	Installed	In Service	Retired
1849	6,250	1,564	4,686
1850	3,605	0	3,605
1853	3,612	1,688	1,924
1858	368	287	81
1860	490	240	250
1862	109	0	109
1863	176	176	0
1867	487	420	67
1868	7,995	2,310	5,685
1869	8,500	4,533	3,967

4-in. Cast-Iron Unlined Mains (contd.)

Year Installed	Feet		
	Installed	In Service	Retired
1871	1,411	1,018	393
1872	984	977	7
1873	2,207	376	1,831
1874	3,274	1,482	1,792
1875	2,835	1,662	1,173
1876	224	24	200
1877	175	175	0
1878	950	850	100
1879	365	365	0
1880	483	233	250
1881	798	798	0
1882	60	0	60
1884	375	315	60
1885	714	297	417
1886	589	83	506
1887	1,904	1,137	767
1888	4,225	2,016	2,209
1889	238	23	215
1890	1,111	137	974
1891	3,036	2,794	242
1892	955	890	65
1893	1,442	602	840
1894	526	437	89
1895	58	58	0
1896	171	171	0
1897	444	420	24
1899	16	0	16
1900	32	32	0
1901	25	25	0
1904	130	130	0
1906	22	22	0
1908	535	535	0
1910	522	522	0
1912	41	41	0
1914	11	0	11
1915	350	350	0
1926	156	156	0
1928	23	13	10
1930	16	16	0
1934	20	20	0
1940	0	0	0
Total	63,045	30,420	32,625

Retirements by Years

Year Installed	Feet	Year	Feet	Year	Feet	Year
1849	1,160	1893	375	1895	257	1898
	1,195	1901	48	1907	65	1908
	18	1910	42	1912	1,462	1917
	64	1919				
1850	800	1887	175	1895	1,580	1905
	1,050	1908				
1853	1,000	1897	575	1899	50	1905
	100	1907	41	1912	100	1918
	58	1919				
1858	81	1907				
1860	250	1868				
1862	109	1907				
1867	67	1907				
1868	1,036	1886	560	1889	444	1896
	605	1907	1,460	1908	1,580	1915
	955	1887	165	1895	891	1904
	380	1908	39	1911	1,070	1913
	339	1914	128	1922		
1871	245	1907	148	1913		
1872	7	1913				
1873	200	1894	570	1907	1,061	1908
	340	1907	740	1912	712	1916
	308	1912	27	1914	838	1916
1876	200	1910				
1878	100	1886				
1880	250	1894				
1882	60	1916				
1884	60	1899				
1885	264	1907	153	1913		
1886	382	1907	124	1915		
1887	315	1908	117	1909	25	1915
	310	1917				
1888	548	1908	12	1909	1,290	1911
	99	1913	260	1914		
1889	170	1908	35	1913	10	1915
1890	32	1908	703	1909	94	1913
	95	1914	50	1915		
1891	76	1905	66	1907	100	1908
1892	65	1908				
1893	505	1907	335	1911		
1894	41	1913	38	1915	10	1929
1897	24	1908				
1899	16	1912				
1914	11	1915				
1928	10	1930				

6-in. Cast-Iron Unlined Mains

Year Installed	Feet Installed	Feet In Service	Feet Retired
1849	4,780	3,299	1,481
1853	1,790	1,790	0
1860	37	37	0
1868	16,017	14,435	1,582
1869	7,642	7,642	0
1870	3,805	3,805	0
1871	8,540	8,540	0
1873	2,407	2,112	295
1874	14,606	14,606	0
1875	362	350	12
1878	49	36	13
1879	1,200	1,200	0
1880	973	973	0
1881	961	941	20
1882	47	47	0
1884	320	320	0
1885	6,133	6,105	28
1886	22,024	21,927	97
1887	16,956	16,916	40
1888	25,122	25,086	36
1889	19,351	19,111	240
1890	19,655	19,556	99
1891	16,595	16,595	0
1892	14,988	14,988	0
1893	15,282	13,598	1,684
1894	13,721	13,142	579
1895	15,592	14,948	644
1896	6,083	5,813	270
1897	11,674	11,654	20
1898	7,409	7,409	0
1899	7,598	7,382	216
1900	7,263	7,263	0
1901	7,840	7,344	496
1902	6,766	6,766	0
1903	4,195	4,195	0
1904	9,174	9,137	37
1905	11,772	11,772	0
1906	8,349	8,166	183
1907	6,348	6,348	0
1908	6,958	6,958	0
1909	1,711	1,711	0
1910	5,932	5,850	82
1911	11,155	11,155	0
1912	5,685	5,425	260
1913	7,985	7,581	404
1914	16,039	16,039	0
1915	8,997	8,997	0
1916	8,353	8,353	0
1917	4,162	3,910	252
1918	722	722	0
1919	13,292	13,292	0
1920	1,629	1,629	0
1921	23,683	23,558	125
1922	25,827	25,817	10
1923	28,249	27,376	873
1924	12,691	12,691	0
1925	13,884	13,884	0
1926	7,200	6,988	212
1927	17,000	16,458	542
1928	7,763	7,723	40
1929	7,453	7,371	82
1930	7,122	7,122	0
1931	6,193	6,183	10
1932	1,622	1,614	8
1933	1,355	1,355	0
1934	483	483	0
1935	162	162	0
1937	55	55	0
1938	18	18	0
1940	0	0	0
TOTAL	596,806	585,834	10,972

Retirements by Years

Year Installed	Feet	Year	Feet	Year	Feet	Year
1849	1,115	1896	105	1912	261	1937
1868	1,020	1870	342	1915	220	1922
1873	295	1908				
1875	12	1908				
1878	13	1908				
1881	20	1913				
1885	28	1908				
1886	48	1912	49	1913		
1887	40	1912				
1888	14	1911	22	1913		
1889	62	1913	70	1923	108	1937
1890	75	1908	24	1913		
1893	1,684	1908				
1894	579	1908				
1895	128	1913	84	1916	432	
1896	270	1910				
1897	20	1911				
1899	216	1931				
1901	496	1935				
1904	37	1929				
1906	183	1935				
1910	60	1929	22	1937		
1912	260	1924				
1914	404	1931				

6-in. Cast-Iron Unlined Mains (contd.)

Retirements by Years (contd.)

Year Installed	Feet	Year	Feet	Year	Feet	Year
1917	252	1934				
1921	15	1934	110	1938		
1922	10	1933				
1923	870	1934	3	1939		
1926	212	1934				
1927	542	1934				
1928	10	1930	30	1934		
1929	16	1934	66	1937		
1931	10	1940				
1932	8	1939				

8-in. Cast-Iron Unlined Mains

Year Installed	Feet Installed	Feet In Service	Feet Retired
1849	3,060	1,578	1,482
1868	1,813	1,337	476
1874	2,560	2,560	0
1875	4,073	4,051	22
1878	1,680	1,680	0
1881	1,841	1,841	0
1882	5,910	5,513	397
1885	190	190	0
1886	7,421	7,392	29
1887	12,063	12,063	0
1888	3,225	3,199	26
1889	2,902	2,902	0
1891	15	15	0
1892	1,721	1,721	0
1893	4,697	4,697	0
1894	1,572	1,572	0
1895	1,692	1,692	0
1896	3,782	3,782	0
1897	1,240	1,240	0
1898	1,981	1,981	0
1900	1,227	1,227	0
1901	620	620	0
1903	1,268	1,268	0
1904	2,047	2,047	0
1905	1,024	1,024	0
1906	1,908	1,908	0
1907	7,311	7,311	0
1908	3,855	3,855	0
1909	322	322	0
1910	623	623	0
1911	2,881	2,881	0
1912	3,223	3,223	0
1913	7,835	7,561	274
1914	3,313	3,313	0
1915	2,160	2,160	0
1916	2,106	2,106	0
1917	4,845	4,845	0
1919	391	391	0
1920	206	206	0
1921	24	24	0
1922	1,279	1,279	0
1923	6,844	6,832	12
1924	4,660	4,660	0
1925	2,438	2,438	0
1926	2,707	2,250	457
1927	1,391	1,391	0
1929	2,889	2,889	0
1930	67	67	0
1931	1,653	1,653	0
1932	603	603	0
1933	550	550	0
1934	102	102	0
1938	22	22	0
1939	117	117	0
1940	0	0	0
TOTAL	135,949	132,774	3,175

Retirements by Years

Year Installed	Feet	Year	Feet	Year	Feet	Year
1849	200	1894	1,141	1915	15	1923
	126	1940				
1868	476	1913				
1875	22	1908				
1882	397	1931				
1886	29	1935				
1888	26	1931				
1913	274	1925				
1923	12	1940				
1926	457	1934				

10-in. Cast-Iron Unlined Mains

Year Installed	Feet Installed	Feet In Service	Feet Retired
1849	4,630	4,050	580
1868	3,050	3,050	0
1869	1,020	535	485
1880	2,080	2,080	0
1885	2,425	2,425	0
1887	1,845	1,845	0
1892	2,996	2,055	941
1894	485	485	0
1900	3,802	3,802	0
1901	1,790	1,790	0
1905	8,050	7,867	183
1907	949	949	0
1908	2,238	2,028	210
1909	8	8	0
1910	324	324	0
1911	341	341	0
1912	627	627	0
1913	38	38	0
1915	31	31	0
1916	1,021	1,021	0
1940	23	23	0
Total	37,773	35,374	2,399

Retirements by Years

Year Installed	Feet	Year	Feet	Year
1849	580	1934		
1869	485	1894		
1892	841	1905	100	1916
1905	183	1916		
1908	210	1915		

12-in. Cast-Iron Unlined Mains

Year Installed	Feet Installed	Feet In Service	Feet Retired
1849	300	300	0
1853	300	300	0
1868	3,130	2,394	736
1870	5,522	5,411	111
1871	3,402	3,402	0
1886	2,325	2,325	0
1887	500	500	0
1891	23	23	0
1897	500	500	0
1900	5,011	5,011	0
1905	2,671	2,671	0
1906	5,833	5,833	0
1907	75	75	0
1908	9,868	9,868	0
1909	797	797	0
1913	2,721	2,721	0
1914	297	297	0
1915	2,582	2,582	0
1916	1,087	1,087	0
1917	1,066	1,066	0
1918	259	259	0
1919	99	99	0
1921	5,161	5,161	0
1923	2,213	2,213	0
1924	2,980	2,980	0
1925	1,825	1,825	0
1926	3,363	3,363	0
1927	6,814	6,814	0
1928	11,283	11,283	0
1929	1,347	1,347	0
1930	56	56	0
1931	230	230	0
1932	207	207	0
1933	529	529	0
1934	896	896	0
1935	44	44	0
1938	7,361	7,361	0
1940	934	934	0
Total	93,611	92,764	84[illegible]

Retirements by Years

Year Installed	Feet	Year	Feet	Year
1868	442	1916	294	19[illegible]
1870	111	1909		

16-in. Cast-Iron Unlined Mains

Year Installed	Feet Installed	Feet In Service	Feet Retired
1886	795	795	0
1898	854	854	0
1901	412	412	0
1904	22,766	22,766	0
1905	1,954	1,954	0
1906	27	27	0
1907	53	53	0
1908	3,512	3,512	0
1909	155	155	0
1913	1,133	1,133	0
1921	38	38	0
1929	280	280	0
1940	0	0	0
Total	31,979	31,979	0

20-in. Cast-Iron Unlined Mains

Year Installed	Feet Installed	Feet In Service	Feet Retired
[illegible]	6,541	6,541	0
[illegible]	8,438	8,438	0
[illegible]	16,704	15,586	1,118
[illegible]	215	0	215
[illegible]	19,977	19,977	0
[illegible]	1,937	1,937	0
[illegible]	651	651	0
[illegible]	253	215	38
[illegible]	27	27	0
[illegible]	33	33	0
[illegible]	0	0	0
Total	54,776	53,405	1,371

Retirements by Years

Year Installed	Feet	Year	Feet	Year	Feet	Year
[illegible]	193	1905	404	1913	355	1915
[illegible]	166	1916				
[illegible]	215	1916				
[illegible]	38	1918				

[illegible]-in. Cast-Iron Unlined Mains

Year Installed	Feet Installed	Feet In Service	Feet Retired
[illegible]	6,924	6,814	110
[illegible]	62,845	62,845	0

24-in. Cast-Iron Unlined Mains (contd.)

Year Installed	Feet Installed	Feet In Service	Feet Retired
1912	596	596	0
1913	28,555	28,479	76
1915	266	266	0
1916	70	70	0
1921	54	54	0
1924	13,384	13,384	0
1940	0	0	0
Total	112,694	112,508	186

Retirements by Years

Year Installed	Feet	Year
1885	110	1916
1913	76	1921

30-in. Cast-Iron Unlined Mains

Year Installed	Feet Installed	Feet In Service	Feet Retired
1924	5,615	5,615	0
1940	0	0	0
Total	5,615	5,615	0

6-in. Cast-Iron Cement-Lined Mains

Year Installed	Feet Installed	Feet In Service	Feet Retired
1934	1,877	1,877	0
1935	443	443	0
1936	1,750	1,750	0
1937	1,332	1,332	0
1938	40	40	0
1939	586	586	0
1940	41	41	0
Total	5,069	5,069	0

8-in. Cast-Iron Cement-Lined Mains

Year Installed	Feet Installed	Feet In Service	Feet Retired
1938	26	26	0
1940	0	0	0
Total	26	26	0

12-in. Cast-Iron Cement-Lined Mains

Year Installed	Feet		
	Installed	In Service	Retired
1934	651	651	0
1935	565	565	0
1940	0	0	0
Total	1,216	1,216	0

21-in. Steel Mains

Year Installed	Feet		
	Installed	In Service	Retired
1934	128	128	0
1940	0	0	0
Total	128	128	0

⅝-in. Lead Mains

Year Installed	Feet		
	Installed	In Service	Retired
1913	28	28	0
1940	0	0	0
Total	28	28	0

¾-in. Lead Mains

Year Installed	Feet		
	Installed	In Service	Retired
1898	45	45	0
1899	103	103	0
1940	0	0	0
Total	148	148	0

¾-in. Wrought-Iron Mains

Year Installed	Feet		
	Installed	In Service	Retired
1913	63	63	0
1940	0	0	0
Total	63	63	0

1-in. Wrought-Iron Mains

Year Installed	Feet		
	Installed	In Service	Retired
1891	33	33	0
1909	138	0	138
1919	150	0	150
1923	65	0	65

1-in. Wrought-Iron Mains (cont'd)

Year Installed	Feet	
	Installed	In Service
1924	56	0
1940	0	0
Total	442	33

Retirements by Years

Year Installed	Feet	Year
1909	138	1915
1919	150	1932
1923	65	1932
1924	56	1932

1½-in. Wrought-Iron Mains

Year Installed	Feet	
	Installed	In Service
1860	126	0
1902	235	0
1908	849	0
1940	0	0
Total	1,210	0

Retirements by Years

Year Installed	Feet	Year	Feet
1860	126	1899	
1902	235	1902	
1908	424	1917	425

2-in. Wrought-Iron Mains

Year Installed	Feet	
	Installed	In Service
1851	175	0
1908	1,064	0
1910	433	433
1926	10	10
1928	20	20
1940	0	0
Subtotal	1,702	463
Unknown	54	0
Total	1,756	463

Retirements by Years

Year Installed	Feet	Year
1851	175	1890
1908	1,064	1917

2½-in. Wrought-Iron Mains

Year Installed	Feet		
	Installed	In Service	Retired
	2,863	0	2,863
	14	0	14
	0	0	0
	2,877	0	2,877

Retirements by Years

Feet	Year
2,863	1917
14	1917

¾-in. Copper Mains

Year Installed	Feet		
	Installed	In Service	Retired
	31	31	0
	0	0	0
	31	31	0

1-in. Copper Mains

Year Installed	Feet		
	Installed	In Service	Retired
	226	226	0
	0	0	0
	226	226	0

1½-in. Copper Mains

Year Installed	Feet		
	Installed	In Service	Retired
	158	158	0
	0	0	0
	158	158	0

2-in. Copper Mains

Year Installed	Feet		
	Installed	In Service	Retired
1938	4	4	0
1940	0	0	0
Total	4	4	0

1-in. Galvanized Steel Lead-Lined Mains

Year Installed	Feet		
	Installed	In Service	Retired
1913	98	98	0
1940	0	0	0
Total	98	98	0

2-in. Galvanized Steel Lead-Lined Mains

Year Installed	Feet		
	Installed	In Service	Retired
1913	128	128	0
1940	0	0	0
Total	128	128	0

6-in. Steel Bituminous-Lined and Coated Mains

Year Installed	Feet		
	Installed	In Service	Retired
1940	470	470	0
Total	470	470	0

8-in. Steel Bituminous-Lined and Coated Mains

Year Installed	Feet		
	Installed	In Service	Retired
1937	45	45	0
1940	0	0	0
Total	45	45	0

METERS

⅝-IN. DISC METERS

Year Installed	Number Installed	Number In Service	Number Retired
1890	1	1	0
1891	1	0	1
1895	6	5	1
1896	105	13	92
1897	134	46	88
1898	184	70	114
1899	195	125	70
1900	26	13	13
1901	34	22	12
1902	391	143	248
1903	369	125	244
1904	708	702	6
1905	540	538	2
1906	761	760	1
1907	536	535	1
1908	411	410	1
1909	614	614	0
1910	758	722	36
1911	482	460	22
1912	414	391	23
1913	661	587	74
1914	659	658	1
1915	540	540	0
1916	571	571	0
1917	535	534	1
1918	439	439	0
1919	411	411	0
1920	505	505	0
1921	522	521	1
1922	755	754	1
1923	1,307	1,306	1
1924	1,073	1,073	0
1925	748	748	0
1926	1,307	1,307	0
1927	222	222	0
1928	186	186	0
1929	20	20	0
1930	139	139	0
1931	159	159	0
1932	66	66	0
1933	2	2	0
1934	193	193	0
1936	23	22	1
1937	133	133	0
1938	139	139	0
1939	169	169	0
1940	65	65	0
TOTAL	18,219	17,164	1,055

Retirements by Years

Year Installed	Number	Year	Number	Year	Number	Year
1891	1	1935				
1895	1	1937				
1896	1	1928	5	1934	1	1935
	5	1936	13	1937	7	1938
	36	1939	24	1940		
1897	1	1929	1	1930	1	1931
	1	1932	1	1933	1	1934
	1	1935	5	1936	22	1937
	10	1938	25	1939	19	1940
1898	1	1930	2	1931	2	1933
	3	1934	4	1936	28	1937
	16	1938	37	1939	21	1940
1899	1	1931	9	1934	1	1935
	2	1936	16	1937	10	1938
	19	1939	12	1940		
1900	1	1934	1	1936	2	1937
	2	1938	6	1939	1	1940
1901	1	1934	1	1936	1	1937
	3	1938	3	1939	3	1940
1902	2	1928	2	1929	2	1931
	2	1932	9	1934	3	1935
	8	1936	59	1937	32	1938
	86	1939	43	1940		
1903	1	1928	2	1929	2	
	6	1931	4	1933	15	
	7	1935	9	1936	57	
	20	1938	80	1939	41	
1904	1	1938	5	1939		
1905	1	1929	1	1937		
1906	1	1934				
1907	1	1940				
1908	1	1938				
1910	1	1931	2	1934	1	
	2	1936	12	1937	1	
	10	1939	7	1940		
1911	1	1934	2	1936	5	
	3	1938	7	1939	2	
1912	1	1934	9	1937	1	
	9	1939	3	1940		
1913	1	1934	2	1936	22	
	6	1938	30	1939	13	
1914	1	1937				
1917	1	1932				
1921	1	1940				
1922	1	1937				
1923	1	1939				
1936	1	1937				

¾-IN. DISC METERS

Year Installed	Number Installed	Number In Service	Number Retired
1916	15	15	0
1917	81	81	0
1918	5	5	0
1919	8	8	0
1920	16	16	0
1926	36	36	0
1929	11	11	0
1933	2	2	0
1940	0	0	0
TOTAL	422	422	0

1-IN. DISC METERS

Year Installed	Number Installed	Number In Service	Number Retired
1918	23	23	0
1923	12	12	0
1924	7	7	0
1925	7	7	0
1926	15	15	0
1927	12	12	0
1929	12	12	0
1930	8	8	0
1931	7	7	0
1933	4	4	0
1940	0	0	0
TOTAL	237	237	0

1½-IN. DISC METERS

Year Installed	Number Installed	Number In Service	Number Retired
1928	1	1	0
1929	1	1	0
1940	0	0	0
TOTAL	19	19	0

2-IN. DISC METERS

Year Installed	Number Installed	Number In Service	Number Retired
1927	1	1	0
1928	4	4	0
1929	1	1	0
1930	6	6	0
1931	3	3	0
1940	0	0	0
TOTAL	56	56	0

1½-in. Compound Meters

Year Installed	Number		
	Installed	In Service	Retired
1912	1	1	0
1913	4	4	0
1914	3	3	0
1915	7	7	0
1916	3	3	0
1917	2	2	0
1918	3	3	0
1919	1	1	0
1921	2	2	0
1922	4	4	0
1923	4	4	0
1924	4	4	0
1925	4	4	0
1926	2	2	0
1927	1	1	0
1928	3	3	0
1929	2	2	0
1933	1	1	0
1940	0	0	0
Total	51	51	0

2-in. Compound Meters

Year Installed	Number		
	Installed	In Service	Retired
1911	7	7	0
1912	14	14	0
1913	4	4	0
1914	3	3	0
1915	8	8	0
1916	7	7	0
1917	2	2	0
1918	4	4	0
1919	4	4	0
1920	1	1	0
1921	6	6	0
1922	8	8	0
1923	10	10	0
1924	10	10	0
1925	7	7	0
1926	8	8	0
1927	3	3	0
1928	2	2	0
1929	4	4	0
1940	0	0	0
Total	112	112	0

3-in. Compound Meters

Year Installed	Number		
	Installed	In Service	Retired
1910	4	4	
1911	2	2	
1912	3	3	
1913	2	2	
1915	2	2	
1916	6	6	
1917	1	1	
1918	1	1	
1920	1	1	
1921	1	1	
1922	1	1	
1923	5	5	
1925	1	1	
1926	1	1	
1929	1	1	
1932	1	1	
1934	1	1	
1940	1	1	
Total	35	35	

4-in. Compound Meters

Year Installed	Number		
	Installed	In Service	R
1910	1	1	
1911	1	1	
1912	7	7	
1913	6	6	
1914	2	2	
1916	3	3	
1917	3	3	
1918	1	1	
1920	3	3	
1921	1	1	
1922	3	3	
1923	2	2	
1924	2	2	
1925	3	3	
1926	1	1	
1928	3	3	
1929	3	3	
1930	1	1	
1933	1	1	
1937	1	1	
1940	0	0	
Total	48	48	

6-in. Compound Meters

Year Installed	Number		
	Installed	In Service	Retired
	1	1	0
	2	2	0
	4	4	0
	1	1	0
	1	1	0
	1	1	0
	1	1	0
	3	3	0
	2	2	0
	2	2	0
	2	2	0
	1	1	0
	1	1	0
	1	1	0
	1	1	0
	1	1	0
	1	1	0
	2	2	0
	0	0	0
	28	28	0

8-in. Compound Meters

	Number		
	Installed	In Service	Retired
	1	1	0
	4	4	0
	1	1	0
	1	1	0
	1	1	0
	0	0	0
	8	8	0

3-in. Crest Meters

	Number		
	Installed	In Service	Retired
	2	2	0
	1	1	0
	1	1	0
	0	0	0
	4	4	0

4-in. Crest Meters

	Number		
	Installed	In Service	Retired
	1	1	0
	4	4	0
	0	0	0
	5	5	0

3-in. Current Meters

Year Installed	Number		
	Installed	In Service	Retired
1904	4	4	0
1940	0	0	0
Total	4	4	0

4-in. Current Meters

Year Installed	Number		
	Installed	In Service	Retired
1906	1	1	0
1912	1	1	0
1940	0	0	0
Total	2	2	0

6-in. Current Meters

Year Installed	Number		
	Installed	In Service	Retired
1906	1	1	0
1940	0	0	0
Total	1	1	0

⅝-in. Piston Meters

Year Installed	Number		
	Installed	In Service	Retired
1890	1	1	0
1891	79	32	47
1892	123	42	81
1893	140	62	78
1894	156	57	99
1895	36	2	34
1896	278	105	173
1897	180	68	112
1898	107	41	66
1899	115	43	72
1900	347	138	209
1901	438	182	256
1902	90	40	50
1903	145	61	84
1904	22	5	17
1909	1	1	0
1919	1	1	0
1936	1	1	0
1937	317	317	0
1938	83	83	0
1940	0	0	0
Total	2,660	1,282	1,378

⅝-in. Piston Meters (contd.)

Retirements by Years

Year Installed	Number	Year	Number	Year	Number	Year
1891	12	1937	7	1938	13	1939
	15	1940				
1892	1	1935	14	1937	8	1938
	23	1939	35	1940		
1893	1	1934	16	1937	14	1938
	19	1939	28	1940		
1894	18	1937	19	1938	24	1939
	38	1940				
1895	9	1937	6	1938	6	1939
	13	1940				
1896	1	1933	27	1937	40	1938
	35	1939	70	1940		
1897	1	1935	1	1936	27	1937
	16	1938	39	1939	28	1940
1898	13	1937	16	1938	15	1939
	22	1940				
1899	1	1936	19	1937	9	1938
	20	1939	23	1940		
1900	50	1937	48	1938	40	1939
	71	1940				
1901	60	1937	36	1938	51	1939
	109	1940				
1902	1	1935	7	1937	10	1938
	16	1939	16	1940		
1903	21	1937	14	1938	20	1939
	29	1940				
1904	4	1937	2	1938	6	1939
	5	1940				

3-in. Piston Meters

Year Installed	Number Installed	In Service	Retired
1897	1	1	0
1900	1	1	0
1940	0	0	0
Total	2	2	0

4-in. Protectus Meters

Year Installed	Number Installed	In Service	Retired
1918	1	1	0
1919	2	2	0
1921	1	1	0
1922	1	1	0
1940	0	0	0
Total	5	5	0

6-in. Protectus Meters

Year Installed	Number Installed	In Service	Retired
1916	1	1	
1918	2	2	
1919	17	17	
1920	7	7	
1921	1	1	
1923	4	4	
1924	2	2	
1925	1	1	
1926	1	1	
1940	0	0	
Total	36	36	

8-in. Protectus Meters

Year Installed	Number Installed	In Service	Retired
1919	15	15	
1920	1	1	
1922	5	5	
1923	1	1	
1924	2	2	
1940	0	0	
Total	24	24	

6-in. Detector Meters

Year Installed	Number Installed	In Service	Retired
1913	1	1	
1924	1	1	
1931	1	1	
1940	0	0	
Total	3	3	

4- × 1-in. Valve Meters

Year Installed	Number Installed	In Service	Retired
1897	1	1	
1912	1	1	
1927	1	1	
1928	1	1	
1929	4	4	
1940	0	0	
Total	8	8	

6- × 1-in. Valve Meters

Year Installed	Number Installed	In Service	Retired
	1	1	0
	1	1	0
	0	0	0
	2	2	0

6- × 1¼-in. Valve Meters

Year Installed	Number Installed	In Service	Retired
	3	3	0
	7	7	0
	4	4	0
	7	7	0
	5	5	0
	3	3	0
	4	4	0

6- × 1½-in. Valve Meters (contd.)

Year Installed	Number Installed	In Service	Retired
1932	2	2	0
1933	2	2	0
1940	0	0	0
Total	37	37	0

6- × 2-in. Valve Meters

Year Installed	Number Installed	In Service	Retired
1908	1	1	0
1924	1	1	0
1925	2	2	0
1940	0	0	0
Total	4	4	0

Hydrants

3- to 10-in. Hydrants

Year Installed	Number Installed	In Service	Retired
1897	34	29	5
1898	85	77	8
1899	52	47	5
1900	46	42	4
1901	30	27	3
1902	25	23	2
1903	17	17	0
1904	27	27	0
1905	37	35	2
1906	15	14	1
1907	73	62	11
1908	43	39	4
1909	4	4	0
1910	13	13	0
1911	19	18	1
1912	16	14	2
1913	37	35	2
1914	38	37	1
1915	31	30	1
1916	22	22	0
1917	17	17	0
1918	7	6	1
1919	29	29	0
1920	10	10	0
1921	54	54	0
1922	68	68	0
1923	77	77	0
1924	58	58	0

3- TO 10-IN. HYDRANTS (contd.)

Year Installed	Number Installed	Number In Service	Number Retired
1925	48	48	0
1926	28	28	0
1927	41	41	0
1928	31	31	0
1929	35	34	1
1930	27	27	0
1931	26	26	0
1932	6	6	0
1933	6	6	0
1934	20	20	1
1935	9	9	0
1936	9	9	0
1937	10	10	0
1938	10	10	0
1939	5	5	0
1940	10	10	0
TOTAL	1,726	1,576	13

Retirements by Years

Year Installed	Number	Year	Number	Year	Number	Year
1849	1	1911	1	1924	1	1940
1860	1	1938				
1868	1	1923	1	1932	1	1934
1869	1	1908	1	1909	1	1924
	1	1929	1	1932	1	1934
	1	1937				
1870	1	1925	1	1928	1	1931
1871	1	1921	1	1923	1	1925
1873	1	1924	1	1933		
1874	1	1930	1	1931	1	1940
1876	1	1930				
1877	1	1929				
1879	1	1938				
1881	1	1930	1	1936		
1882	1	1929	1	1937		
1885	2	1924	1	1931	1	1936
	2	1940				
1886	1	1915	1	1923	1	1928
	1	1930	1	1939		
1887	1	1912	1	1919	2	1925
	1	1928	1	1929	1	1930
	3	1934	1	1937	2	1938
	1	1939				
1888	1	1924	2	1926	1	1928
	2	1930	2	1931	1	1939
	2	1940				
1889	1	1925	1	1926	1	1930
	1	1933	1	1934		
1890	1	1922	1	1933		
1891	1	1925	1	1927		
1892	1	1928	1	1931	1	1934
	1	1937	1	1938		
1893	1	1925	1	1936		
1894	1	1939				
1895	1	1907	1	1924	1	
1896	1	1923	1	1930	2	
	1	1937	1	1938		
1897	1	1918	1	1924	1	
	1	1935	1	1938		
1898	1	1922	1	1925	2	
	1	1931	1	1932	1	
	1	1936				
1899	1	1921	1	1922	1	
	1	1934	1	1940		
1900	2	1934	2	1940		
1901	1	1920	1	1922	1	
1902	1	1920	1	1928		
1905	1	1925	1	1929		
1906	1	1940				
1907	1	1921	1	1923	2	
	2	1929	1	1930	1	
	2	1936	1	1939		
1908	1	1922	1	1923	1	
	1	1935				
1911	1	1938				
1912	1	1922	1	1923		
1913	1	1913	1	1931		
1914	1	1924				
1915	1	1924				
1918	1	1937				
1929	1	1935				

Clinton, Iowa—Survival and Retirement Experience With Water Works Facilities

As of December 31, 1939

THE privately-owned Clinton Water Works Company is a subsidiary of the American Water Works & Electric Company, Inc., serving the city of Clinton, Iowa, and a small area outside the city limits.

The city of Clinton, the county seat of Clinton County, is situated in the east central part of Iowa on the Mississippi River about 130 mi. west of Chicago. It was first settled in 1855 and incorporated as a village in 1857. At the time of the original construction of the Clinton Water Works, in 1874–1875, the population was 7,500. From that time until 1910 Clinton experienced a fairly steady growth, but since 1910 there has been little increase in population. The 1940 census gave the population of the city as 26,270.

Clinton was originally a lumber manufacturing center of considerable importance and had at one time what was considered the largest saw mill in the world. With the decline of the lumber business on the Mississippi River the town suffered considerably, but there has been gradually built up a diversified industrial activity of a diversified nature. The Du Pont Company recently built a large cellophane plant on the outskirts of the city.

The territory served is therefore both residential and industrial. As of December 31, 1939, there were 6,638 consumers, 91.9 per cent of whom were served through meter measurement. There were in the system about 75 mi. of mains with 576 hydrants. The average daily pumpage during 1939 was 2.57 mil.gal. of which about 64.5 per cent was measured through consumers' meters. This pumpage is equivalent to about 99 gpd. per capita.

Development of Existing System

The original Clinton Water Works franchise was granted in 1874 and the system was built during 1874–1875. Under this franchise the company was granted the right to construct and maintain its pumping station and to develop the water supply in the public park on the river front where it has since been maintained.

The original supply was taken from the Mississippi River and filtered through boxes filled with sand which were placed in the bottom of a rectangular well 53 ft. long, 12 ft. 6 in. wide and 25 ft. deep, divided by a central wall. From the well the water flowed through a tunnel into a suction well. There is no definite record of how long this method was used.

In 1886 two artesian wells were installed and when a new contract was made in 1889 the use of Mississippi water as a regular source of supply was abandoned and wells at or adjacent to the pumping station have since that time formed the source of supply.