

PATERSON—Continued.

Kind of power used: Steam and water.

Description of water-wheels: Built by Stout, Mills, & Temple, Dayton, Ohio; one 54 inches diameter, 8 feet head, 64 revolutions per minute; one 48 inches diameter, 28 feet head, 135 revolutions per minute; 10 gallons of water required to lift one gallon to reservoir (average).

Description of boilers: Two horizontal tubular, 15 feet long; 46 3-inch tubes; fuel, egg-coal.

Description of engine: Condensing; 24 inches diameter, 4 feet stroke, 40 strokes per minute; Hewes' patent valves; surface condenser.

Cost of engine and pumps: \$40,000.

Remarks: Water pronounced very pure by silk-dyers, who require the best.

TRENTON:

Population: 29,910 inhabitants.

Name of corporation: Trenton Water-Works (municipal).

Water obtained from: Delaware river above tide-water.

Cost of dam: \$15,000.

Water first introduced: In 1855.

Description of distributing reservoir: Open reservoir.

Sizes of distributing mains: 16 to 2 inches.

Available head: 6 to 85 feet.

Total length of distributing mains: 35 miles.

Number of water-takers: About 5,000.

Consumption of water: 1,250,000 gallons per day (estimated).

First cost of water-works: \$100,000.

Average annual cost of maintenance and repairs: \$8,830.

Filtering apparatus: 60 by 100 feet area; tile at bottom; 4 layers of gravel, each layer diminishing 1 foot of river; sand on top; cleaned once a year.

Number of fire-plugs: 200.

Design and dimensions of pumps and water-plungers: Pumps made by William Wright, Newburg, New York, and Charles Carr, Trenton, New Jersey; bucket-plungers 16 inches diameter, 5 feet stroke, 20 strokes per minute; pump-barrel, 16 inches diameter.

Time pumps are run during the year: Wright engine and pump, 1,560 hours; Carr engine and pump, 185 hours; water-wheel and pump, 7,249 hours; total, 8,994 hours.

Time spent in repairs: 244½ hours per year.

Description of force-main: 4 miles long, 16 inches diameter; ½ mile long, 10 inches diameter; 50 pounds pressure on pumps.

Description of water-valves: Wright, perpendicular; Carr, hinge.

Kind of power used: Steam and water.

Description of water-wheel: One Ohio turbine, 4 feet diameter, 14 feet head, 20 revolutions per minute; 8 gallons of water required to lift 1 gallon to reservoir.

Fuel used: Plymouth broken coal.

Description of engine: Condensing compound; high-pressure cylinder 12 inches diameter, low-pressure cylinder 16 inches diameter, 5 feet stroke each, 20 strokes per minute; Wright's automatic valves.

Cost of engine and pumps: \$30,000.

Duty of engine: Capacity of Wright's engine and pump, 2,000,000 gallons in 24 hours; actual amount pumped yearly by all the pumps, 596,271,297 gallons; water-wheel pumps alone 448,930 gallons.

NEW YORK.

COHOES:

Population: 19,416 inhabitants.

Name of corporation: Cohoes Water-Works (municipal).

Water obtained from: Mohawk river.

Character and dimensions of dam: 144 feet long, 9 feet high (average); stone, capped with limestone; built diagonally across Mohawk river.

Cost of dam: \$160,000.

Water first introduced: In 1859.

Description of main conduit: Diameter, 16 and 12 inches; cast iron; head, 130 to 245 feet.

COHOES—Continued.

Description of distributing reservoirs: On elevation; one built in clay soil and the other in clay and gravel; capacity, 4,000,000 and 8,000,000 gallons.

Sizes of distributing mains: 16 to 4 inches.

Available head: 130 to 240 feet.

Total length of distributing mains: About 12 miles.

Consumption of water: 30 gallons per head per day (estimated).

First cost of water-works: \$160,000.

Average annual cost of maintenance and repairs: \$13,000 to \$15,000.

Number of fire-plugs: 135.

Design and dimensions of pumps and water-plungers: Geyelin, Philadelphia; built at Cohoes in 1858-'59 and 1868-'69; two plain plungers, 10 and 10 inches diameter, 5 and 6 feet stroke, 12 to 16 strokes per minute; pump-barrels, 10 inches by 5 feet, 16 inches by 6 feet.

Time pumps are run: Almost constantly.

Time spent in repairs: About five days per year.

Description of force-main: 1,250 feet long, 10 inches diameter; 3,400 feet long, 16 inches diameter; 20 to 70 pounds pressure on pumps.

Description of water-valves: Clack-valves.

Kind of power used: Water.

Description of water-wheels: 2 Jouval turbines, one 4 feet diameter, one 3 feet 6 inches diameter, 30 and 40 horse-power; 14 feet head; 70 revolutions per minute; 12½ gallons required to lift 1 gallon to reservoir.

Remarks: Water impure only after freshets.

HUDSON:

Population: 8,670 inhabitants.

Name of corporation: Hudson Water-Works (municipal).

Water obtained from: Hudson river.

Capacity of receiving reservoir: 4,000,000 gallons.

Water first introduced: In 1874.

Description of conduit: 7,215 feet long, 12 inches diameter; iron; head, 130 feet (average).

Description of distributing reservoir: Area at crest line, 32,696 square feet; 20 feet deep; capacity, 3,200,000 gallons.

Sizes of distributing mains: 12, 6, 4, and 3 inches.

Available head: 80 pounds (average).

Total length of distributing mains: 12½ miles.

Number of water-takers: 888.

Consumption of water: 830,000 gallons per day (average).

First cost of water-works: \$250,000.

Average annual cost of maintenance and repairs: \$10,000.

Filtering system: 13½ feet deep; area at crest, 15,081 square feet; surface of sand, 9,081 feet; stone gravel; cleaned every six weeks (average).

Number of fire-plugs: 177.

Design and dimensions of pump and water-plungers: Clapp & Jones, Hudson, New York, 1874; 2 plain plungers, 8 inches diameter, 36 inches stroke, 34 strokes per minute; pump barrel, 36 by 8 inches.

Time pump is run: 12 hours per day (average).

Time spent in repairs: 1 hour per day (average).

Description of force-main: 7,215 feet long; 311.9 feet head on pump.

Description of water-valves: Rubber; made by Clapp & Jones.

Kind of power used: Steam.

Description of boilers: Tubular; 16 by 5½ feet; 40 pounds pressure, 8 pounds by 1 pound coal; fuel, Pittston coal.

Description of engine: Condensing; 36 by 25 inches, 34 strokes per minute; slide-valves; jet-condenser, 15 by 26 inches; lifting-pump.

Cost of engine and pump: \$34,000.

Duty of engine: 77,000,000 foot-pounds daily; 50,000,000 foot-pounds guaranteed.

LYONS:

Population: 3,820 inhabitants.

Name of corporation: Rawley Water-Works (private).

Water obtained from: Springs.