CONCISE STATEMENT,

GIVING THE

DIMENSIONS, CAPACITY & EXTENT

OF THE IMPORTANT DETAILS OF

CLEVELAND WATER WORKS

—FOR GENERAL REFERENCE—

AKEN FROM REPORTS AND THE PLANS FROM WHICH THE WORKS ARE BEING CONSTRUCTED.

Inlet-Pipe.

The Inlet-pipe extending from the shore into Lake Erie, made of boiler plate, $\frac{3}{8}$ inch thick, 50 inches diameter, nd 300 feet long.

Inlet-Tower.

The water for the supply of the city is obtained at a oint in Lake Erie, 300 ft. from the shore, and 400 ft west f the western terminus of the Old River Bed (so called), here the inlet-pipe terminates in a circular Tower, constructed of piles driven as deep as they can be forced into he bottom of the Lake, at 12 feet depth of water. The iles are driven to form two distinct circles, two piles breast, leaving 6 feet space between the outer and interior ircles, having the space between filled with stone to the

top of the piles. The piles are capped with strong timber framing, securely bolted and fastened with iron. The outside diameter of the Tower is 30 feet, and the inside diameter is 10 feet, forming a water chamber over the end of the inlet-pipe. An iron grating is fixed in the Tower, through which water from the Lake, 4 feet below the surface, passes into the water chamber and out at the inlet-pipe.

Aqueduct.

The Aqueduct connects with the inlet-pipe at the Lake shore, and conveys the water from the inlet-pipe to the pump-well at the engine house, a distance of 3550 feet. The shape of the Aqueduct is oviform; the horizontal width is 4 feet, and the vertical depth inside 5 feet. The width of annular ring 8 inches, built throughout of hard burnt brick, laid in hydraulic mortar.

Engine House Foundations.

The Engine House Foundations are built of stone, laid on two cross courses of 12 inch square timbers, 2 feet deep, placed 12 inches apart, with all the spaces between the timbers filled with concrete. The masonry is commenced by laying one course of stone in blocks, 1 foot thick, $2\frac{1}{2}$ ft. wide, and 5 feet long, on which invert arches are turned over the whole surface to support a system of walls so arranged with top arches as to make an engine-room floor of masonry perfectly fire-proof, and to equally distribute the weight of Engine House walls, Stand-pipe and Pumping Engines thrust upon the Foundations. The Foundations are $105\frac{2}{3}$ ft. long, 56 ft. wide, and 21 ft. deep from the timbering to the top. All the masonry from the timbering

to 2 ft. above the level of Lake surface, is laid in hydraulic mortar, and the balance in rich common mortar, well grouted in every course.

Engine House.

The Engine House is built of brick, with roof, cornice, door and window frames of iron. The Main building, containing the pumping engines, is 46½ ft. front, 52⅓ ft. width, and 48 ft. height to the cornice. The side wings, each containing a battery of boilers, are 29¼ ft. front, 52⅓ ft. width, and 23½ ft. high to the cornice. Entire length of Engine House, 105 feet.

The Tower enclosing the stand pipe forms a part of the Engine House, projecting from the roof 159 ft. above the surface of the ground.

Pumping Engines.

The main building of engine house contains two purely Cornish Beam Engines (duplicates), each of the following dimensions and capacity, viz.:

Steam Cylinder, 70 inch. diameter, 10 ft. stroke of piston.

Beam for carrying the main-pump plunger is double and unequal; the long end of the Beam, from the steam cylinder to fulcrum is 15 ft. 11 inches. The short end, from fulcrum to Pump-plunger, is 13 ft. 11½ inches. Whole length of beam between end centers is 29 ft. 10½ inches. Width across the fulcrum is 6 ft. 8 inches. Weight of beam, with centre-shaft, 40 tons.

Working velocity of Engine, 9 strokes per minute.

The Engine making 9 strokes per minute, exerts 120 horse power.

Available power of Engine, 200 horse power.

Cornish Boilers.

There are three Boilers, 6 ft. diameter, 28 ft. long: each Boiler containing a fire-box and four flues. The two upper flues are 17 inches diameter, and the two lower ones are 15 inches diameter.

Main Forcing Pump.

Each Cornish Engine works one single action Pump (for forcing water to the reservoir), with plunger, 30 in. diameter, 8 ft. 10 in. stroke.

Lift of water by suction from Pump-well, 10 ft.

Height of column of water (above suction lift) forced by plunger, 140 ft.

Whole height to which water is elevated from surface of Lake Erie to top water line of reservoir, 150 ft.

Weight of column of water forced by plunger, 42,875 lbs., nearly 19 tons.

Weight of column of water lifted by vacuum, 3062 lbs.

Total weight of united columns, 150 ft. high, 45,937 lbs., 21 tons nearly.

Load on Pump-plunger is equal to a column of water 30 in. diameter, 140 ft. high, added to one-quarter of its weight, usually allowed for friction of the machinery= 51,450 lbs., or 23 tons; which together with the suction lift (atmospheric load), 3,062 lbs., make up the amount of load and resistance to be overcome by the power of Cornish Engine=54,512 lbs., or 24 tons, 752 lbs. total load.

Each down stroke of the plunger elevates at the reservoir
:0 U. S. standard gallons of water.

The Stand-pipe is made of boiler plate, $\frac{3}{8}$ in. thick at the Stand-Pipe
ttom, tapering to $\frac{1}{16}$ in. thick at the top. It is 36 in.
ameter, and 148 feet to the top above engine room floor.
Height of column of water in Stand-pipe on a level with
p water line at reservoir, 138 ft. above engine room floor.
Weight of column of water in Stand-pipe, thrust on
one foundations of engine house, 42,262 lbs.

The Pump-main (cast), 24 in. diameter, 3000 ft. long, Pump-Main.
nnects with the stand-pipe and conveys the water (ele-
ted by the pump) from the engine house to the reservoir.

The Reservoir is constructed of earth by first raising a Reservoir.
lid embankment 21 ft. above the natural surface of the
ound to obtain the desired elevation.

From surface of Lake Erie to bottom of solid embank-
ent, 111·28 feet.

On the solid embankment, retaining embankments are
ised (to form the Reservoir basin) 25 ft. high, 100 ft.
idth of base, and 15 ft. width at top. The inside slope
$1\frac{3}{4}$ to 1, and the outside slope $1\frac{1}{2}$ to 1.

The inside of Reservoir is lined with impervious clay
ddle, 2 ft. thick, covered with hard burnt brick laid in
draulic mortar.

The Reservoir (to prevent overflow) is provided with a
) inch waste-pipe, placed at the top water line, to carry
f surplus supply.

Depth of water in Reservoir at top water line, is 20 ft.

The Reservoir is furnished with usual hydranlic machinery.

Top water line at Reservoir above surface of Lake Erie (at high water mark), 150 ft.

Inlet-pipe (Pump-main), 24 in. diameter.

Two outlet-pipes (supply mains), 20 in. diameter.

The outside of Reservoir embankments is turfed with sod.

The top of Reservoir embankment has a gravel walk 8 ft. wide, which is reached by a flight of stone steps on front slope.

On the inside of gravel walk, an iron lattice fence encloses the Reservoir basin.

The grounds about the Reservoir are enclosed with an iron fence, and ornamented with walks, shade trees, and shrubbery. A fountain in the foregronnd plays a jet of water at pleasure.

The Reservoir capacity equals 6,000,000 U. S. standard gallons.

Water Pipes.

The Main Pipe, 20 in. diameter, for supplying the city east of Cuyahoga river, is - - - - - - 9,500 feet long.

The portion of the main crossing under the river is made of boiler iron, $\frac{3}{8}$ in. thick, 24 in. diameter, 225 ft.

The main for supplying the city west of the river, is 20 in. diameter, reduced to 16 in. diameter, - - - - - - - - - 1,200 " "

10,700 " "

Brought over, - - - - - - - -					10,700	feet long.
xtent of Distributing pipe, 16 in. diam.					1,450	" "
" " " "	10	"			4,900	" "
" " " "	8	"			6,350	" "
" " " "	6	"			15,900	" "
" " " "	4	"			27,850	" "
amp Main, - - - - - - - - - -					3,000	" "
					70,150	" "

Whole extent of Water Pipe 70,150 ft., or 13 miles 51 feet.

Weight of Water Pipes, 2008 gross tons.

Estimated weight of lead to lay Pipes, 100 gross tons.

For the whole system of water pipes, 202 Stop-valves e used. Stop-Valves.

For extinguishing fires, 200 Fire Hydrants are used. Fire Hydrants.

Estimated cost of Water Works, $436,419 84. Estimated Cost.

By order of the Board,

T. R SCOWDEN,

Engineer.

CLEVELAND, April 6th, 1855.