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HISTORICAL  
AND  
STATISTICAL ACCOUNT  
OF THE  
CINCINNATI WATER DEPARTMENT,  
WRITTEN FOR THE BENEFIT OF THE  
THIRTIETH MEETING  
OF THE  
AMERICAN ASSOCIATION

FOR THE ADVANCEMENT OF SCIENCE,

HELD IN

CINCINNATI, AUGUST 17th, 1881.

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CINCINNATI:

PETER G. THOMSON, ARCADE BOOKSTORE.

1881.

*Historical & Philosophical Review*  
*of Ohio*

## Location of the Works.

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### MAIN PUMPING WORKS AND LOW SERVICE RESERVOIR.

East Front street, East of Little Miami Railroad, take East  
and West End cars.

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### GARDEN OF EDEN RESERVOIR, (Middle Service).

Eden Park, take Highland House Incline cars.

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### HUNT STREET PUMPING WORKS.

Take Avondale or Gilbert Avenue (Walnut Hills) cars.

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### WESTERN HILL PUMPING WORKS.

Foot of Price's Incline, take Eighth street cars.

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### WESTERN HILL TANK.

Take Eighth street cars, and Price's Incline.

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### MT. AUBURN TANKS.

Take Main street cars and Mt. Auburn Incline.

## BOARD OF PUBLIC WORKS.

DAVID BAKER, PRESIDENT.  
FRANK TUCKER,  
E. C. BOYCE,  
JNO. D. CALDWELL,  
JNO. E. BELL.

## COMMITTEE ON WATER WORKS.

J. D. CALDWELL. E. C. BOYCE. J. E. BELL.

## OFFICERS OF THE WATER DEPARTMENT.

A. G. MOORE,  
*Superintendent and Engineer.*

THOS. J. BELL,  
*Assistant Superintendent.*

RICH. E. ZEIDLER,  
*Secretary.*

JNO. DRAPER,  
*Paymaster.*

JNO. W. RAHN,  
*Engineer, in Charge of Front Street Works.*

JOS. H. STREHLI,  
*Engineer, in Charge of Hunt Street Works.*

BEN. F. GOSSIN,  
*Pipe Inspector.*

## HISTORICAL AND STATISTICAL ACCOUNT

OF THE

## CINCINNATI WATER DEPARTMENT.

The permanent system of water supply was commenced in 1817, when City Council granted to the Cincinnati Manufacturing Company the privilege of supplying the City with water for 99 years at an annual consideration of one hundred dollars—the water to flow three feet above the first floor of James Ferguson's kitchen, on West side of Vine between 6th and 7th streets by 1820.

The first water was drawn from a wooden penstock at Sycamore Street and Lower Market July 1821, being raised by horse power from Ohio River at the present site of pumping works, and forced into a wooden reservoir and from thence delivered through wooden pipes to water consumers.

The Cincinnati Manufacturing Company transferred its privileges in 1820 to Samuel W. Davis, and by him sold to Cincinnati Water Co. in 1825. The entire works were purchased by the city in 1839, for the sum of three hundred thousand dollars, and consisted of—

19 miles of wooden pipes,

3½ miles of Iron pipe,

Reservoir in three compartments of 1,700,000 gallons capacity.

Two high pressure pumping engines with a capacity of 4,200,000 gallons per 24 hours.

The management of the Water Department was vested first with a Board of Directors composed of one Councilman from each ward. In 1847 this power was given by act of Legislature, to a Board of three Trustees elected by the people, and in 1876 the Board of Public Works was established, which assumed entire control of all the public works, including the water works.

The city is supplied by pumping and reservoir system, with a main and two auxiliary pumping works, and four distinct reservoir or distributing services.

The main work is located on the bank of the Ohio river, and takes its supply through two stone aqueducts each 50 feet in length. The western one is extended 40 feet further into the channel of the river by two forty inch wrought Iron pipes

The pumping engines at these works are—

No. 3—Duplex Non-condensing Rotative—erected 1844.

Steam cylinder, 23 in. x 10 ft.

Pumps, double acting, 14 in. x 10 ft.

Mains, 17 in. x 750 ft.

Capacity, 5,000,000 gallons.

No. 4—Single Condensing Rotative, erected 1850.

Steam cylinder, 45 in. x 8 ft.

Air pump, 36 in. x 3 ft.

Pump, double acting, 18 in. x 8 ft.

Capacity, 4,500,000 gallons.

No. 5—Duplicate of No. 4—erected 1854.

No. 6—Single Condensing, Direct Acting—erected 1865.

Steam cylinder, 100 in. x 12 ft.

Air pump, 32 in. x 12 ft.

Pump, double acting, 18 in. x 8 ft.

Capacity, maximum, 20,000,000 gallons.

“ available, 12,000,000 gallons.

No. 7—Duplex Non-condensing Rotative—erected 1874.

Steam cylinder, 28 in. x 8 ft.

Pumps, 23½ in. x 8 ft.

Plunger, 16½ in. x 8 ft.

Main, 14 in. x 3690 ft.

Capacity, 7,500,000 gallons.

No. 8—Duplicate of No. 7 Power.

No. 4 and 5 engines deliver their water into the Low Service No. 1 Reservoir against a frictional head of 171 feet, and the other powers into Middle Service Reservoir with a head of 245 ft.

Steam is furnished by four batteries of four boilers—two batteries of three boilers, and one battery of five boilers, all flue boilers with external furnace, save in one battery.

A number of smoke abating devices have been tried but without practical success.

Last year the works pumped 7,285,371,595 gallons against an average head of 223 feet, consuming 17,523 tons coal. The pumping expense was \$101,222.24.

There are two auxiliary or second lift pumping works, for supplying the hill-tops. The main one is located on Hunt street, and furnishes water for Mt. Auburn, Walnut Hills and Mt. Adams. It contains two duplex engines—one of four and the other of two millions capacity. The frictional head is 264 feet, and the length of pumping main 7,206 feet. During 1880 this service pumped 563,082,800 gallons of water, with a consumption of 1,409 tons coal. The pumping expense was \$13,701.08.

The reservoirs are—

Low Service No. 1, built 1850, 5,000,000 capacity.

Middle Service No. 2, built 1836-78, 100,000,000 capacity.

High Service No. 3, built 1869, two iron tanks each 60 feet diameter, 38 feet high,  $\frac{3}{4}$  million capacity.

Western Hill Tank was 100 feet diameter by 48 feet high. The thickness of sheets was :

1st or lowest ring,	$\frac{5}{8}$ inch.
2d	" $\frac{9}{16}$ "
3d	" $\frac{1}{2}$ "
4th	" $\frac{7}{16}$ "
5th	" $\frac{3}{8}$ "
6th	" $\frac{5}{16}$ "
7th	" $\frac{1}{2}$ "
8th	" $\frac{1}{4}$ "
9th	" $\frac{1}{4}$ "
10th	" $\frac{1}{4}$ "
11th	" $\frac{1}{4}$ "
12th	" $\frac{1}{4}$ "
Bottom	" $\frac{3}{8}$ "

Plates 4 feet by 12 feet, vertical joints for first five rings were butt ends and double riveted on each side of seam. Material used was Bessemer steel. Tensile strength required by specifications 65,000 pounds. The test resulted as follows:

	Lowest	Highest
Bottom,	70,300	72,000
1st ring,	60,820	79,300
2d "	71,200	88,200
3d "	72,000	75,200
4th "	70,000	75,000
5th "	80,200	80,300
7th "	79,500	85,800
$\frac{1}{4}$ inch sheets,	80,000	86,400

The tank was completed during spring of 1880, and tested to height of 37 feet, June 30, 1881, when it gave way.

The principal distributing mains are :

Two 36 inch mains from Middle Service Reservoir.

Two 20 inch mains from Lower Service Reservoir.

The size of mains in use January 1, 1881 :

55,933 ft.,	3 inch.	
486,027 ft.,	4 "	
2,040 ft.,	5 "	
133,805 ft.,	6 "	
47,663 ft.,	8 "	
145,394 ft.,	10 "	
193 ft.,	12 "	
603 ft.,	14 "	Wrought iron.
21,346 ft.,	16 "	
78,029 $\frac{1}{2}$ ft.,	20 "	
5,607 ft.,	24 "	

582 ft.,	30	"	
7,337 ft.,	35	"	
4,783 ft.,	36	"	
3,782 ft.,	40	"	
3,294 ft.,	46	"	Pump main.
803 ft.,	50	"	"
Number of miles of pipe in use,			189
Number of valves in use,			2,334
Number of branches or taps,			23,627
Number of meters,			545
Number of hydraulic elevators,			318
Daily average consumption of water			
for 1880 was,			19,476,739
Population,			260,000
Gallons of water per inhabitant per			
24 hours,			75
Largest consumption of water for			
one day, 1880,			27,951,391
Largest consumption of water for			
one day, 1881,			38,000,000
Increase due to excessive waste on account of in-			
tense warm weather,			

The present value of works is \$6,778,847.55, distributed as follows.

Hunt Street Pumping Works,	184,475.98
Front " " "	1,696,356.33
Third St. Reservoir and Property,	400,000.00
Mt. Auburn Tanks,	35,000.00
Water Mains,	2,706,864.58
Western Hill Supply,	58,603.61
Garden of Eden Reservoir,	1,670,225.55
Office Fixtures,	5,000.00
Markley Farm,	22,321.50

The amount of outstanding water works bonds is \$1,625,000.00.

The water fund provides for the interest on the entire fund, and a sinking fund for \$600,000 of bonded indebtedness. The department furnishes free water to fire department and public buildings to the amount of \$40,000 per annum.

The net water rent receipts for 1880 were	\$499,857.36
Net expenses,	\$186,527.90
Net interest,	102,768.00
	<u>289,295.90</u>
Net gain (applied to extension of mains),	\$210,561.46