MAP OF THE CITY OF MILWAUKEE, Showing WATER WORKS 1874

Milwaukee, Lith & Eng. Co.

Note: The portion of the city Colored Red is situate below a plane 25 feet above Lake Michigan.

REFERENCES.

Water Pipes — 30 inch, 20 inch, 16 inch, 12 inch, 8 inch, 6 inch, 4 inch

- Hydrants
- Surface Hydrants.
- Rail Roads
- Street Railways
- Churches.
- Circles indicate distances from Post office.
- Post Office.
- Court House & City Hall.
- Ward Schools.
- Contour Lines.

RESERVOIR 150 FT ABOVE THE LAKE 21,500,000 GALLS.

STAND PIPE

PUMPING WORKS

CRIB

MILWAUKEE & NORTHERN R.R.

NORTH SHORE L.E.

North St. Bridge

CANAL WATER POWER

RIVER

MILWAUKEE & St. PAUL R.WY. Pr. du Ch. Div.

MILWAUKEE & St. PAUL R.WY. LA CROSSE Div.

MENOMONEE RIVER

MIL. & St. PAUL RAIL WY CO. GROUNDS

SLAUGHTER HOUSES

DOCKS

QUENTIN'S PARK

RACE COURSE

Shooting Park

HOSPITAL

HOUSE OF CORRECTION

BRICK YARD

STOCK YARDS

LIGHT HOUSE

Kinikinik Cr.

Kinikinik Sta

CHICAGO & N.W. RAIL ROAD

CHICAGO & ST. PAUL R.R.

LAKE SHORE ROAD

CHICAGO ROAD

MILWAUKEE & WAUKESHA PLANK ROAD

MUSKEGO ROAD

JANESVILLE PLANK ROAD

MURWANAGO ROAD

BISHOPS BLANK ROAD

FOREST HOME

BAY VIEW

LAKE MICHIGAN

100 ft. above Lake

125 ft. above Lake

75 ft. above L.

50 ft. above L.

25 ft. above Lake

30 ft. above Lake

23 ft. above Lake

Milwaukee Water Works.

REPORT

— OF —

Board of Water Commissioners,

December 1st, 1873, to December 31st, 1874.

BOARD OF WATER COMMISSIONERS.

E. H. BRODHEAD, PRESIDENT.
GEORGE BURNHAM,
ALEXANDER MITCHELL,
JOHN PLANKINTON,
FREDERICK PABST,
GUIDO PFISTER,
JAMES C. SPENCER.

TREASURER.

DAVID FERGUSON,

CHIEF ENGINEER.

MOSES LANE,

SECRETARY

CHARLES MacRITCHIE.

Report of Board of Water Commissioners.

OFFICE OF BOARD OF WATER COMMISSIONERS,
MILWAUKEE, February 9th, 1875.

To the Honorable the Mayor and Common Council of the City of Milwaukee:

GENTLEMEN:—The Commissioners, in presenting this, their third Report, desire to say that, as they regard it as substantially their last Report, they have endeavored to present all the facts and information in their possession, together with such suggestions as they judged proper to make under the circumstances.

The Report of the Chief Engineer hereto attached gives a full and very clear description of all the work as constructed. Accompanying the Report are also sketches of the most important parts of the work.

There are also in the Engineer's office plans and drawings, all very essential to a full and complete understanding of the work; and a portion of them will be found very important in its management. A description of them is given in the Engineer's report.

The Secretary's Report, also hereto attached, is very much in detail, full and complete, and an examination

of it will show the resources from which the means have been obtained to construct the work, and it will also show where every dollar has been expended.

Our first meeting to organize was held April 18th, 1871.

The Hon. Edward O'Neill was elected President of the Board on the 5th of June, 1871.

We appointed Moses Lane, Chief Engineer, August 31st, 1871; David Ferguson, Treasurer, February 19th, 1872; Matthew Keenan, Secretary, March 2d, 1872.

The preparing of plans and estimates was commenced in October, 1871, and continued during the winter months, when surveys were made for the Reservoir and the site of the Pumping Works. The plan of the pipe distribution was perfected, surveys and borings made for a Lake tunnel, to determine the propriety of adopting that plan.

After a careful investigation of the subject, the plan of the works as built was adopted by the Board and approved by the City Council. Contracts for water-pipes were let March 8th, 1872, to Messrs. E. P. Allis & Co. of Milwaukee, and to several Iron Founders in New Jersey and Pennsylvania.

The contract for building the Reservoir was awarded to Messrs. G. & C. Peterson of Lockport, New York, April 9th, 1872, and the work of construction commenced on it the 19th of the same month.

The first contract for laying water-pipe was let May 8th, 1872, and the work commenced June 11th, and up to the end of that year thirteen and one-half miles had been laid.

The contract for building the Pumping Engines was awarded to Messrs. E. P. Allis & Co. of this city, May 10th, 1872.

The work of grading roadway, excavating foundations, and constructing wharf at the Pumping Works, North Point, was commenced in July, 1872, and prosecuted until the 15th of November, when the work had to be stopped for the winter.

The Engine foundations, Engine-house, Boiler-house and Coal-shed were finished in 1873, and also the lower portion of the Water Tower. The Lake crib was built. The abutments of the North street Bridge were built, but no progress had been made with the piers.

It being evident early in September, 1873, that the large Pumping Works at the Lake could not be completed in season to supply the city with water that year, the Commissioners decided to erect temporary Pumping Works on the west side of the Milwaukee River above the present North street Bridge.

These temporary works were completed in October. A pump of capacity to raise one and one-half million gallons of water into the Reservoir in twenty-four hours was bought and set in place.

The water was first pumped into the Reservoir October 24th, and on November 3d, when the depth of water in the Reservoir was about ten feet, it was let into the large mains through the city, and gradually into the smaller mains, this work occupying several days. The length of pipe laid at this time was about fifty-five miles. The supply of water to the city by the temporary works was constant and uninterrupted from its commencement until September 14th, 1874, when the large Pumping Engines erected at North Point were started, and have since supplied the city with Lake water.

It will be seen that the whole city was supplied with water for all purposes in one year and seven months from the time that ground was first broken for the construction of the Works.

Matthew Keenan resigned the office of Secretary February 3d, 1874, and we appointed for the office Charles MacRitchie, who had up to this time held the position of Principal Assistant Engineer.

The Hon. Edward O'Neill resigned the office of President of the Board of Commissioners April 4th, 1874. J. C. Spencer was appointed Water Commissioner in his stead April 13th, 1874.

E. H. Brodhead, Esq., was elected President of the Board of Water Commissioners June 9th, 1874.

The work on the piers of North street Bridge was

commenced early in 1874, and the whole structure completed and opened for traffic in December.

The water was first pumped directly into the Reservoir through the force main across the bridge, December 23d, 1874.

CONSUMPTION OF WATER.

The present daily consumption of water is one million two hundred and fifty thousand gallons. If it had been possible to introduce the lake water into the City earlier last season, there would undoubtedly have been a larger number of water takers now. Many citizens preferred not to use the river water for household purposes, and in consequence delayed making connections with the water mains. From present indications, however, and the inconvenience experienced generally during the winter from the supply of water falling short, it is anticipated that the number of water takers will be very largely increased during the season of 1875.

In addition to the seventeen hundred and eighty-seven permits now issued for house and other connections twenty branch pipes, from three to four inches diameter, have been put in to accommodate Breweries, Elevators, and other establishments requiring a large supply of water.

Five Hydraulic Elevators are now in operation in different business establishments in the city, and are supplied with power from the water-mains by means of

three-inch pipes. These Elevators work admirably, and can be operated at much less expense by water pressure than by steam.

ADMINISTRATION OF THE WORK—SECRETARY'S OFFICE.

The duties of the Secretary are to keep the records of the business of the Board, the various accounts, to make all payments, to make the assessments for water-pipe and water rates, and to collect the water-rates. In the Secretary's office are a clerk, one inspector, a Collector, and a Draughtsman. The duties of the latter have been to keep the books and plans of the Wards for assessment purposes posted up, besides acting as a General Assistant.

MAINTENANCE OF PIPE DISTRIBUTION.

This includes the inspection of the Hydrants, and all other work and repairs necessary to the efficiency of the water-pipe system. In winter it employs two Inspectors in each of the the three divisions of the City, whose duty it is to attend to the Hydrants, and keep them in good working order for fire purposes. Mr. John Cummings is Superintendent of this part of the Works.

For tapping the mains for house connections, there are employed a Tapper and helper, both of whom during the winter season act as Inspectors of Hydrants, and go to make up the number of six Inspectors employed.

There is a Keeper employed at the Reservoir, whose

duty it is to keep the Reservoir and its surroundings in proper order; he also makes observations of the depth and temperature of the water, and temperature of the air, and reports the same daily to the office of the Chief Engineer.

PUMPING WORKS.

Since pumping commenced with the large engines at North Point, the Board have made the following appointments:

One Engineer, at $125 per month.
" Assistant, " 75 " "
Two Oilers, " 60 " "
" Firemen, " 50 " "
" Coal-passers, at 40 " "

The monthly pay-roll for the service of the whole force employed here, viz., eight men, is five hundred dollars.

The Engineer keeps a daily record of the working of the Engines, the weight of coal consumed, etc., all of which is entered in a book prepared for this purpose, and reported to the General Office.

The works as now built are capable of supplying the City daily with sixteen million gallons of water, equal to supplying 320,000 inhabitants with fifty gallons each per day. To deliver this quantity would, however, involve the running of the Pumping Engines constantly. When the daily consumption of water reaches eight or

ten million gallons, it will be advisable to erect a second pair of Pumping Engines. There is space provided in the Engine House for this purpose.

The other enlargement of the Works will be the extension of the water-pipes to supply new streets; the number of miles required will be one or two every year.

It would best promote the interests and prosperity of the City to make these extensions yearly, as wanted.

Owing to the high price of iron during the building of the works, we kept down the amount of distribution pipes as much as a due regard to the City's interests would allow. Hence there will be a greater call than usual for water pipes to be laid in new streets the present year.

After a careful examination of the improved streets not at present supplied with water, it is our opinion that there should be about six miles of water-pipe laid the present year. A list of these streets is given in the appendix to this report. The pipe to be laid in these streets could now be purchased about twenty-five per cent. cheaper than during the building of the Works, on account of the present very low price of iron; they could probably be purchased much cheaper now than later in the season. We recommend that these pipes be contracted for, to be delivered as early as May or June of the present year. There will be required about forty-five fire Hydrants.

The Secretary's Report shows that the total cost of construction of Works to date is $1,855,401.39, to which must be added $50,000 as a further expenditure to fully complete the entire Work, including the percentage retained on contracts of $35,000, making a total expenditure of $1,905,401.39. It also shows that the total amount collected for water rates, and tapping, etc., amounts to $37,453.05 for 1874. It is proper for us to state that the actual cost of some portions of the Work has very much exceeded the previous estimates.

The principal Works to which this remark applies are the Engine House, including the foundations for the Engines, the supply pipe laid in the Lake, and the high Bridge over the Milwaukee River.

In the case of the Engine House, we had, in order to reach a foundation suitable for the Building and for the engines, to excavate 75 feet of earth in which there was more or less quicksand, which in the execution of the work presented obstacles that no human foresight could estimate the cost of beforehand. The work was all performed by day labor, and we are most happy to say in the most substantial and permanent manner. In considering the character of this portion of the work, it must be borne in mind that the success of the whole enterprise depends mainly upon its reliability and permanency; and, therefore, however large the expense might be, we determined it was better economy in the end to encounter it, rather than to take any risk what-

ever. This remark is also equally applicable to the North street Bridge. The large excess of cost here arises from the fact that it becamc nccessary to sink the foundations of the piers from fifteen to twenty-five feet in mud and water, in order to reach the *solid rock* on which each pier now rests, and the work is perfectly secure.

In reference to the supply pipe laid in the Lake, it is only necessary to say that a large portion of what may seem to be *additional cost* here, is due to the fact that the original estimates were based upon laying the pipe out from the shore 1,000 feet; but on a more careful examination it was decided to double the distance, and lay it 2,000 feet, thus more than doubling the expense of the work; but the advantage will more than balance the additional expense.

In a word, and in concluding this branch of our Report, we have this to say, that we have aimed to be economical in all of our expenditures; but we have in no single instance spared expense if by so doing there was even a chance that it would or might result in any hazard to the permanency of the work.

Before finally deciding on our plans, Mr. Lane, our Chief Engineer, and Mr. Keenan, our then Secretary, were appointed a Committee to visit all the principal Cities where any extensive plan of supplying them with water had been adopted, for the purpose of getting all the useful and practical information that was to be ob-

tained. This Committee collected a large amount of information which is embodied in a Report on file in our office. It will show the failures as well as the successes of many plans adopted in other cities, from which we have derived much benefit, and if our plans are a complete success it is due to the close and careful investigations which we have made before their adoption.

In this connection, it is but justice to say that the plan of making the cost of the minor pipe a charge to the lots in front of which any pipe, whether for main or supply purposes, was laid, was recommended by all the Commissioners of the cities visited, whether the plan was in force with them or not, and we feel assured from our experience that is a most desirable and conservative measure. Hereafter, as the extension of the pipe is made, it will in nearly all cases, be six-inch or eight inch pipe, and therefore the only charge to the general expense of the city for doing the same will be for the street crossings.

FUTURE MANAGEMENT OF THE WORK.

We believe that the organization which we now have is as economical and efficient in the practical working of the Water Works as can be adopted. We have endeavored to school men during the construction of the Works, so that when the same shall be completed these men would be fully prepared to superintend and manage them. In the daily working of the system, there

are many things pertaining to the Works that must be fully understood or great loss or inconvenience may result.

While we regard our Works as completed, so far as we have progressed with them, still the details of the management are in their infancy. There is much to be done to increase the number of the Water-takers, and make the Works self-sustaining, if possible, and remove any defects that practice and experience may develop.

Now, we desire to say in the most respectful, and at the same time in the most emphatic manner, that it would be a misfortune to our City, after she had made so large an expenditure in order to make the Water Works complete and substantial, to have them fall into the hands of inexperienced men to manage them.

We have in every instance employed men on their merits, and because they were especially adapted to the duties we desired them to perform. We have striven to introduce economy everywhere, but we have not acted upon the principle that the cheapest men are the most economical.

We pay our Chief Engineer a liberal salary. He is not only competent and thoroughly skilled in the principles of his profession, but has had a long and successful experience.

We paid our first Secretary, Matthew Keenan, the

same salary paid to the Chief Engineer. His systematic mind and large experience in city matters were of eminent value to us, as shown by the careful and correct manner in which all our accounts have been kept, and in the full and complete records of our meetings, where will be found every transaction of the Board, and the reasons for the conclusions arrived at. On his resignation, the present Secretary, Charles MacRitchie, was appointed. Here again, we found a gentleman equally systematic and thorough, with this additional advantage: that he is a civil engineer by profession, and was the Principal Assistant Engineer in the construction of the Works, and therefore familiar with every part. Hence we regarded it essentially important to secure his services.

And again, when it became necessary to have a skillful and practical mechanic, we found that person in Henry Buestrin, who is too well known to our citizens to need any further commendation. The work in which Mr. Buestrin has been engaged is about completed, and therefore his services will only be required for a short time longer. This is the class of men we have drawn about us, and into whose hands, or an equally competent class, we think the management of the Works should remain, at least, for a time, until the Works have been tested and perfected.

ENGINES.

These are fully described in the Chief Engineer's Report in all their essential parts. The Commissioners at this time will simply remark that the Engines are working very satisfactorily.

By the terms of the contract the Engines are to be thoroughly tested before they shall be accepted. The Commissioners have selected three competent gentlemen to perform this duty. This will be done as soon as the weather will permit, and a Report of the test will be made by them.

Accompanying that Report will be a short statement of the Commissioners, which will embrace their views in relation to the Engines.

It is proper for us, before closing this Report, to speak of the long and valuable services of the Hon. Edward O'Neill, our former President. Mr. O'Neill, while Mayor of the City in 1869, and before that time, had taken a lively interest in the construction of Water Works, and had devoted much time to the investigation of the subject. After the organization of the Board, he served as its President and Chief Executive Officer about three years, having attended during this time every meeting of the Board, and performed a very great amount of work. He had the satisfaction before

his resignation of seeing the City supplied with water, an object to which he, as well as his co-commissioners have voluntarily and without compensation devoted much labor and time.

Respectfully submitted,

E. H. BRODHEAD,
GEORGE BURNHAM,
GUIDO PFISTER,
ALEX. MITCHELL,
JOHN PLANKINTON,
JAMES C. SPENCER,
FREDERICK PABST.

Commissioners.

Engineer's Report.

To the Honorable the Board of Water Commissioners:

GENTLEMEN:—I have the honor to submit the following Report descriptive of the Milwaukee Water Works.

The population of Milwaukee, as given in the census of 1870, was seventy-one thousand four hundred and sixty-four; the estimated population now is about one hundred thousand.

The water for supplying the City is taken from Lake Michigan, two and one-half miles north of the mouth of the Milwaukee River, near the northern boundary of the City.

The Pumping Station is located on the shore of the Lake. This locality is familiarly known as North Point.

A cast-iron pipe, three feet interior diameter, is laid to a distance of two thousand one hundred feet from the Engine House into the Lake, through which the water flows into the Pump Well. This pipe is com-

posed of sections, each twelve and a half feet long, and one and one-fourth inches thick. These are connected together by the use of a peculiar form of the ball and socket joint, which admits of being made of lead and calked in the usual way, the pipes being sustained above water, and as the work proceeds, lowered to their place on the bed of the Lake.

The Lake end of this pipe is protected by a crib made of several rows of oak piles, and filled with heavy stones. The form of this crib is a hexagon, the length of one side of its exterior being twenty-one feet; the length of a side of the interior space inclosed by the Crib is eight feet. The exterior of the Crib is formed by two rows of piles driven close; the interior is formed in the same manner by two rows of piles, and the space, about six feet in width, between these outer and inner rows, is filled in with stone. The top of the Crib is seven feet above the surface of the Lake. The piles are cut off evenly, and secured in the usual manner by iron bolts, and the whole top decked over with heavy timber.

The end of the pipe within the Crib is fitted with gates, so that the water can be drawn at pleasure from points four to twelve feet below the surface. These gate openings are defended by screens of copper wire. The depth of water at the Crib at ordinary low water is eighteen feet.

There is a pile bridge directly over the line of pipe from the Crib to the shore.

The Buildings at the Pumping Station consist of an Engine House eighty-four feet by seventy, a Boiler House forty-two by forty, and a Coal Shed forty by one hundred. These buildings are all of brick, with iron roofs covered with slate. The chimney stands apart from the main buildings, and is one hundred and fifty feet high. The diameter of the flue is four feet two inches. The Engine House is built large enough to accommodate four Engines. Two are now erected. The general arrangement and style of these buildings will be easily understood by reference to the accompanying drawings. The Engine House grounds comprise twelve acres, with a water front onthe Lake shore of one thousand feet. Five hundred and seventy-five feet have been protected by a very substantial wharf, and prepared for the Engine House yard.

The shore of the Lake rises rapidly at this point, and within one or two hundred feet reaches an elevation varying from seventy to eighty feet, which is near the general level of this part of the city.

The location of the Pumping Station here, rendered necessary a large amount of excavation and embankment, and the building of an expensive wharf to protect the Engine House yard from the effects of Lake storms. The excavation in the foundations, and in grading the grounds and road up the bluff was about forty-five thousand cubic yards.

The Pump Well is ten feet wide and twenty-eight

feet long, and divided by cross-walls fitted with gates, so that the water can be pumped out of either well while the other is in use. The foundation of the Well rests upon two courses of oak timber. The first course is twelve inches square, laid close; the second course is four-inch plank, laid transversely, and spiked to the timber. Upon this timber foundation is laid a course of masonry twenty inches thick, forming the bottom of the Well. The thickness of the masonry enclosing the well is five feet. The bottom of the Well is eleven feet below the surface of the Lake at extreme low water, and about sixteen feet at extreme high water.

The Pumping Engines are condensing beam and fly-wheel Engines, both coupled to one fly-wheel, and so arranged that they can be run together or separately. The Engines are of the compound or double-cylinder style. Each Engine can pump into the Reservoir eight million gallons of water in twenty-four hours, with a consumption of eight tons of coal.

Each Engine has two steam cylinders. The high-pressure cylinder is thirty-six inches diameter, and sixty-two inches strokes; the low pressure cylinder is fifty-eight inches diameter, and eight feet stroke.

The beams are of wrought iron, consisting of two plates each thirty feet long, six feet four inches deep at the centre, and one and three-fourths inches thick. The plates are two feet apart, and properly stiffened by cast-

iron hubs and braces. The weight of each beam is twelve tons. The beams are supported by a frame-work of cast-iron twenty-two and one-half feet high above the bed plates.

The fly-wheel is twenty-four feet diameter, and weighs thirty tons. The crank shaft is sixteen feet long, and eighteen inches diameter. The Pumps are bucket and plunger, and at the opposite end of the beam from the steam cylinders. They are forty inches diameter, and seven feet stroke. The plunger is twenty-eight inches diameter. The delivery of each Pump is four hundred and fifty gallons per stroke. The air chambers are five feet diameter, and forty-seven and one-half feet high.

There are four drop return flue Boilers, each seven feet diameter, and twenty-four feet long.

The total weight of metal in the two Engines and four Boilers is over five hundred tons. The accompanying drawing shows an elevation of one of these Engines.

The Stand Pipe is six hundred feet west of the Engine House. The ground is here eighty-five feet above the Lake. This pipe is four feet in diameter, and one hundred and thirty feet high; its top is thus two hunered and ten feet above the Lake. It is made of wrought iron; the base is of cast-iron, and has three openings, each thirty-six inches in diameter. Two of these are in use, one for the force main connection,

and the other for the main leading to the Reservoir; the third was designed for the main from another pair of Engines, when the growth of the City may require their erection; it is now closed by a cap.

The Stand Pipe is enclosed by the Water Tower. This Tower is built of stone masonry. Its size at the base is twenty-four feet square. The shaft is circular. There is within the Tower a circular iron stairway leading to the top. The whole height of the Tower is one hundred and seventy-five feet; its top is two hundred and fifty-five feet above the Lake. A very correct idea of its appearance can be obtained from the accompanying drawing. From its conspicuous location, the beauty of its design, and the magnificent view which is commanded from the top, it forms by far the most attractive feature of the whole Water Works.

The design of the Tower, and also the plans of the Engine House Buildings, were made by C. A. Gombert, Esq., Architect.

The water is forced by the Pump through a cast-iron pipe thirty-six inches diameter, and five hundred and twenty-five feet long to the Stand Pipe, and thence flows by gravity through a cast-iron pipe thirty inches diameter to the Reservoir, which is fifty-seven hundred feet west from the Stand Pipe.

The accompanying profile indicates the course of the water from the Crib in the Lake to the Reservoir.

There is a check valve in the force main between the Engines and the Stand Pipe, which allows the water to flow to the Stand Pipe, and closes when the current in this direction ceases, thus preventing the water from flowing back toward the Pump Well when the Engines are not in operation.

The main pipe from the Stand Pipe to the Reservoir is laid in North street, and crosses the Milwaukee River on an Acqueduct Bridge, built for this purpose, and also to accomodate the public travel.

This bridge is built of wrought iron, resting upon abutments and piers of stone masonry. It has four spans, the length of the shore spans is each one hundred and twenty-four feet and nine inches; the length of the centre spans is each one hundred and forty feet and three inches. The eastern abutment is fifty-four feet long, and the western abutment twenty-six, making the whole length of the Bridge five hundred and eighty feet. The width of the roadway is seventeen feet in the clear; the sidewalks are four feet in the clear. The foundations of the piers rest upon the rock, which is from ten to twenty feet below the surface of the River. The size of the piers at the top is twenty-three feet long, and six feet wide. The easterly pier is thirty-one and one-half feet long, and ten feet wide at the bottom, and is twenty-five feet high. The centre pier is thirty-four feet long, and thirteen feet wide in the bottom, and

thirty-four feet high. The westerly pier is thirty-four feet and ten inches high.

The water-pipe across the Bridge is of wrought iron; it is placed beneath the roadway, and is supported by iron girders from the upper chords of the Bridge. This pipe is enclosed in a box, made of two thicknesses tongued and grooved, to protect it from the frost. This pipe is also provided at each end, where it connects with the cast-iron mains, with expansion joints working in stuffing boxes.

The Reservoir has a capacity of twenty-one and one-half million gallons. Its top water line is one hundred and fifty feet above the Lake. The depth of the full Reservoir twenty-one feet. The embankments are of earth. They are carried up four feet above the top water line, are sixteen feet wide on top, and finished to slopes of one and a half to one on the inside, and one and three-fourths to one on the outside.

These embankments were built in layers nine inches thick, each layer being rolled with a heavy iron roller. The Reservoir is located upon the highest ground in the City. The material excavated on the site was suitable for forming the embankments, and was all used for this purpose; and it was found necessary to procure about forty thousand cubic yards of earth outside of the Reservoir grounds.

The whole interior surface of slopes and bottom are

covered with clay puddle two feet thick. The slopes are then covered with a layer of broken stone nine inches thick, and upon this layer there is a stone paving fifteen inches thick, laid in cement mortar. The puddle in the bottom is covered with concrete. The exterior slopes are sodded. The water flows into the Reservoir on the east side, and flows out on the west side, where is built an effluent chamber fitted with stop-valves, waste and overflow pipes. The influent pipe is connected directly with the effluent pipe by a main pipe laid across the bottom of the Reservoir, so that the water can, if neceessary, be drawn off from the Reservoir, and the supply to the City kept up through this pipe directly from the Stand Pipe.

The effluent pipe, or principal distributing main, is thirty inches diameter.

The area of the water surface of the Reservoir is three and one-half acres. The whole area of the Reservoir grounds is thirty acres.

This Reservoir is called Kilbourn Park Reservoir, from the late Hon. Byron Kilbourn,who gave to the City, for the purpose of a Park or Reservoir, a portion of these grounds.

There are fifty-eight miles and four hundred and fifty feet of cast-iron pipe laid in the City for the distribution of water.

The general width of the carriage way of the streets

is fifty feet, and the course of the streets is either north and south or east and west.

The water-pipes are laid on the northerly, or easterly side of the street, ten feet from the curb line, and covered five feet.

These pipes were all cast vertically. They are coated with coal-tar varnish, to prevent rusting and the formation of tubercules on the inside. They were all carefully proved by water pressure to three hundred pounds per square inch, at the foundries where they were made. This process of proving was done under the supervision of Inspectors appointed by the Water Commissioners. There are two classes of pipe laid in the City, distinguished as Class A and Class B. The pipes of the A class are about ten per cent. lighter than those of the B class, and are laid in those portions of the City situate above a plane fifty feet above the Lake, thus being subject to a water pressure not exceeding one hundred feet. The Class B pipes are laid in the other portions of the City, and are subject to an extreme head of one hundred and fifty feet.

The joints of the pipes are of the ordinary form of socket and spigot, and are made by pouring melted lead into the joint after the pipes are properly fitted together, a small strand of hemp yarn having been first driven into the joint to prevent the lead from running through into the pipe. The lengths in miles of the dif-

ferent sizes, the quantity of lead used per joint in laying the pipes, also the weights, lengths, and other dimensions, are given in the following tables:

Diameter Inches.	Length. Miles.	Depth of Lead in Joint Inches.	Pounds of Lead per Joint.
36	.099	5	170
30	3.202	$3\frac{1}{4}$	58
24	.129	$4\frac{1}{2}$	70
20	3.767	$2\frac{3}{4}$	33
16	.850	$2\frac{1}{2}$	25
12	4.779	$2\frac{1}{2}$	18
8	7.646	$2\frac{1}{2}$	$12\frac{1}{2}$
6	37.612	$2\frac{1}{2}$	10

Diameter of Pipe. Inches.	Length of Pipe. Feet. In.	Thickness of Pipe. Inches.	Depth of Socket Inches.	Weight.		Working Head.		Thickness of Joint for Calking Inches.
				Per Pipe. lbs.	Per Foot run. lbs.	Feet of Water.	Lbs. Pres're per sq. inch	
6 in. A.,	12.3½	$\frac{15}{32}$	$3\frac{1}{2}$	394	32.8	100	43.5	$\frac{5}{16}$ to $\frac{3}{8}$
6 in. B.,	12.3½	$\frac{1}{2}$	$3\frac{1}{2}$	420	35.0	150	65	$\frac{5}{16}$ to $\frac{3}{8}$
8 in. A.,	12.4	$\frac{1}{2}$	4	554	46.2	100	43.5	$\frac{5}{16}$ to $\frac{3}{8}$
8 in. B.,	12.4	$\frac{55}{100}$	4	601	50.1	150	65	$\frac{5}{16}$ to $\frac{3}{8}$
12 in. A.,	12.4	$\frac{9}{16}$	4	943	78 6	100	43.5	$\frac{3}{8}$ to $\frac{7}{16}$
12 in. B.,	12.4	$\frac{9}{16}$	4	1016	87.2	150	65	$\frac{3}{8}$ to $\frac{7}{16}$
16 in. B.,	12.4¼	$\frac{11}{16}$	4¼	1553	129.4	150	65	$\frac{3}{8}$ to $\frac{7}{16}$
20 in. A.,	12.4½	$\frac{3}{4}$	4½	2022	166.8	100	43.5	$\frac{3}{8}$ to $\frac{7}{16}$
20 in. B.,	12.4½	$\frac{7}{8}$	4½	2331	194.3	150	65	$\frac{3}{8}$ to $\frac{7}{16}$
24 in. A.,	12.4½	$\frac{15}{16}$	4½	3000	250.0	100	43.5	$\frac{3}{8}$ to $\frac{7}{16}$
24 in. B.,	12.4½	1	4½	3200	266.6	150	65	$\frac{3}{8}$ to $\frac{7}{16}$
30 in. A.,	12.5	1	5	3980	331.7	100	43 5	$\frac{3}{8}$ to $\frac{7}{16}$
30 in. B.,	12.5	$1\frac{1}{16}$	5	4210	350.9	150	65	$\frac{3}{8}$ to $\frac{7}{16}$

There are two main pipes crossing the Milwaukee River; one is twenty, the other sixteen inches diameter: there is also one twenty-inch main crossing the Menomonee River.

These three mains have the same kind of flexible joint as the inlet pipe from the Crib to the Pump Well. These mains and the Lake Inlet Pipe were furnished and laid by John F. Ward, Esq., of Jersey City, New Jersey, who is the inventor of this particular form of joint, and had laid it very successfully in other cities. These river mains have now been in constant use for over one year, without showing any leaks. The River channels were dredged out to a depth of about seven feet below the bed before the pipes were laid; the pipes are thus protected by about five feet of earth from any danger liable to result from the dragging of anchors of vessels passing up and down the River.

The total number of tons of pipe laid, is ten thousand six hundred and eighty. About five thousand tons of these were made in this City, at the Pipe Foundry of Messrs. E. P. Allis & Co. The others were made by Drullard & Hayes, Buffalo, N. Y.; Warren Foundry, Phillipsburg, N. J.; J. McNeil & Sons, Burlington, N. J.; J. W. Starr & Sons, Camden, N. J.; Gloucester Iron Works, N. J.; R. D. Wood & Co., Florence, N. J., and S. Fulton & Co., Conshohocken, Penn.

The smallest size of distribution main laid in the City is six inches diameter.

The thirty-inch mains are not tapped for service pipes; all the other sizes are tapped. The ferules used for services are three-eights inch, one-half inch, five-eighths inch, and three-fourths inch diameter. They are inserted in the street mains by the aid of a tapping machine, without shutting off the water.

The whole number of service connections now made is seventeen hundred and eighty-seven. The pipe used for service pipe to convey the water from the mains to the houses of the water-takers is lead pipe, of the thickness known as "extra strong." Its weight is as follows: the half-inch pipe, two and a half pounds to the foot; the five-eighths-inch, three pounds to the foot; the three-quarter-inch, three and one-half to the foot; and the one-inch pipe, four and three-quarter pounds to the foot.

The expense of tapping the mains, and of the service pipe to the houses, is paid by the owners of the property.

The distributing mains and force main from Water Tower to Reservoir were laid by contract. The work was let in two contracts, about twenty-nine miles in each.

One was taken by De Golyer & McClelland, of Chicago, and the work done under the personal direction of O. W. Gunnison, Esq. of this City.

The other contract was let to Harrison, Green & Walker, of this City.

All the work in both these contracts was done in the most faithful, prompt and satisfactory manner. The whole expense for repairs, for a period of the first twelve months' test of the water-pipes under pressure and in constant use, has been less than two hundred and fifty dollars on this division of the Works costing over one million dollars.

By reference to the Map accompanying this Report, the location of the Hydrants and the general location of the whole Water Works will be easily understood.

There are contour lines drawn on the map, showing quite clearly the general topography of the City. It will be seen from these that a large area, including all the business portion of the City, is situate below a plane twenty-five feet above the Lake. The head of water over this part of the City is from one hundred and fifteen to one hundred and forty feet, giving an available pressure in the mains for fire purposes of from fifty to sixty pounds per square inch. The complete command this head gives for fire purposes is shown by the accompanying drawing, upon which are platted the relative heights above the Lake, of the Reservoir, the Stand Pipe and four or five of the principal buildings in the City.

The streets in which the pipes are laid are given in the Schedule in the Appendix. There are three hundred and twenty-four stop-valves, viz.:

Six of thirty inches diameter.
Two of twenty-four inches diameter.
Thirteen of twenty inches diameter.
Four of sixteen inches diameter.
Twenty-three of twelve inches diameter.
Forty-four of eight inches diameter.
Two hundred and thirty-two of six inches diameter.

By the aid of these the water can be shut off from any one or two blocks without interfering with the supply to the rest of the City. Three-inch and four-inch stop-valves are placed on large service-mains for supplying Breweries, Railways and Hydraulic Elevators, at the points where such services connect with the street mains. The stop-valves were manufactured by the Boston Machine Company, Brown & Co., of Troy, and the Ludlow Valve Co. of Troy, N. Y.

The number of Fire Hydrants set is four hundred and nine. Nine of these are surface Hydrants, placed at the intersection of the street mains, each having four nozzles, two with four and one-half inch openings for steam fire engines, and two with smaller openings for the ordinary hose connections. The remaining four hundred Fire Hydrants are all post Hydrants; they

are placed just inside the curb line, and within about fifteen feet of their intersection. Their average distance apart is four hundred feet. These hydrants have a clear water-way of a little over five inches diameter. They are all provided with one nozzle four and one-half inches diameter, and one two and one-half inches diameter.

The pipes connecting the hydrants with the street mains are eleven feet long and six inches diameter.

The most of the post Hydrants are of the pattern called the Matthew's Hydrant as made by Messrs. R. D. Wood & Co. of Philadelphia, and a similar style made in this City by Messrs. Filer, Stowell & Co. The chief merit of this style of Hydrant is that they are provided with a frost jacket, so called, which effectually prevents the Hydrant from freezing, provided the water is shut off at the valve in the bottom of the Hydrant, and that the water remaining in the Hydrant after the valve is closed can run out of the waste. There has been one winter's experience with these Hydrants on these Works, and about one month of very cold weather this winter, and no trouble so far in keeping them free from frost, and in good order for use at all times. In some exposed localities, and especially where the sidewalks and streets are not up to the regular grade, the hydrant is protected in winter by a wooden box filled inside with horse manure.

The Inspectors examine the Hydrants every day during the winter season to see if there is any water standing in them above the waste valves. This they easily ascertain by dropping a line with a light sinker attached to it into the Hydrant through the nozzle. When water is found in the Hydrant, it is immediately pumped out by a hand-pump made for this especial purpose, and so designed as to fit the nozzle of the Hydrant, the suction, a piece of rubber hose, being thrown into the Hydrant before the pump is attached. The Hydrants requiring most frequent attention are those located where the sewers are not built, and the water runs into them from the outside through the waste. In localities where the sewers are built, by connecting the waste with the sewer all further trouble of this kind is avoided.

The Inspectors examine every Hydrant during the cold weather immediately after it has been used, and pump out the water remaining in it after the valve connecting with the main is closed. They generally avoid throwing salt into the Hydrants to protect them from frost, because, though the salt might answer the purpose temporarily, its effect on the iron, if frequently used, would be to render the Hydrants nearly worthless in a single winter. A Schedule showing the location of all the Hydrants is given in the Appendix.

The Reservoir was built by Messrs. Gilbert & Charles Peterson, Contractors.

The North street Bridge was built by Messrs. Soulerin, James & Co. of this City; from designs made by L. Soulerin, C. E. of that firm.

The large Pumping Engines were built by Messrs. E. P. Allis & Co. at the Reliance Works, in this City; and designed by R. W. Hamilton, Mechanical Engineer, their Superintendent.

The Boilers and also the wrought-iron pipe across the North street Bridge, were built by John W. Eviston, Esq. of this City. The Stand Pipe was built by Richard Davis, Esq. of this City.

The Iron Roofs of the Buildings at the Pumping Station were built by Messrs. Bailey & Greenslade, from plans made by the late Wm. Melms, M. E., formerly employed in the Engineer Department of these Works.

The gallery and stairs in the Engine House and also the iron floors and stairs in the Water Tower, were built by Messrs. Hornbach & Wagner, of this City.

And to save a too frequent repetition of what has been said before in this Report, it is due to all of these Contractors to say that their aim throughout the Execution of the whole Work appeared to be to do good and

faithful work, and they have done it. The Buildings at the Pumping Station, the Pump Well, the Engine Foundations, the Chimneys, the Water Tower, and the Abutments and Piers of the North street Bridge were built by the Water Commissioners, under the direction of their Superintendent, Mr. Henry Buestrin, and his skill and faithfulness need no other commendation than is shown by the substantial and excellent character of all this Work.

There are, in the office of the Water Department, plans of all the Works, viz.:

Detail Plans of Engines, thirty sheets, bound;

Plans of Pipe Distribution, one copy, fifty-four sheets bound;

Plans of Pipe Distribution, one copy, twenty-two sheets, bound;

Plans of Pipes and special castings;

" " Reservoir;

" " North street Bridge;

" " Engine House and chimney;

" " Water Tower.

The Assistant Engineers employed on the Works were:

Charles MacRitchie, Principal Assistant from September 1871, to February 1874.

John Nichol, Principal Assistant from February 1874, to January 1875.

Wm. A. Illsley, Assistant in charge of construction of Reservoir, October 1871, to January 1874.

John Nichol, Assistant in charge of Pipe-laying in 1873.

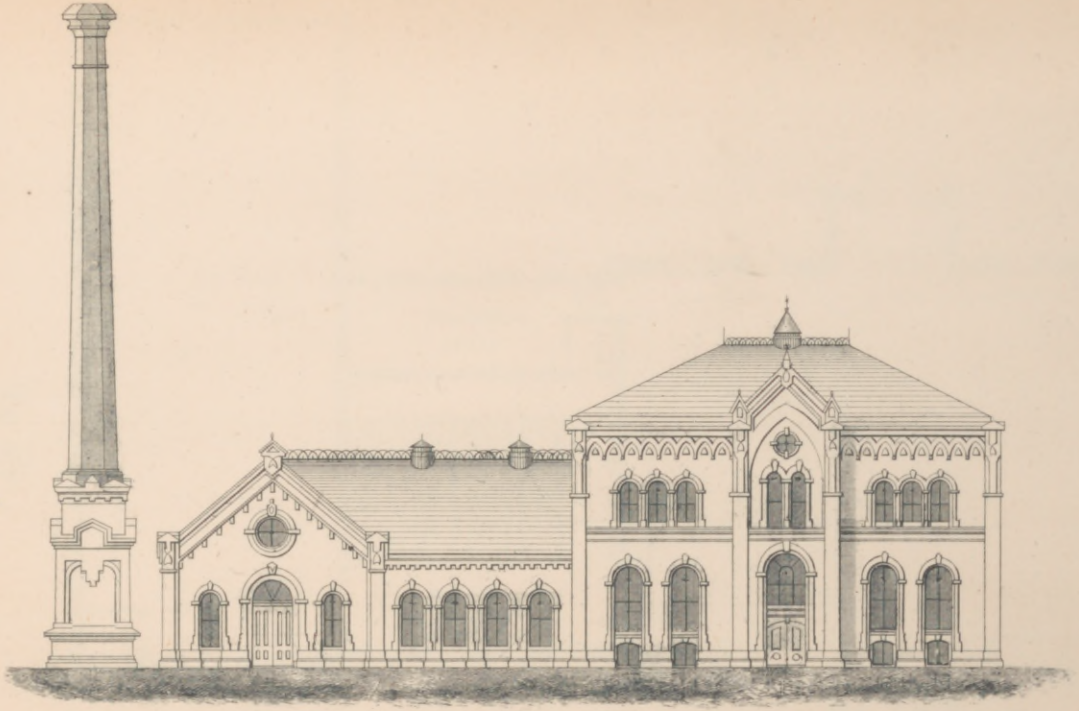
J. F. Clarke, Assistant at Pumping Works, July 1872, to January 1874.

I am indebted to these gentlemen for faithful services of which the general success attending the construction of the Works is sufficient evidence.

Respectfully submitted,

MOSES LANE,

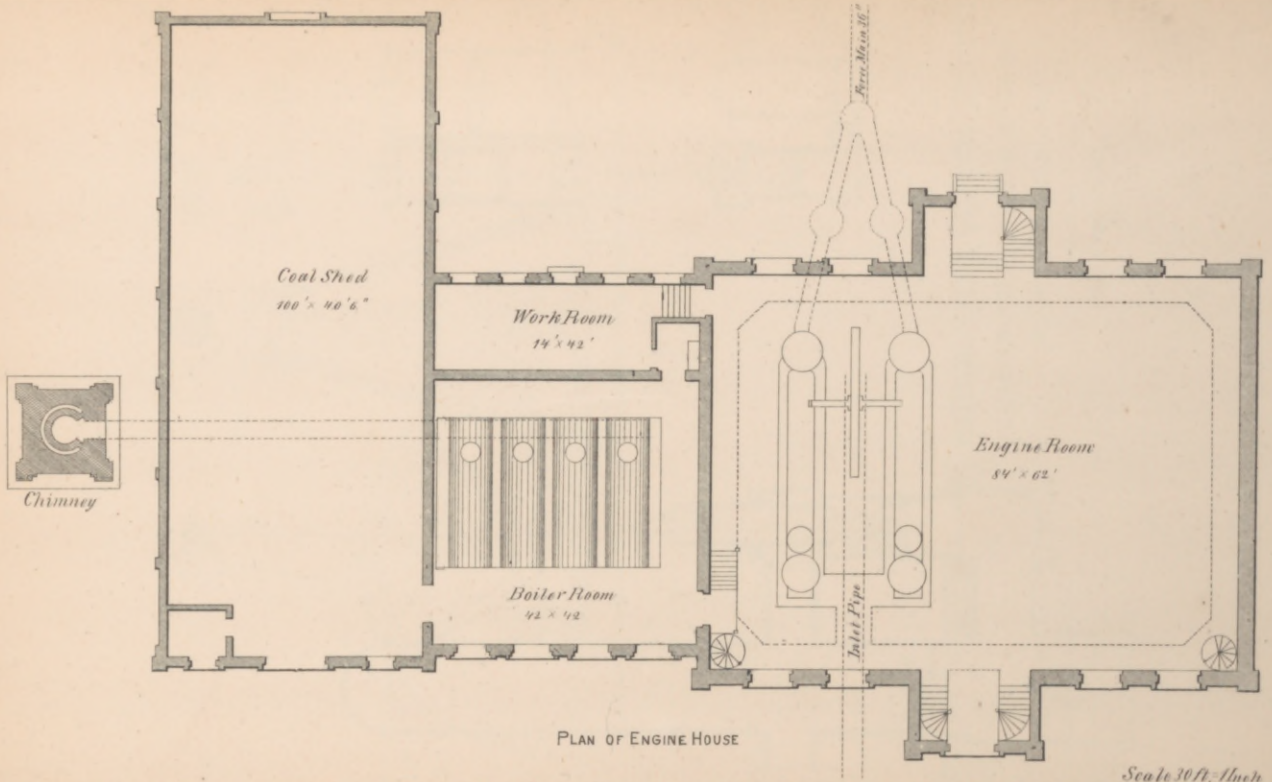
Chief Engineer.



ENGINE HOUSE

Scale 40 ft. to 1 inch

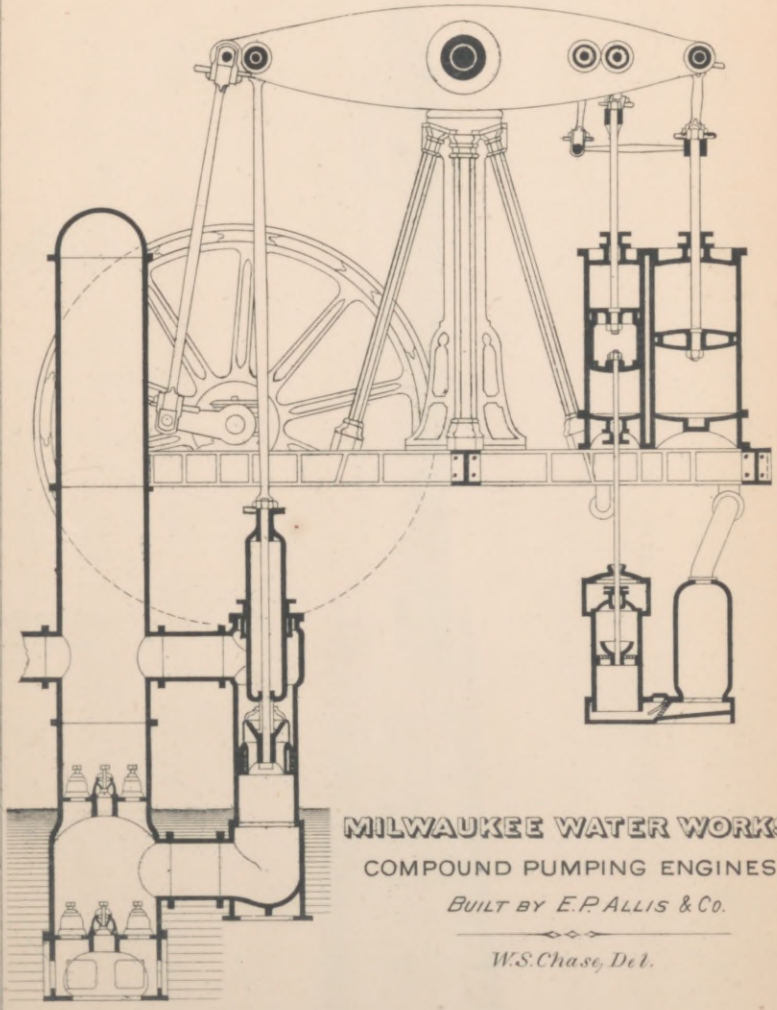
J. Knauber & Co. Lith. Milwaukee



PLAN OF ENGINE HOUSE

Scale 30 ft. 1 Inch

J. Knauber & Co. Lith. Milwaukee



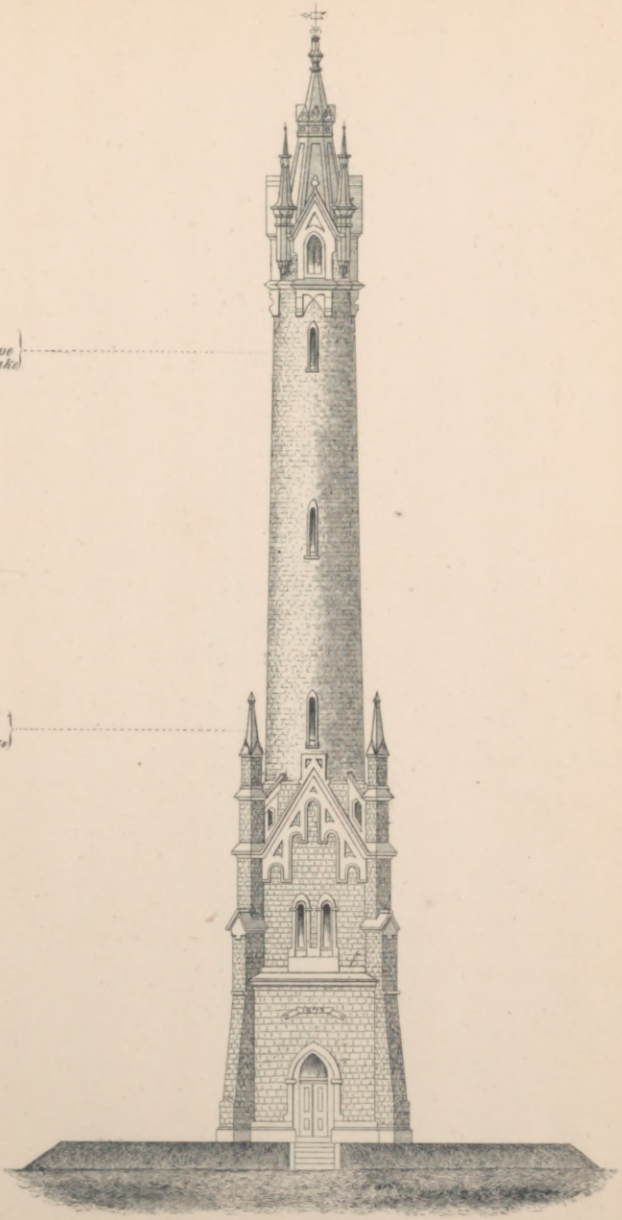
MILWAUKEE WATER WORKS

COMPOUND PUMPING ENGINES.

Built by E.P. Allis & Co.

W.S. Chase, Del.

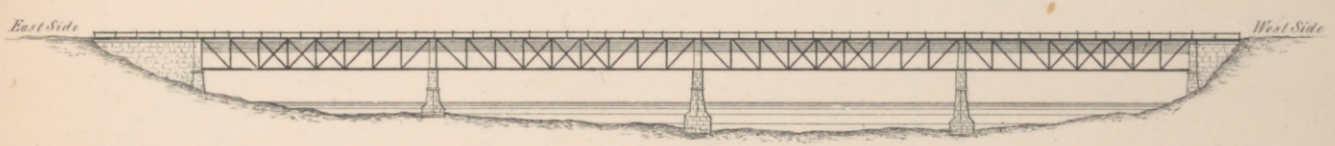
J. Kneuber & Co. Lith. Milwaukee



WATER TOWER

Scale 30ft. to 1 inch

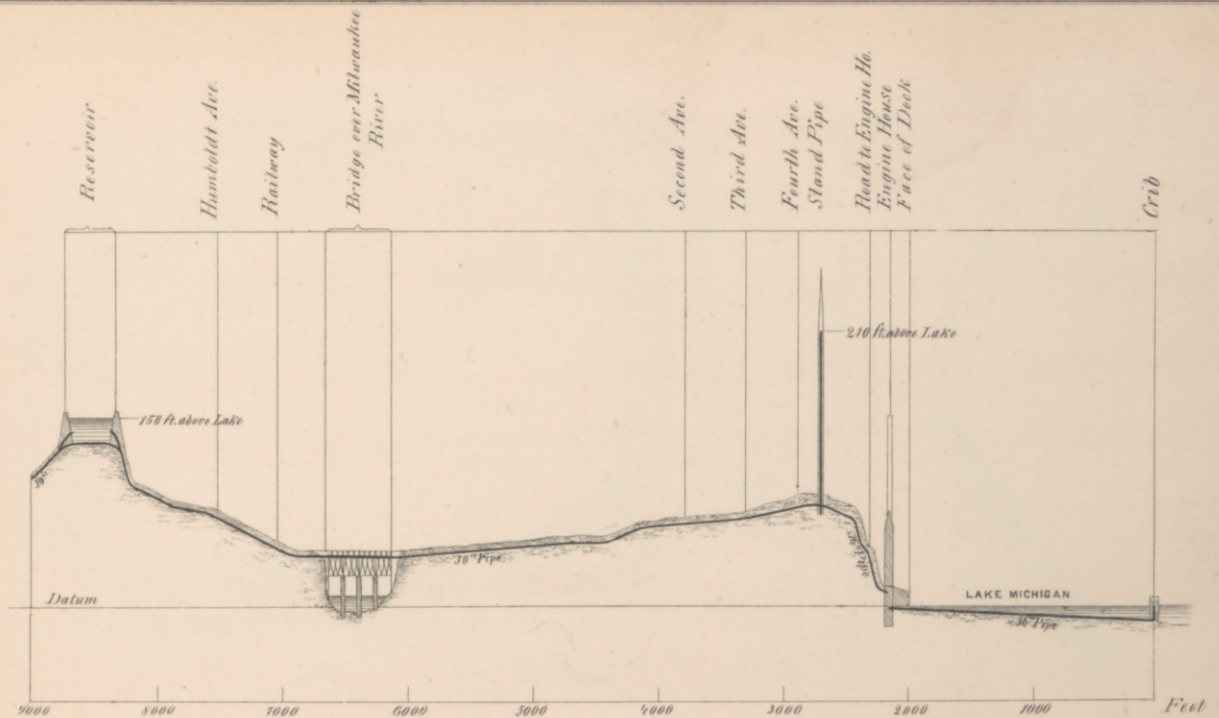
J. Kramer & Co. Lith. Milwaukee



NORTH STREET BRIDGE

Scale 100 ft. to 1 inch

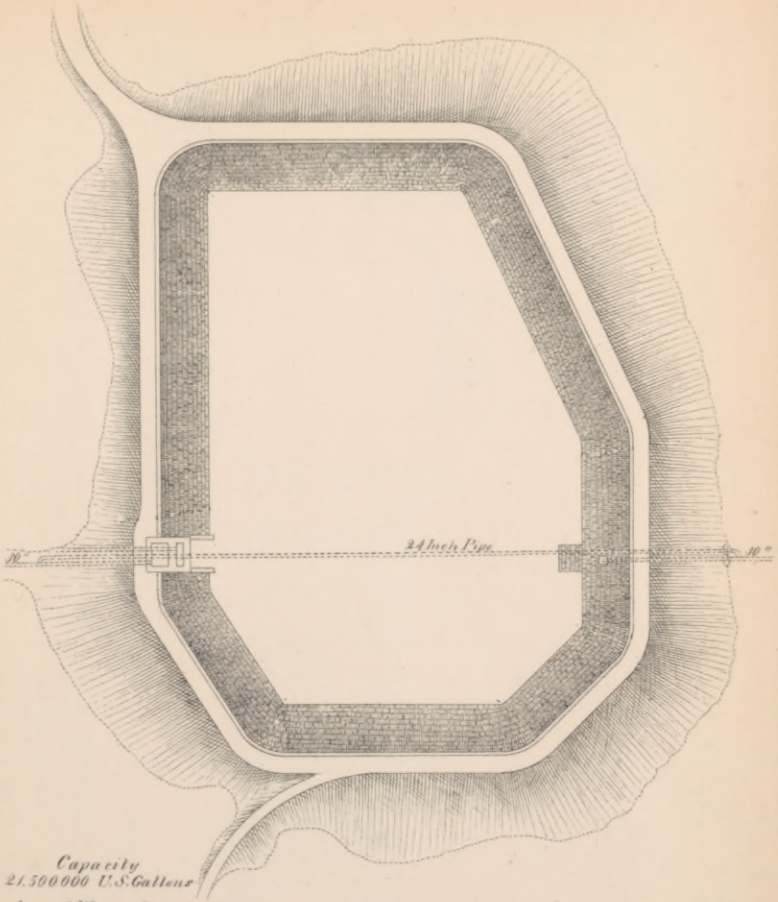
J. Knauber & Co. Lith. Milwaukee



PROFILE FROM CRIB TO RESERVOIR

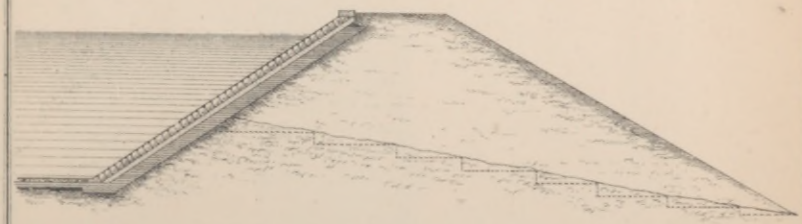
Horizontal Scale 1500' - 1"
Vertical " 150' - 1"

J. Knauber & Co. Lith. Milwaukee



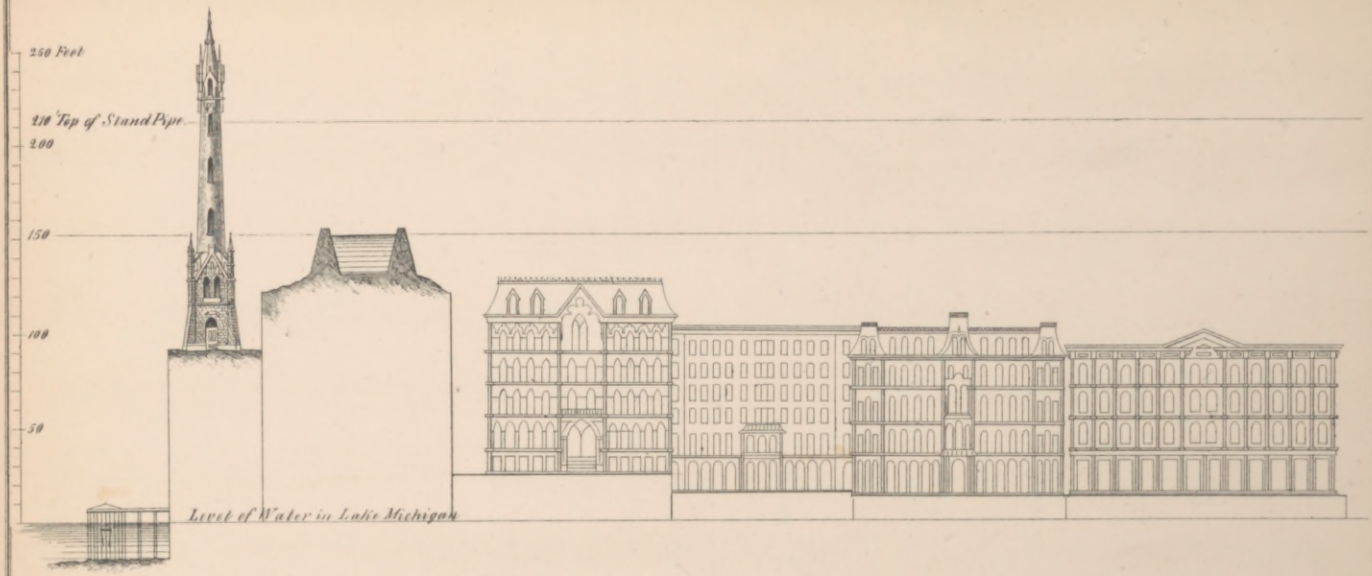
Capacity
21,500,000 U.S. Gallons
Area of Water Surface 3½ acres
Flow Line 150 ft. above Lake

PLAN OF RESERVIOR
Scale 150 ft. = 1 Inch



SECTION
Scale 30 ft. = 1 Inch

J. Knauber, & Co Lith. Milwaukee



Lake Crib. Water Tower. Reservoir

Insurance Building Corner Broadway and Wisconsin St.

Part of Newhall House Corner Broadway and Michigan St.

Plankinton House Spring Street near West Water St.

Naxra's Hardware Store Corner of Reed and South Water Sts.

J. Knauber & Co. Lith. Milwaukee

Secretary's Report.

To the Honorable the Board of Water Commissioners:

GENTLEMEN:—The following is a Report of the finances and cost of the Water Works to date; a statement of the construction and maintenance accounts, with payments thereon, from December 1st, 1873, to December 31st, 1874; a schedule of warrants drawn upon the Treasurer for Estimates, Accounts, etc., from December 1st, 1873, to December 31st, 1874; Statement of Contracts let during the year 1874; tables showing Items of Expenditure on Engine House, Water Tower, and North Street Bridge; also a Statement of the Water Rates, with a list of the Establishments supplied with water up to December 31st, 1874.

Respectfully,

CHARLES MACRITCHIE,

Secretary.

Statement.

Bonds.

Total amount of Water Bonds authorized and sold	$1,600,000.00	
Total amount realized on sale of Bonds.....		$1,563,294.42

Water Pipe Assessment.

Assessed in 1872 .....$	83,310.65	
" " 1873	232,370.04	
" " 1874	13,989.33	329,670.02

North Street Bridge.

Received from City Treasuurer on Account of North Street Bridge.....		20,000.00

Interest. 38.36

Income Account.

Water Rates for year ending Dec. 31st 1874..$	27,155.99	
Ferrules and tapping up to Dec. 31st, 1874..	7,019.00	
Furnishing and laying Water Pipe Stop-cocks, etc., for sundry parties	3,298.06	
Recd. from Frt. Agts. for broken Water Pipe..	568.75	
Sale of Sand at Engine House.....	227.25	
Received for Sundry Repairs, Express Charges, sale of Ladder and Scaffold Poles, and amounts on Pay Rolls not called for..	186.20	
Interest on Income Account to Jan. 1st 1875..	789.43	39,244.68
Total.....		$1,952,247.48

Warrants issued up to Dec. 1st 1873 .....$1,579,651.35		
Warrants issued Dec. 1 '73, to Dec. 31, 1874..	308,971.94	
Water Pipe Assessment to be Collected. ...$	32,573.84	
Outstanding Bills for Water Rates 1874.....	1,649.13	
Outstanding Bills for Laying Pipe and Rep'rs.	116.50	
Outstanding Bills for Ferrules.....	46.00	
Balance Cash in hands of Treasurer.....	29,238.72	$1,952,247.48

STATEMENT OF AMOUNTS DUE BOARD OF WATER COMMISSIONERS

DEC. 31ST 1874.

Amount of Asssessment returned to the City Comptroller for Water Pipe laid during the year ending Dec 31st, 1874:		
First Ward	$ 4,422.60	
Second "	762.74	
Third "	1,450.92	
Fourth "	1,918.74	
Sixth "	1,360.00	
Tenth "	4,074.33	
Total amount Assessed for the year 1874.		$ 13,989,33
Amount of Assessment for Water Pipe laid in 1872 and 1873	$ 315,680.69	
Collected and paid to Treasurer of Board of Water Commissioners	297,096.18	
Balance to be Collected		$ 18,584.51
Outstanding Bills for Water Rates for the Year ending December 31st 1874	1,239.69	
Miscellaneous Rates, building purposes, etc.	409.44	
Repairs, Laying Pipe, etc	116.50	
Ferrules	46.00	
Total Amount of Outstanding Bills.		$ 1,811.63
		$ 34,385.47

NOTE.—Since the above statement was prepared, the sum of $300.00 has been collected for Water Rates, and of the amount remaining to be collected $178.47, are for Rates upon City property.

RECEIPTS TO JANUARY 1st, 1875.

City of Milwaukee	$1,880,428.96	
Income Account	37,433.05	
		$1,917,862.01

EXPENDITURES TO JANUARY 1st, 1875.

Construction Accounts.

Reservoir	$ 113,647.50	
Water Pipe and Castings	828,421.48	
Stop-cocks and Valves	32,266.57	
Hydrants	24,911.77	
Pipe Laying and Inspection	211,661.46	
Engine House, Lake Crib, Pier, etc	228,344.42	
Pumping Engines	142,884.24	
Water Tower	48,641.32	
North Street Bridge	73,400.20	
North Street—Grading, etc	11,938.48	
Land	41,709.87	
Pipe Yard—Bdgs., Lumber, labor, rent, etc.	9,714.29	
River Pump'g W'ks (Pump, Boiler, etc.)	6,067.09	
Fourth Ward—Pipe Covering	687.41	
Implements and instruments	5,376.50	
Printing, Books and Stationery	3,921.90	
Office expenses	1,668.89	
Traveling, Telegraphing and Express charges,	4,144.34	
Ferules	3,133.33	
Meters	198.48	
Public Drinking Hydrants	162.43	
Engineering	38,931.52	
Salaries	19,757.54	
Interest	3,810.36	
	$1,855,401.39	

Maintenance Accounts.

Pumping Works—North Point.	$ 12,975.09		
River Pumping Works	9,757.37		
Pipe Distribution,	9,666.74		
Reservoir—	822.70	33,221.90	1,888,623.29
Balance Cash in Hands of Treasurer			$29,238.72

STATEMENT OF ACCOUNTS.

DECEMBER 1ST 1873, TO DECEMBER 31ST 1874.

Construction Accounts.

Reservoir.

1873.			
December.	Hornbach & Wagner, Copper Wire Screen	$	128.00
"	Hitching Posts etc.		10.76
"	J. H. Walker. Setting Gates, Valves, etc		650.73
"	C. Peterson, Estimate for Roadway		403.43
1874.			
January.	J. Soulen & Bro., Gauge Rod, and Templates		5.70
February.	Sundry Work and Materials		12.32
April.	Services Inspector Masonry		36.65
May.	Pay Roll, Inspector and Masons laying Coping		210.00
"	Cement		81.00
"	G. & C. Peterson advance on Final Estimate		1,249.85
June.	Pay Roll men laying Coping, etc		69.74
"	G. & C. Peterson, Advance on Final Estimate		4,293.69
October.	Pay Roll, men making Gravel Walk, Sodding etc		131.05
November.	Gravel for Walks, etc		197.25
"	Pay Rolls laborers, etc., sodding making Gravel Walk, etc. two weeks ending Nov. 7th.		229.29
"	Pay Rolls laborers etc., sodding, making Gravel Walks etc., two weeks ending Nov. 21th.		204.11
			7,913.57

Water Pipe and Castings.

1873.			
December.	John W Eviston, Estimate, Wrought Iron Pipe	$ 4,100.40	
"	E. P. Allis & Co., Estimate	3,817.04	
1874.			
January.	John W. Eviston, Estimate. Wrought Iron Pipe.....	1,475.24	
"	E. P. Allis & Co., Estimate,	1,068.93	
February.	E. P. Allis & Co., Estimate,	1,539.72	
March.	John W. Eviston, Estimate, Wrought Iron Pipe.....	428.85	
"	E. P. Allis & Co., Estimate	852 34	
April.	E. P. Allis & Co., Estimate,	2,977.83	
"	John F. Ward, Repairs, Flexible Pipe	4.57	
May.	E. P. Allis & Co., Lathe Work and Forging	112.43	
"	John F. Ward, Estimate, Flexible Pipe.....	4,751.58	
"	E. P. Allis & Co., Estimate.....	1,487,49	
June.	John F. Ward, Estimate, Flexible Pipe.....	12,106.80	
July.	John F. Ward, Estimate Flexible Pipe...	11,828.63	
September.	John F. Ward, Estimate, Flexible Pipe	4,225.95	
"	John McNeal & Sons, Balance of Account	5.41	
"	S. Fulton & Co.. Balance of Account....	18.24	
October.	E. P. Allis & Co., Estimate.....	1,471.16	
"	" " Lathe and Vise work, etc., Force Main.....	161.60	
November.	E. P. Allis & Co., Expansion Joints—Bridge Pipe..	723.55	
	Forward....		$53,157.76

	Brought Forward.....	$ 53,157.76	
November.	Hauling Pipe.....	22.00	
"	John W. Eviston, Estimate,. Wrought Iron Pipe..	862.78	
			54,042.54

Stop Cocks and Valves.

1874.			
March.	Boston Machine Co., Estimate..	2,552.54	
April.	" " " Freight....	11.25	
"	" " " Estimate..	314.75	
May.	" " " Freight...	3.70	
"	" " " Estimate..	101.75	
August.	Ludlow Valve Mf'g. Co , Balance of Acoount.....	43.18	
"	Boston Machine Co., Estimate .	48 45	
September.	" " " " ..	32.32	
November.	Boston Machine Co., Four 3 in. Stop Cocks.....	65.96	
			3,173.90

Hydrants.

1873.			
December.	Filer, Stowell & Co., Lathe and Vise Work, etc	29.04	
1874.			
January.	Surface Hydrant Heads, Freights	2.93	
February.	Cartage.....	.50	
"	E. P. Allis & Co., Repairs	6.41	
June	R. D. Wood & Co., Three 4 in. Hydrants	118.20	
"	Freight and Cartage.....	8.45	
"	Filer, Stowell & Co., Estimate..	360·00	
September.	Freight on 12 Hydrants	33 00	
"	Boston Machine Co., Estimate, Heads for Surf. Hydrants	450.00	
"	R. D. Wood & Co., Estimate, Hydrants.....	672.00	
October.	Cartage	,75	
			1,681.28

Pipe Laying and Pipe Inspection.

1873.			
December.	Lead, Cartage, Testing Specimen Bars of Pipe Iron, etc..	288.22	
"	Pay Rolls Insp'r, Laborers, etc	166.37	
"	Harrison, Green & Walker, Est.	3,810.62	
"	DeGolyer & McClelland.....	466.46	
1874.			
Jan. & Feb.	Sundry Bills and Services.....	36.65	
March.	Services Insp'r at Pipe Foundry	72.85	
April.	" "	78.00	
"	Harrison, Green & Walker, Est.	11,779.40	
"	DeGolyer & Mc Clelland, "	9,683.26	
"	Robert Mc Clelland, "	178.29	
May.	Lead, Setting Hydrant, Cartage,	190.28	
"	Pay Rolls Inspector, Calkers, Laborers, etc.....	135.55	
June.	Cement, Lead, Cartage, etc.....	236.16	
"	Pay Rolls Inspector, Calkers, and Laborers	556.00	
"	Harrison, Green & Walker, Est.	1,597.60	
July.	Lead, Wrought Iron, Gasket, Cartage, etc	635.78	
"	Pay Rolls Inspector, Calkers, and Laborers.....	1,131.10	
August.	Lead, Cartage, Grading, etc	776.88	
"	Pay Rolls Inspector, Calkers, and Laborers	1,691.83	
September.	Lead, Cartage, etc.....	362.23	
"	Pay Rolls Inspector, Calkers, and Laborers.....	384.22	
"	DeGolyer & McClelland, Est., Laying Pipe, (Erie Street)....	222.21	
October.	Wrought Iron Links, Gasket, Cartage, etc..... .	163.63	
	Forward		$34,643.59

	Brought Forward	$ 34,643.59	
"	Mil., Gas Light Co, Repair damages to Pipes. Dec. '72 to July 1873..	466.90	
"	Pay Rolls Inspector, Calkers, and Laborers.....	918.25	
November.	Lead, Gasket, Cartage, etc.....	384.89	
"	Pay Rolls Inspector, Calkers, and Laborers.....	458.80	
December.	Lead, Lumber, Wrought Iron, etc	746.71	
"	Pay Roll Laborers, Dec. 5th 1874.	26.40	
			37,645.54

Engine House—Including Lake Crib, Pier, etc.

1873.			
December.	Stone, Lumb'r, Brick, Piles, etc.	$ 2,681.45	
"	Pay Roll Nov. 24th to Dec. 6th..	995.19	
"	" " Dec. 8th to Dec. 20th.	955.58	
"	" " Dec. 21st to Jan. 3d..	474.46	
"	" " Jan. 5th to Jan. 7th..	79.25	
"	Bayley & Greenslade--Estimate Iron Roof..... ...	2,028.60	
1874.			
January.	Lumber, Stone, Piles, etc.....	1,062.95	
"	Bayley & Greenslade—Estimate Iron Roof.....	1,817.10	
February.	Piles, Window Frames, Superintendence, etc.....	1,173.57	
"	Cook & Hyde—Stone.....	1,257.51	
"	Bayley & Greenslade--Estimate Iron Roof.....	1,089.00	
March.	Services, Lumber, Piles, etc..	772.60	
"	Pay Roll to March 28th.....	558.31	
"	Bayley & Greenslade—Estimate—Iron Roof.....	1,633.50	
"	Biersach & Niedermeyer—Estimate Galv. Iron Work	800.00	
	Forward.....	$ 17,379.07	

	Brought Forward.. .. ..$	17,379.07
April.	Brick, Lime, Glazing, Cement, etc.....	2,423.87
"	Pay Roll two weeks ending April 11th	538.82
"	Pay Roll two weeks ending April 25th.....	734.64
"	Bayley & Greenslade— Estimate—Iron Roof	2,200.24
"	Jacob Mueller—Estimate Painting.....	315.00
"	Harrison & Greene—Estimate Crib and Pier.....	629.47
"	Story Bros.—Estimate Stone .	540.00
May.	Lime, Piles, Brick, Cement, etc.	1,701.51
"	Pay Roll two weeks ending May 9th....	757.95
"	Pay Roll two weeks ending May 23d.....	644.75
"	Cook & Hyde—Estimate Flagging.....	265.50
"	Harrison & Green—Estimate—Crib and Pier....	182.64
"	Harrison & Green—Estimate—Dock Extension.....	389.70
"	Biersach & Niedermeyer—Estimate Galv. Iron Work.....	716.24
June.	Cement, Lumber, Lime, Piles, Stone, etc.....	2,004.43
"	Pay Roll two weeks ending June 6th.....	656.04
"	Pay Roll two weeks ending June 20th.....	481.67
"	Pay Roll two weeks ending July 4th.....	489.54
"	Harrison & Green—Estimate —Crib and Pier.....	1,421.26
	Forward..... $	34,472.34

	Brought Forward.....$	34,472.34
July.	Piles, Lumber, Cement, Stone, etc.....	1,905.45
"	Pay Roll two weeks ending July 18th.....	410.07
"	Pay Roll two weeks ending August 1st.....	508.71
"	Harrison & Green—Estimate—Crib and Pier.....	2,196.36
"	Harrison & Green—Estimate—Dock Extension.....	399.33
"	Harrison & Green—Estimate—Grading Grounds.....	480.00
August.	Lumber, Wire Screen, Cement, Nails, etc.....	1,051.52
"	Pay Roll two weeks ending August 15th.....	474.00
"	Pay Roll two weeks ending August 29th.....	355.00
"	Harrison and Green—Estimate—Crib and Pier.....	2,954.16
"	Harrison & Green—Estimate—Dock Extension.....	720.37
"	Harrison & Green—Estimate—Grading Grounds.....	960.00
September.	Filling Stone, Sewer Pipe, Cement, Iron Floor and Beams, Black Earth, etc.....	4,037.19
"	Pay Roll two weeks ending September 12th.....	720.33
"	Pay Roll two weeks ending Sept. 26th.....	1,183.75
"	Hornbach & Wagner Estimate Iron Stair and Gallery.	1,260.00
"	Hornbach & Wagner—Estimate—Cap for Chimney ...	130.60
	Forward.....$	54,218.58

	Brought Forward.....	$ 54,218.58	
September.	Harrison & Green—Estimate— Grading Ground.....	147.20	
"	Cook & Hyde — Estimate— Stone for Flagging.....	497.61	
October.	Sodding, Black Earth, Lime, Lumber, etc.....	1,315.90	
"	Pay Roll two weeks ending October 10th	1,198.84	
"	Pay Roll two weeks ending October 24th..	1,169.69	
November,	Sodding Slopes, Earth, Lumber, Glass, etc.....	1,236 99	
"	Pay Roll. two weeks ending Nov. 7th.....	585.95	
"	Pay Roll, two weeks ending Nov. 21st	613.18	
"	Pay Roll, week ending Nov. 28th...	46.50	
"	Cook & Hyde, Estimate, Flagging and Door Steps.....	119.30	
"	Harrison & Green, Crib and Pier.....	846.70	
December.	Plumbing Work, Brick, Lime, Lumber, etc.....	932.26	
"	Pay Roll, two weeks ending Dec. 5th	401.32	
"	Pay Roll, two weeks ending Dec· 9th.....	330.75	
"	Pay Roll, two weeks ending Jan. 2d 1875	282.37	
"	Jacob Mueller, Estimate, Painting and Glazing	300.00	
			64,243.14

Pumping Engines.

1873. December.	E. P. Allis & Co., Estimate.	$ 2,376.60	
1874. January.	" " " "	1,224.00	
	Forward..	$ 3,600.60	

	Brought Forward.....$	3,600.60	
February.	E. P. Allis & Co., Estimate..	557.60	
April.	" " " "	1,028.50	
May.	" " " "	1,063.00	
June.	" " " "	1,028.50	
July.	" " " 16 in. Castings and Fitting	59.82	
"	E. P. Allis & Co., Estimate.	1,021.70	
August.	" " " "	867.00	
			9,226.72

Water Tower.

1874.			
March.	Services of Draughtsman ...$	45.00	
April.	Lumber.....	4.37	
"	Story Bros., Estimate, Stone..	360.00	
May.	Lime.....	4.75	
"	Pay Roll.....	158.87	
"	Richard Davis, Est. Stand Pipe	810.00	
"	Cook & Hyde, Est., Cutting Stone..... ..	450.00	
June	Nails, Screws, Lime, etc.....	77.80	
"	Services, Hoisting Machine, etc	304.00	
"	Pay Roll, 2 weeks ending June 6th.....	230.55	
"	Pay Roll, 2 weeks ending June 20th.....	817.43	
"	Pay Roll, 2 weeks ending July 4th	838.30	
"	R. Davis, Estimate, Stand Pipe	961.52	
"	Cook & Hyde, Est., Cutting Stone.....	900.00	
	Cook & Hyde, Est., Dimension Stone	1,601.44	
July.	Services, Lumber, Cement, Lime, etc.....	311.77	
"	Pay Roll, 2 weeks ending July 18th.....	798.40	
	Forward.....	$8,674.20	

	Brought Forward	$ 8,674.20	
July.	Pay Roll, two weeks ending Aug. 1st.	799.64	
"	Cook & Hyde. Est., Cutting Stone	540.00	
"	Cook & Hyde, Est., Dimension Stone.	331.44	
"	Story Brothers, Est., Building Sotne.	286.85	
August.	Services, Brick, Lime, Lumber, etc.	786.08	
"	Pay Roll, 2 weeks ending Aug. 15th	897.07	
"	Pay Roll, 2 weeks ending Aug. 29th.	889 55	
"	Cook & Hyde, Est., Cutting Stone	270.00	
September.	Services, Cement, Lime, Brick, etc	304.80	
"	Pay Roll two weeks ending Sept. 12th.	675.35	
"	" " " " " " 26th.	492.95	
"	Hornbach & Wagner—Estimate—Iron Stairway, etc	405.00	
"	Hornbach & Wagner—Estimate—Wrought Iron Roof	500.00	
"	Cook & Hyde—Estimate—Cutting Stone	374.50	
October.	Lengthening Stand Pipe, Services, Lime, etc	424.83	
"	Pay Roll two weeks ending Oct. 10th.	255.52	
"	" " " " " " 24th.	387.50	
"	Story Brothers—Estimate—Building Stone	36.30	
November.	Glass	7.52	
"	Pay Roll two weeks ending Nov. 7th.	343 57	
"	" " " " " " 21st.	283.25	
"	Cook & Hyde—Estimate—Dimension Stone	278.70	
December.	Cement, Lumber, etc	100.07	
"	Pay Roll two weeks ending Dec. 19th.	56.05	
"	Biersach & Niedermeyer—Estimate—Galv. Iron Roof and Painting	1,585.00	
			$19,985.74

North Street Bridge.

1873.			
December.	Davis & Soulerin, Est., Superstructure.	$ 580.97	
	Forward	580.97	

	Brought Forward.... .....$	580.97
1874.		
January.	Davis & Soulerin, Est., Superstructure,	853.68
February.	" " " "	895.76
March.	" " " "	979.59
"	Services, Lumber, etc.....	220.65
"	Pay Roll, March 1st. to 28th.....	62.18
April.	Services, Lumber and Sundry Acc'ts..	425 13
"	Pay Roll for month of April.....	393.26
April.	Soulerin, James & Co. Estimate— Superstructure	2,097.00
"	Story Brothers—Estimate—Stone ..	589.73
May.	Services, Cement, Lumber and Stone .	2,154.82
"	Pay Roll two weeks ending May 9th..	448.80
"	" " " " " " 23d..	1,008 87
"	Soulerin, James & Co.—Estimate— Superstructure.....	1,541.77
"	Story Brothers—Estimate—Stone....	1,199.30
June.	Services, Cement, Lumb'r, Awning etc.	1,227.22
"	Pay Roll two weeks ending June 6th..	1,704.38
"	" " " " " " 20th..	1,481.20
"	" " " " " July 4th..	1,388.77
"	Soulerin, James & Co,—Estimate— Superstructure..	1,145.49
"	Story Brothers—Estimate—Stone....	465.30
July.	Services, Iron, Lumber and Cement.	1,212·92
"	Pay Roll two weeks ending Jnly 18th.	1,755,38
"	" " " " " Aug. 1st..	1,356.02
"	Soulerin, James & Co.—Estimate— Superstructure..	1,332.00
"	Cook & Hyde—Estimate—Stone.....	350.00
"	Story Brothers, " "	643 50
August.	Services, Stone, Lumber, Bolts, etc..	497.78
"	Pay Roll two weeks ending Aug 15th.	1,025.62
"	" " " " " " 29th.	826.02
"	Soulerin, James & Co.—Estimate— Superstructure	1,066.50
	Forward.. .....$	30,929.61

	Brought Forward..... .....$30,929.61		
September.	Services, Pumps, Cement, etc.....	1,104.98	
"	Pay Roll, two weeks ending Sep't. 12th.	1,328.97	
"	" " " " " 26th.	1,152.71	
"	Cook & Hyde, Estimate, Stone.....	242.82	
"	Soulerin, James & Co., Est., Superstructure.....	900.00	
"	Story Brothers, Estimate, Stone.....	306.90	
October.	Services, Lumber, Spikes, Repairing Wagon, etc.....	836.69	
"	Pay Roll, two weeks ending Oct. 10th	544.26	
"	" " " " " 24th	127.50	
"	Soulerin, James & Co., Est., Superstructure.....	1,215.00	
"	Story Brothers, Estimate, Stone.....	2,606.23	
November.	Services Sup't, and Sundry Accounts.	248.75	
"	Pay Roll, two weeks ending Nov. 21st	102.85	
"	Cook & Hyde, Est., Dimension Stone.	69 54	
December.	Services Sup't, etc., Galv. Iron Pipe, Sawing Lumber, etc	406.21	
"	Pay Roll, two weeks ending Dec. 5th.	222.55	
"	" " " " " 19th.	349.23	
"	" " Jan. 2d, 1875.	282.37	
"	Soulerin, James & Co., Final Estimate Superstructure.....	4,579.10	
			47,556.27

North Street—Grading, etc.

1873.			
December.	Pay Roll, Men on Pipe Trench, Dec. 3d to 9th.....$	39.75	
1874.			
October.	Pay Roll, two weeks ending Oct. 10th. Grading.....	42.00	
November.	Pay Roll, two weeks ending Nov. 21st Grading.....	33.61	
"	Pay Roll, week ending Nov. 28th Grading.....	163.17	
	Forward..... .....$	278.53	

	Brought Forward.. .. ..$	278.53	
December.	Pay Roll, week ending Dec. 5th.	24.31	302.84
Land.			
1873.			
December.	Recording Deeds.....	1.75	
1874.			
January.	Abstract of Title	10.00	
July.	Am't Lodged in Bank for part of Lands taken on line of North Street, East and West of Milwaukee River.	1,172.80	
			1,184 55
Pipe Yard.			
1873.			
December.	Fifth Ward—Rent of Yard, services of Keeper	275.00	
1874.			
January.	Services Keeper of Pipe Yard	75.00	
February.	" " "	75.00	
March.	" " " "	75.00	
April.	" " " "	75.00	
November	Use of Teams mov'g Lumber in Yd..	10.00	585.00
River Pumping Works.			
1873.			
December.	Steam-fitting, Pump, etc.....	701.20	
1874.			
February.	E. P. Allis & Co., W'rk and Mate'l..	84.88	786.08
Fourth Ward—Pipe Covering.			
1873.			
December.	Sundry Bills and Grading.....	491.56	
1874.			
January.	Grading.....	169.00	
February.	"	1.65	
December.	" (work done in 1873)	25.20	687.41

Implements and Instruments.

1873.			
December.	Watchman's Time Detector, Wrenches, Brass Pump, etc	234.48.	
1874.			
January.	Wheelbarrow Scale, Oil-can, etc.	93.00	
February.	Wrenches, Hammers and Sundry Fittings	293.26	
April.	Tapping Machine, Wrenches, etc.	307.58	
May.	Taps, & Drills, Repairs of Pumps, etc	97.75	
June.	Hammer, etc.	16.08	
July.	Stop-cock Wrenches, Steel Sledge, etc	89.37	
August.	Derrick for Pipe Laying, Picks, Files, etc	100.63	
September.	Two Iron Wheelbarrows, Rubber Hose. etc	280.95	
October.	Picks, Sheaves, Augur, etc	29.53	
November.	Files, Steel Rake, etc	9.33	
December.	Repairing Level, Diamond Point Chisels, etc	12.30	1,564.26

Printing Books and Stationery.

1873.			
December.	Office Stationery, Printing Blanks, etc	38.05	
1874.			
January.	" "	8.05	
February.	" " and 12 Water Rate Books	83.16	
March.	Blank Books, Print'g, Advertising, etc	106.30	
April.	Office Stationery, Printing and Advertising	94.88	
May.	Office Stationery and Printing,	64.63	
June.	Printing and Binding 300 copies Report, Stationery and Printing.	102.65	
	Forward	497.72	

	Brought Forward.....$	497.72	
July·	Office Stationery, Printing, etc.....	32.72	
August.	" " " "	39.90	
September	Book of Warrants, Small City Maps.	22.00	
October	Binding Engine Plans, Printing, Stationery, and Advertising.....	181.07	
November.	3 Books for Water Rates, Stationery and Advertising	78.79	
December.	Printing 3000 Water Bills, Blanks, etc.	31.00	883.20

Office Expenses.

1873.			
December.	Plumbing Work, Cutting Wood, etc.	107 09	
1874.			
January.	Repairing Lock, etc	6.00	
February.	Office Furniture, Repairing Stove, etc	128 50	
March.	Brooms and Sawing Wood....	1.82	
April.	Repairing Door Lock.....	.60	
May·	Carpenter Work in Office	.35	
July.	Postage.....	1.00	
August.	Drinking Glass	.12	
October.	Wood, Ice, etc....	27·70	
November.	Repairing Stove, Sawing Wood, etc ..	9.30	
December.	Repairing Lock of Safe, Coal etc....	34.37	316.45

Traveling, Telegraphing and Express Charges.

1873.			
December.	Livery Bill Engineer's Department and Superintendent Engine House W'k.	60.10	
1874.			
January.	Livery Bill, Engineer's Department and Superintendent Engine House W'k.	52.50	
February.	Livery Bill, Engineer's Department and Superintendent Engine House W'k. and Telegrams	38.13	
	Forward .... $	150.73	

	Brought Forward....	150.73	
March.	Livery Bill, Engineer's Department...	38.75	
April.	" " Teams for Tapper, Buggy Hire, for Sundry Parties and Telegrams.....	114.13	
May.	Livery Bill, Teams for Tapper, Buggy Hire for Sundry Parties and Telegrams.....	126.50	
June.	Livery Bill, Teams for Tapper, Buggy Hire for Sundry Parties and Telegrams.....	191.00	
July.	Livery Bill, Teams for Tapper, Buggy Hire for Sundry Parties and Telegrams.....	223.50	
August.	Livery Bill, Teams for Tapper, Buggy Hire for Sundry Parties and Telegrams.....	223.85	
September.	Livery bill, Teams for Tapper, Buggy Hire for several Parties and Telegrams...	225.18	
October.	Livery Bill, Teams for Tapper, Buggy Hire for several Parties and Telegrams	155.05	
November.	Livery Bill, Teams for Tapper, Buggy Hire for several Parties and Telegrams.....	119.50	
December.	Livery Bill, Teams for Tapper, Buggy Hire for several Parties and express charges paid by Treasurer on Bonds April 22d 1872, to May 23d, 1874...	682.10	2,250.29

Ferrules.

1874.			
January.	Arnold, Yale & Thomas—Estimate...	454.68	
February.	Bebb, Thomas & Co., " ...	74.30	
April.	Fales, Jenks & Sons, Taps and Stops.	14.25	543.23

Meters.

1874.			
March.	H. R. Worthington, $\frac{5}{8}$ inch meter and Freight	28.30	
July.	Setting Meter	7.31	
September.	Freight on three Meters	1.91	
October.	H. R. Worhthington, 3-inch Meter and Freight	160.96	198.48

Public Drinking Hydrants.

1874.			
September.	Setting Hydrant, Box, etc., cor. Wisconsin street and Broadway	28.10	
October.	Bost. Machine Co.—Drinking Hydr't	108.00	
November.	Bartholomew & Co.—Hydrant and freight	26.33	162.43

Engineering.

1873.			
December.	Services of Engineers, Rodmen, etc.	1,186.66	
January.	" " "	816.66	
February.	" " "	616.66	
March.	" " "	616.66	
April.	" " "	866.66	
May.	" " "	878.66	
June.	" " "	753.66	
July.	" " "	755.66	
August.	" " "	753.66	
September.	" " "	753.66	
October.	" " "	755.66	
November.	" " "	751.66	
December.	" " "	755.66	$10,261.58

Salaries.

1873.			
December.	Services of Sundry Persons.....	817.66	
1874.			
January.	" " "	1,267.66	
February.	" " "	625.33	
March.	" " "	631.33	
April.	" " "	631.33	
May.	" " "	714.66	
June.	" " "	714.66	
July.	" " "	717.66	
August.	" " "	714.66	
September.	" " "	714.66	
October.	" " "	717.66	
November.	" " "	711.66	
December.	" " "	817.66	9,796.59

Interest.

1874.			
June.	Drullard & Hayes—Interest on deferred Payment	77.92	
"	Harrison, Green & Walker—Interest on Deferred Payment.....	191.98	
"	De Golyer & McClelland—Interest on Deferred Payment.	54.52	
December.	Amounts paid by Treasurer on Loans from Banks and Deferred Payments on Warrants to Dec. 31st 1874....	3,245.57	
	Story Brothers—Interest on Deferred Payment of Estimate.....	100.00	3,669.99

MAINTENANCE ACCOUNTS.

Pumping Works—North Point.

1874.			
July.	Coal	4,329.95	
August.	Coal and Oil	1,824.52	
September	Coal and Wood	4,764.46	
"	Pay Roll—Engineers, Firemen, etc	170.00	
October.	Oil, Hemp, Packing, Red Lead, etc	81.19	
"	Pay Roll—Engineers, Firemen, etc	500.00	
November.	Empire and Rubber Packing, Cotton Waste, etc	193.92	
"	Pay Roll, Engineers, Firemen, etc	493.60	
December.	Oil, Emery Cloth, etc	117.45	
"	Pay Roll, Engineers, Firemen, etc	500.00	12,975.09

River Pumping Works.

1873.			
December.	Coal, Oil, etc	1,233.93	
"	Pay Roll—Engineers and Firemen	240.00	
1874.			
January.	Wood, Coal, etc	22.20	
"	Pay Roll—Engineers and Firemen	240.00	
February.	Coal, Fire Brick, etc	727.88	
"	Pay Roll—Engineers and Firemen	240.00	
March	Smoke Stack, Brick, Oil, etc	51.34	
"	Pay Roll—Engineers and Firemen	240.00	
April.	Engine Counter, Wood, etc	178.98	
"	Pay Roll—Engineers and Firemen	240.00	
May.	Coal, Lumber, Oil, etc	253.76	
"	Pay Roll—Engineers and Firemen	240.00	
June.	Coal, Packing, Repairs, etc	951.80	
"	Pay Roll—Engineers and Firemen	185.20	
	Forward	$ 5,045.09	

	Brought Forward	$ 5,045.09	
July.	Oil, Coal, Brooms, etc	748.71	
"	Pay Roll, Engineers and Firemen	240 00	
August.	Coal, Oil and Packing	789.00	
"	Pay Roll—Engineers and Firemen	240.00	
September.	Coal	326.75	
"	Pay Roll—Engineers and Firemen	240.00	
November.	Lubricator, Packing, Repairs, etc	132.21	7,761.76

Pipe Distribution

1873.			
December.	Sundry Accounts, Hydrant Boxes, Cartage, etc	$ 389.00	
"	Pay Rolls, Inspector's and Laborers	636.83	
1874.			
January.	Stop Cock Boxes, Repairing Hyd'ts etc	101.83	
"	Pay Rolls Inspector's and Laborers	501.83	
February.	Sundry Accounts	.50	
"	Pay Rolls Inspector's and Laborers	413,33	
March.	Wood, Lead, etc	209 96	
"	Pay Rolls Inspectors and Laborers	485.58	
April.	Repairing Streets, Gravel, etc	277,28	
"	Pay Rolls, Inspector's and Labores	548 33	
May,	Repair'g Sts. and Hydt's, Hauling, etc	230.26	
"	Pay Rolls Inspector's and Laborers	529.33	
June.	Repair of Hydt's, Cartage, Gravel, etc	126.67	
"	Pay Rolls, Inspector's and Laborers	431.83	
July.	Gravel, Cartage of Hydants, etc	47.50	
"	Pay Rolls Men lowering Pipe, etc	630.00	
August.	Gravel, Cartage, Repairs, etc	65 48	
"	Pay Roll Inspector's and Laborers	424.83	
September.	Repair of Hydrants, Hauling etc	149 17	
"	Pay Rolls, Inspector's and Laborers	441.50	
October.	Repairing and Altering Hydrants, Hauling Earth, etc	99 64	
"	Pay Rolls Men low'ng Pipe in 3d St. etc	743.55	
	Forward	$ 7,484.23	

	Brought Forward.. .. ..$	7,484.23	
November.	Sundry Bills, Cartage, Repairs etc,....	124.09	
"	Pay Rolls Inspector's, Men lowering Pipe, etc.....	565.01	
December.	Repairs, Use of Teams, etc.....	40.50	
"	Pay Rolls Inspectors and Laborers ...	587.08	8,800.91

Reservoir.

1873.			
December.	Services of Keeper.....	54.00	
1874.			
January.	" "	54.00	
February.	" "	48.00	
March.	" " and Ins. on B'dg..	67.00	
April.	" "	52.00	
May.	" "	52.50	
June.	Services Keeper, Repairing Cistern, Cutting Grass, etc.....	117.85	
July.	Services of Keeper.....	54.00	
August.	" " etc.....	52.55	
September.	" " etc.....	52.50	
October.	" " Fence Posts, etc..	64.30	
November.	" "	50 00	
December	" "	54.00	772.70

p. 66 to 79 missing

Recapitulation of Accounts.

PAYMENTS DECEMBER 1st 1873, TO DECEMBER 31st 1874.

Construction Accounts.

Reservoir	$ 7,913.57	
Water Pipe and Castings	54,042.54	
Stop Cocks and Valves	3,173.90	
Hydrants	1,681.28	
Pipe Laying and Inspection	37,645.54	
Engine House, Lake Crib, Pier, etc	64,243.14	
Pumping Engines	9,226.72	
Water Tower	19,985.74	
North Street Bridge	47,556.27	
North Street—Grading, etc	302-84	
Land	1,184.55	
Pipe Yard	585.00	
River Pumping Works	786.08	
Fourth Ward—Pipe Covering	687.41	
Implements and Instruments	1,564.26	
Printing Books and Stationery	883.20	
Office Expenses	316.85	
Traveling, Telegraphing and Express Charges	2,250.29	
Ferules	543.23	
Meters	198.48	
Public Drinking Hydrants	162.43	
Engineering	10,261.58	
Salaries	9,796.59	
Interest	3,669.99	$278,661.48

Maintenance Accounts.

Pumping Works, North Point	12,975.09	
River Pumping Works	7,761.76	
Pipe Distribution	8,800.91	
Reservoir	772.70	30,310.46
Total		$308,971.94

CONTRACTS LET DURING THE YEAR 1874.

1874.		
February.	Jacob Mueller, for Painting and Glazing, Engine House, Boiler House and Coal Shed.....	$ 895.00
April 28.	Cook & Hyde for Cutting Stone for Water Tower, and furnishing and cutting Flagging for Boiler Room Floor.....	2,800.00
May 18.	Harrison & Green, for driving Piles in Dock Extension at Engine House, at $2.90 per Pile—486 Piles Driven.....	1,409.40
" 26.	C. H. Swan & Co., for furnishing Coal for Pumping Works, North Point—1,200 Tons Anthracite Coal at $8.97 Per Ton..	10,764.00
" 26.	Elmore & Phelps, for furnishing 150 Tons Briar Hill Coal for River Pumping Works at $7.38 per Ton. Delivered 366.789 Tons, $7.33.....	2,688.55
July 14.	Harrison & Green, for Grading part of Engine House Grounds—5,000 cubic yards at 32c; quantity excavated, 4,960 cubic yards at 32c..	1,587.20
August 12.	Biersach & Niedermeyer, for Galvanized Iron Work on Roof of Water Tower, including Painting	1,585.00
" 13.	Hornbach & Wagner, for Furnishing and erecting Wrought Iron Roof for Water Tower.....	500.00
October 29.	Jacob Mueller, for Painting Doors and Window Sashes and Glazing Windows of Water Tower.	110.00
" 30	Hornbach & Wagner, for Furnishing and Putting up Iron Floor above main Stairway in Water Tower.	165.00
December 1.	Hoffman, Billings & Co., for Furnishing and putting up Heating Apparatus for Eng. House.	389.00

On April 28th, 1874, the Contract for Superstructure of North Street Bridge was, by request of the Contractors, Messrs. Davis & Soulerin, transferred to the firm of Soulerin James & Co., who have completed the contract.

ITEMS OF EXPENDITURE ON ENGINE HOUSE.

	Reported to Dec. 1,'73.	Reported Dec. 1, '73 to Dec.31 '74	Total.
Stone	$ 30,944 56	$ 1,797 51	$ 22,742 06
Brick	19,634 52	3,158 50	22,793 02
Lime	1,771 28	587 80	2,359 08
Cement	2,566 30	261 70	2,828 00
Lumber	4,630 12	1,929 14	6,559 26
Iron Work, including Floor Beams	2,260 30	3,441 07	5,701 37
Cut Stone	4,207 00	1,159 24	5,366 24
Stone-cutting	7,011 03	.....	7,011 03
Nails, Spikes, etc	762 61	318 53	1,081 14
Wrought Iron and Slate Roof	4,956 30	8,768 44	13,724 74
Door and Window Frames	1,219 45	560 00	1,779 45
Galvanized Iron Cornice	1,594 00	1,730 34	3,324 34
Sewer Pipe	170 70	365 86	536 56
Painting and Glazing	.....	615 00	615 00
Sodding Slopes and Grading part of Grounds	.....	3,445 34	3,445 34
Plumbing	.....	420 22	420 22
Connecting Lake Pipe with Well	.....	721 39	721 36
Cost of Borings—Survey for Lake Tunnel	1,251 91	.....	1,251 91
Lake Crib, Pier and Dock Work	22,658 45	14,061 52	36,719 97
Miscellaneous	571 74	1,376 75	1,948 49
Pay Rolls, Masons, Stone-cutters, Carpenters, Laborers, Teams, etc	55,084 02	17,524 79	72,608 81
Superintendence	2,807 00	2,000 00	4,807 00
Total	$164,101 28	$64,243 14	$228.344 42

ITEMS OF EXPENDITURE ON WATER TOWER.

	Reported to Dec. 1, 1873	Reported Dec. 1, 1873 to Dec 31 '74	TOTAL.
Stone	$ 8,444 84	$ 2,894 73	$ 11,339 57
Brick	325 00	433 00	758 00
Cement	357 05	77 50	434 55
Lime	269 80	217 55	487 35
Stone Cutting	222 36	2,534 50	2,756 86
Lumber	150 22	49 45	199 67
Iron, Spikes, Nails, etc	26 30	62 70	89 00
Iron Castings for Base of Stand Pipe	1,086 56	.....	1.086 56
Wrought Iron Stand Pipe	3,168 00	1,966 56	5,134 56
Calking Base of Stand Pipe	46 53	.....	46 53
Iron Stairway and Flooring	858 60	405 00	1,263 60
Wrought Iron Roof	.....	500 00	500 00
Galvanized Iron work on Roof	.....	1,585 00	1,585 00
Miscellaneous	58 65	220 50	279 15
Pay Rolls, Foremen, Masons, Stone Cutters, Carpenters, Laborers, Teams, etc	13,625 67	9,039 25	22,664 92
	28,639 58	19,985 74	48,625 32
Amount formerly charged to J. Ready, Fr't. on Stone	.....	.....	16 00
Total	.....	.....	$ 48,641 32

Items of Expenditure on North Street Bridge.

	Reported to Dec. 1, 1873	Reported Dec. 1, 1873 to Dec. 1, '74	TOTAL.
Stone	$ 2,312 00	$ 6,950 36	$ 9,262 36
Lime	63 65	....	63 65
Sand	81 00	.....	81 00
Cement	126 40	1.095 00	1,221 40
Lumber	668 32	3,353 19	4,021 51
Iron Spikes, Straps, Bolts etc	109 52	550 19	659 71
Pumps	.....	407 75	407 75
Wrought Iron Superstructure	17,533 53	17,186 86	34,720 39
Cutting Coping	....	58 17	58 17
Boring for Foundations	151 69	.....	151 69
Miscellaneous	102 15	180 81	282 96
Pay Rolls, Foremen, Masons, Carpenters, Laborers, Teams, etc	4,695 67	16,773 94	21,469 16
Superintendence	.....	1,000 00	1,000 00
Total	$ 25,843 93	$ 47.556 27	$ 73,400 20

STATEMENT OF WATER RATES

For the Year ending Dec. 31, 1874.

First Ward	$ 1,941.24	
Second "	3,590.24	
Third "	3,606.60	
Fourth "	4,729.42	
Fifth "	2,690.47	
Sixth "	1,194.55	
Seventh "	7,092.52	
Eighth "	1,174.17	
Ninth "	139.67	
Tenth "	59.84	
Eleventh "	79.33	
Twelfth "	10.00	26,308.05
Miscellaneous Rates, (Building purposes, etc.)		847.94
Total		$27.155.99

OUTSTANDING BILLS FOR WATER RATES

December 31, 1874.

First Ward	$ 125.28	
Second "	112.72	
Third "	218.08	
Fourth "	253.19	
Fifth "	134.08	
Sixth "	20.76	
Seventh "	320.89	
Eighth "	10.34	
Ninth "	17.85	
Tenth "	25.33	
Eleventh "	1.17	
	1,239.69	
Miscellaneous Rates	409.44	1,649.13
Total Amount Received for Water Rates, 1874		$25,506.86

List of Establishments Supplied with Water.

NAME.	NO.
Banks	9
Bakeries	23
Barber Shops	16
Bathing Houses	2
Beer Gardens	1
Breweries	12
Boarding Houses	49
Brick Yard	1
Churches	3
Convent	1
Court House	1
City Hall, (old)	1
Chemical Works	1
Dwelling Houses	1715
Dyeing and Scouring Establishments	3
Distilleries	1
Engine Houses, (Fire Department)	5
Elevators, (Grain)	1
Elevators, (Hydraulic)	5
Foundries	10
Freight and Warehouses	2
Gas Works	1
Halls, (Public)	6
Hotels	21
Hospitals and Asylums	4
House of Correction	1
Jail	1
Laundries	6
Manufactories and Work-shops	83
Meat Markets	39
Market Houses	2
Mills	1
Malt Houses	2
Newspaper Offices	7

List of Establishments Supplied with Water.—Continued.

NAME.	NO.
Offices and Public Rooms	88
Opera Houses and Theatres	2
Printing Offices	7
Photograph Galleries	6
Packing and Curing Houses	4
Planing Mills	2
Post Office	1
Restaurants	9
Rectifying Establishments and Liquor Stores	27
Saloons	136
Stables (private)	167
" (hack and car)	4
" (livery)	15
Stores	341
Schools	12
Tanneries	2
Vinegar Manufactories	5
Water Cures	1

Number of Permits issued up to Dec. 31st, '74, 1787
" " Branch Pipes supply Breweries, etc., 20

p. 87 to 104 missing

Schedule

Showing Streets in which Pipe should be laid the present year, 1875.

STREET.	BETWEEN WHAT STREETS.	LENGTH IN FEET.		
		6 inch.	8 inch.	12 inch.
Reed	Scott to Mitchell			2,300
Elizabeth	Eighth Ave. to Clark's Addition			2,650
Chestnut	Twelfth to Fourteenth			800
Fowler	Ninth to Tenth			350
Park	Fourth to Eighth		1,525	
Jefferson	Pleasant to Kewaunee		500	
Mitchell	Fourth Ave. to Hanover	2,200		
Hanover	Elizabeth to Mitchell	4,000		
Scott	First Ave. to Sixth	1,880		
Virginia	Reed to First Avenue	1,440		
Franklin	Pleasant to Brady	1,050		
Sycamore	Ninth to Thirteenth	1,300		
Thirteenth	State to Vliet	1,900		
Fourteente	Spring to Vliet	3,600		
Vliet	Thirteenth to Twenty-second	3,150		
Eighth	Poplar to Cherry	1,000		
Second	Walnut to North	2,800		
		24,320	2,025	6,100

Total 32,445 lineal feet=6.144 Miles.

The cost of furnishing and laying these 6.144 miles of pipe including cost of furnishing and setting forty-five hydrants, and the twenty stop valves will be $52,200.

MILWAUKEE WATER WORKS.

Schedule of Water Rates.

ADOPTED FEBRUARY 14, 1874.

Rates for Dwelling Houses.

For one Family occupying a house containing 1 or 2 rooms..	per annum,	$4
3 or 4 rooms	"	5
5 or 6 rooms	"	6
7 or 8 rooms	"	8
9 or 10 rooms	"	10
11 or 12 rooms	"	11
13 or 14 rooms	"	13
15 or 16 rooms	"	14

Houses containing more than 16 rooms to be charged at the rate of fifty cents for each additional room. Houses occupied by more than one family to be charged at above rates for one family, and $4 for each additional family.

For Boarding or Lodging Houses of

1 or 2 rooms	per annum..	$ 6.00
3 or 4 rooms	"	7.50
5 or 6 rooms	"	9.00
7 rooms	"	10.00

For each additional room, $1.00.

For Other Institutions.

Bakeries—from $5 to $50 per annum.

Banks—from $10 to $15 per annum.

Barber Shops—First Chair, $3; each additional chair, $2.

Bars—from $10 to $50.

Bath—Private, $3; public, $5 to $15.

Billiard Saloon—each table, $1.

Book Bindery—for 10 persons or under, $5; each additional person, 25 cts.

Building Purposes.—Brick-work per M., and stone-work measured as brick-work, per M., 6 cents; Plastering, per 100 square yards, 30 cents.

Candy Manufactories—$15 to $50.

Churches—$5 to $15.

Cigar Manufactories—For ten persons or under, $5; each additional person, 25 cents.

Cisterns—Water furnished for filling Cisterns, 3 cents per 100 gallons.

Confectioneries, Refectories, Eating Houses, Refreshment and Oyster Saloons, Market and Fish Stalls, from $10 to $50.

Dyeing and Scouring—From $20 to $50.

Forge—$3

Fountain—From $10 to $100.

Hall—From $5 to $20.

Hose—For Private Stable, not less than $5; for Livery or Sale Stable, from $25 to $50; for Washing Pavement, for every twenty-five feet or less, $3; for Sprinkling Street, including Sidewalk, per foot run, 20 cents.

Hotels—For each room, $1.

Laundries—$10 to $50.

Office and Sleeping Rooms—$3 to $10.

Photograph Gallery—$10 to $20.

Printing Offices—According to number of Presses, not including Steam Power, $8 to $30.

For Other Institutions—continued.

Schools—Public and Private, each 100 scholars, $5, and below 50 scholars, $3.

Schools—Boarding—Each room 50 cents.

Shops—According to number of hands, from $5 to $25.

Sprinkling—Private Garden with Hose, $5 to $10; Public Garden with Hose, $50 to $100.

Stables—Livery, per stall, $1; Hotel, per stall, $1.50; Sale per stall, $1 50 Private Carriage and Buggy Horses, each $2; Work Horses, $1; Horse trough, $5; Cows, each $1.

Steam Boilers—Per square foot, fire surface, 30 cents; no license less than $10.

Steam Engines—Each horse-power, $4.

Stores—From $6 to $30.

Urinals—$5 to $10.

Wash Basins—Stationary, first basin in dwellings free; all others $1 each.

Water Closets—Private, first $3; all others $2. Public, $5.

Workshops or Manufactories—For ten persons or under, $5; each additional person, 25 cents.

All manufacturing and other business requiring a large supply of water for steam engines and other purposes, are to be charged therefor two cents per hundred gallons on the average estimated quantity during the year.

The Commissioners have the authority in their discretion to allow a discount on the rates above given to hotels, on amounts above $300, of 20 per cent., and on amounts nnder $300 of 10 per cent.

All rates not hereinbefore indicated are reserved for special contract with the Water Commissioners.