

ANNUAL REPORT

*OF THE*

WATER COMMISSIONER

*OF THE*

CITY OF ST. LOUIS

*FOR THE*

YEAR ENDING APRIL 12TH, 1926

ORGANIZATION  
OF THE  
ST. LOUIS WATER DIVISION

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EDWARD E. WALL, Water Commissioner to May 1st, 1925; Director of Public Utilities, May 1st, 1925 to April 1, 1926.

JOHN C. PRITCHARD, Water Commissioner, May 15th, 1925 to April 1, 1926; appointed Director of Public Utilities, April 1, 1926.

F. T. CUTTS, Assistant Water Commissioner, resigned August 15, 1925.

CHARLES A. CHENEY, Secretary.

**Supply and Purifying Section:**

C. M. DAILY, Division Engineer, resigned Aug. 15, 1925.

E. E. EASTERDAY, Asst. Div. Eng'r in Charge of Section

AUG. V. GRAF, Chemical Engineer.

**Operating Section:**

LEONARD A. DAY, Division Mechanical Engineer.

K. TOENSFELDT, Asst. Division Engineer.

H. C. HENNING, Engineer-in-Charge of Section.

**Distribution Section:**

THOMAS J. SKINKER, Engineer-in-Charge of Section.

WM. A. FOLEY, Assistant Engineer.

**Assessment Section:**

W. T. KIRCHEIS, Resigned.

S. O. SCHUMACHER, Supervisor Assessment of Water Rate

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OFFICE OF THE DIRECTOR OF PUBLIC UTILITIES,  
April 20th, 1926.

HONORABLE E. R. KINSEY,  
President, Board of Public Service,  
City of St. Louis, Missouri.

DEAR SIR:

The long-continued period of hot, dry weather during the four months of 1925 gave ample proof of the pressing necessity for an addition to the water supply of the City of St. Louis. During this fiscal year the average daily consumption has increased six million gallons a day, having now reached almost 119 gallons per day. During the same period the per capita consumption has gone from 139 gallons to 145 gallons per day. For 122 days during the four summer months of 1925 the average daily pumping was greater than 131 million gallons per day, or 13 million gallons per day greater than the average throughout the year. To turn out this amount of filtered water over such a long period of time necessitates the operation of all pumping and purification machinery almost to its limit and indicates the close proximity of the demand to the ultimate capacity of the present plant.

Comparatively few complaints were received of low pressure and inadequate supply, but the high points in the city are beginning to feel a reduced pressure due to increased consumption. A request will be made this summer that there be no sprinkling between the hours of 6 A. M. and 6 P. M., which it is hoped will carry the high spots over the critical periods of peak load. The increased per capita consump-

tion emphasizes the fact that universal metering should be adopted in the City of St. Louis at an early date. No waterworks in the country can stand indefinitely an unchecked water waste. The daily per capita consumption of 145 gallons in St. Louis may be contrasted with Cleveland, a universally metered city, whose consumption has dropped to 90 gallons per capita. On the other hand, Chicago is a shining example of what may happen with an unlimited waste of water with its abnormal daily consumption of 280 gallons per capita.

Progress on the new Water Works at Howard Bend has reached the point where a construction schedule can be established with some guarantee of accuracy. Of the contracts under way at present, the intake and pump pits and the pipe line contracts are practically complete; Stacy Park Reservoir, the filter plant and boiler house foundations are well under way, the two former being scheduled for completion in 1927 and the boiler house foundation in the fall of 1926. According to present plans, the mixing chamber, grit chamber and settling basins will be let under one contract in the fall of 1926, and the superstructures housing the intake, pump pits, boiler house and coal receiving house at about the same time. Pumping machinery contracts will be let in the summer of 1926, the boiler house equipment having been already put under contract. Our schedule for 1927 contracts includes the coagulant house, the secondary coagulant basin, the clear water basin and the filter plant superstructure, with their necessary conduits, sewers and connections. These contracts will complete the plant, and we are expecting to pump water from Howard Bend by the fall of 1928.

The net cost of operation and maintenance of the Water Works reached the sum of \$1,913,000.00 this year, an increase of \$67,000.00 over last year. This is an excellent record in view of the fact that the Water Division pumped 2,106 million gallons more water this year than in the previous fiscal year. Using the figures given in Table 106 for total cost of operation and maintenance and checking against the total consumption, the cost of water per million gallons in this fiscal year has been \$44.07 as against \$44.73 last year. These figures, of course, take no account of interest on bonded indebtedness, depreciation and sinking fund payments but are merely given to indicate that there has been a slight decrease in operating cost this year over last year. This is due in part to the fact that a great deal more water was pumped this year than last year and also that our purification costs have dropped about \$1.50 a million in this fiscal year,

by reason of a considerable decrease in the price paid for lime under the new contract, which went into effect on January 1st, 1926.

A considerable economy was effected in the Distribution Section by closing the May Street and Chestnut Street Stations. This was possible due to the fact that slow horse-drawn equipment has been almost entirely replaced by motor transportation, which enables the territory formerly served by these two stations to be taken care of effectively by the remaining stations.

During the year the Distribution Section conducted a Pitometer survey for detection of waste in a selected district on the South Side, details of which are given in the report of the Distribution Section. Pitometer work is a very valuable part of the routine work of the Distribution Section, and it is the intention of this department to systematically continue a periodic survey for the detection of water waste as this first survey resulted in an appreciable stoppage of water waste. In addition to this work, some Pitometer work has been done in connection with the water supply from the Missouri River, looking toward a revision of the distribution system when Missouri River water becomes available.

In the past year a history of the St. Louis Water Division has been compiled by Mr. Thos. E. Flaherty, Assistant Engineer in the Distribution Section. His material has been derived from a number of sources but mostly from the annual reports of the Water Commissioner of the City of St. Louis, of which we have a complete file. In view of the fact that the Water Division of St. Louis is almost one hundred years old, it is thought that this history is of considerable value and we are including it as a part of this annual report.

Respectfully submitted,

JOHN C. PRITCHARD,

Director of Public Utilities.

A HISTORY  
*of the*  
WATER WORKS OF ST. LOUIS

FROM THEIR INCEPTION IN THE YEAR 1829  
TO THE YEAR 1868.

*From the Manuscript of THOS. J. WHITMAN,  
Chief-Engineer of Water Works,  
1867-1876.*

*Edited and Annotated  
THOS. E. FLAHERTY,  
May, 1924*

*Compiled for  
EDWARD E. WALL,  
Water Commissioner.*

## OLD WORKS.

### INTRODUCTION.

In making this report I have endeavored to first, present a history of the Water Works of St. Louis up to May, 1867, giving as nearly as I can ascertain from the few reports accessible, the time the original works were commenced, the cost and capacity thereof, and the history of such extensions as it was found necessary to make from time to time.

To this I have added a statement of such work as I found was required in order to keep up the water supply while the new works were being constructed, bringing the statement up to the time when the engines and pumps located at the foot of Bates Street were dismantled, and the ground turned over to the city government for wharf purposes.

The honor of the first practical steps toward supplying the City of St. Louis with water through pipes is due to Daniel D. Page, Esq., the second Mayor.

On the 27th of September, 1829, John C. Wilson and Abraham Fox entered into an agreement with the City to build and conduct Water Works, it being stipulated that the supply to the citizens should be "clarified" water. At this time the population of the city was about six thousand inhabitants.

Some of the conditions imposed by the contract were, that the contractors (Wilson and Fox) should supply the city with water for twelve fire hydrants free of charge. The hospital of the Sisters of Charity and a fountain on the grounds of Wm. H. Ashley were also to be supplied without pay. The water must be distributed through the city in cast iron pipes buried at least three and a half feet under ground, and that the water should be delivered in the reservoir in one year, and to the fire hydrants in eighteen months from date of contract. Another provision was that the works were to belong to the city at the expiration of the term for which the contract was made.

In return, the contractors were granted the exclusive right of supplying the citizens with water for twenty-five years, with the right to charge as high as Twenty Dollars per year for a private family, and up to One Hundred Dollars for hotels and manufactories. The city also agreed to give a bonus of Three Thousand Dollars in cash on the com-

pletion of the works, and further, the city was to donate a lot, forty by one hundred and twenty feet, on the river bank, for a pumping station, and a half acre of ground, on some eminence, for a reservoir.

April 3rd, 1830, a lot of ground about 170 by 160 feet was acquired from Wm. H. Ashley. It was on "an eminence" known as the "Little Mound", situated on the corner of Ashley and Collins Streets. \$500.00 was paid for this lot, with the condition that when the ground should cease being used for Water Works purposes, it should revert back to Mr. Ashley, or his heirs, on the city being refunded the sum paid for the land.

- \*3. On June 29th, 1830, a lot for the engine house, 250 by 250 feet, was purchased from the United States for \$2,265.00.

Up to this time the contractors had made but little progress with their work, except getting a small lot of pipe. On April 2nd, 1830, Mayor Page had given his private note to Vanleer & Co. for \$2,309.60 to pay for some of the pipe that had been ordered and made.

August 20th, 1830, Wilson sold out his half of the contract to Fox, and in November, same year, the city had advanced, on account, to the contractors, the sum of \$1,500.00.

Wilson and Fox were eastern mechanics, and appear to have been men of fair ability, but sadly in want of capital. Their hopes of profit were dampened at a very early state of the project, and they owed their sole encouragement to the repeated advances of cash and credit by Mr. Page.

Shortly after going into operation, the receipts for water licenses for one year amounted to \$1,157.75. During this time the operating expenses were far in excess of this amount, being some \$4,000.00, not including the interest on the capital invested.

Matters progressed very unsatisfactorily. Mr. Fox suspended work to such an extent as to force the city into a new agreement dated April 2nd, 1831. In this agreement Fox was released from all the conditions of the first contract except the providing of a fountain for Wm. H. Ashley, which was one of the considerations for the purchase of the lot for the Reservoir.

The new contract bound the city to take charge of and complete the Water Works, assuming three-fourths of the expense,—Fox to assume one-fourth. This provision included all expense for "materials"

heretofore incurred; and Fox was authorized to receive one-fourth of the proceeds of the Works. The rates, as set forth in this agreement were, private families not less than Ten Dollars, hotels at least Forty Dollars, and manufactories, livery stables, etc., not less than Fifty Dollars per annum.

- \*4. In May, 1831, it was estimated that it would require the sum of \$35,000.00 to complete the works as designed. At this date the excavation for the Reservoir had been made, and the walls carried up to a height of five and a half feet, and the bottom was being paved. The engine house was built, and most of the machinery in place.

- \*5. A settling reservoir 40 by 80 feet had been excavated to the rock, and it was proposed to blast it out to a depth of 12 feet. The amount of pipe laid does not appear in the report.

The loan negotiated by the city in 1831, of \$25,000.00, to be applied to the construction of Water Works, was one of the first of any magnitude ever made by the city; and a much respected Councilman, in a speech approving the object of the loan, warned the Council, with deep solemnity, that when the loan should be completed, the debt of the city would be so much increased that the interest would amount to Four Thousand Seven Hundred Dollars per annum.

The first pumping engine for the Works was made by Francis Pratt of Pittsburgh, steam cylinder 10 inches diameter and four feet stroke. The pump was a double acting piston pump 6 inches in diameter, and same stroke as the engine. The cost of this engine and pump does not appear. This machine proved so defective that it was abandoned and replaced by two rotary pumps, then in possession of the city, that had been made for fire engines. These rotary pumps were set up in a small building located on the banks of the river at the foot of Smith Street.

The pump delivered the water through a six-inch cast iron main into a reservoir situated at the corner of Bates and Collins Streets. This was the first reservoir used in St. Louis for the storage and distribution of water. It was constructed partly in excavation and partly in embankment. The bottom was paved with brick laid on a floor of thick plank, tongued and grooved, driven together, and fastened to sills. The main walls were of stone masonry lined with brick. The dimensions of the reservoir were 62 by 55 feet, the depth of water was to be 15 feet, giving a capacity of about 350,000 gallons. The elevation of the high water line was 90 feet above the city directrix.

\*7. Water was first supplied the city (probably) in the fall of 1831, yet the reports only speak incidentally of this. The first positive statement in regard to furnishing water is made in the summer of 1832.

\*8. With these facilities, the ordinary demands of the city at this time were easily supplied, but when fires occurred, there was for many years always a deficiency of water on account of the small size of the distribution pipes.

For many years after the works were supplying water, the plumbing of private houses and the attachments to street mains were done by the city, and it was not until 1847 that the work was given up to private competition. At one time the city even manufactured the lead used in these attachments. The expenditures and receipts on account of this branch of the works for some years formed a large proportion of the items of water works accounts.

During the early days of the work, they received the most zealous care of the city council. A committee of three of its best men always had its management under their care, and its expenditures were inspected and guarded with great fidelity.

Monthly appropriations were made by the council for the expenses of the works, the money being placed in the hands of the Superintendent for disbursement, who was required to render all accounts monthly.

The collections of the Water Works revenue were made by the City Collector until 1839, when the duty was intrusted to the Superintendent of the works.

Abraham Fox was elected Superintendent of the works, by the City Council, in 1832, at a salary of \$800.00 per annum.

The first engine-house, built in 1831, at the foot of Smith Street was destroyed by fire in 1833. The water supply was suspended such a length of time by this accident that the Council passed an ordinance refunding a part of the money paid for water rates.

The works were in operation but a very short time before it was found that extension and improvement were desirable. To this end many plans were presented to the Council, all receiving thorough scrutiny and attention, and, although many ideas were entertained that were extravagant and undesirable, yet the ones carried into effect were generally wise and prudent under the circumstances.

\*9. For many years it was a strongly favored project to build a reservoir on the summit of the "Big Mound", but the extravagant price demanded by the owners stood in the way of its accomplishment.

\*10. Fox retained the office of Superintendent until 1835, when he resigned to take a contract to supply the water pipe for the city.

In July, 1835, during the time that John F. Darby was Mayor, the city concluded to purchase the interest of Fox, and allowed him for his share the sum of eighteen thousand dollars. In settling up the account it was found that, after deducting one-fourth of all the expenses incurred up to date, there was \$7,447.18 due Fox. The total cost of the works up to this time was \$54,294.01, besides interest-bearing obligations given in pay for pipe furnished.

After the city became sole owner of the works, they were conducted on the same system as before. John M. Wimer was made Superintendent to succeed Fox, and the capacity of the works was gradually increased proportionally with the increase in population, appropriations being made from year to year for that purpose. In 1835 the contract price of coal was 8 cents per bushel.

For many years there was no particular attention paid to the question of water rates assessments, and the increase in revenue was very slow up to the year 1851, since which time more attention has been given to this department of the works.

In 1836 a ten-inch pumping main was put in to replace the six-inch one. This work was done under John M. Wimer, the second Superintendent, and afterwards Mayor of the city.

Although a settling basin had been constructed near the engine house, there is no evidence in any of the reports showing that it was ever used for the purpose intended. All the statements go to show that the water was pumped directly from the river to the reservoir, and from thence flowed to the consumers.

In September, 1837, a new engine was contracted for with "Gaty & Coonce". It was finished and put to work in 1839. Its cost was about \$6,000.00. This engine was direct acting, with a double acting pump, steam cylinder 13 inches in diameter, and 6 feet stroke,—pump same dimensions.

In 1838 a new pumping main of 12 inches diameter was laid to connect the new engine with the reservoir, and the same year it was

determined to enlarge the reservoir. Peter Brooks was engaged to make the drawings and estimates for the enlargement; but, while the plans were being made, for some reason the scheme was abandoned.

\*9. The ground surrounding the reservoir was at this time looked upon as the most promising for speculation in the city, and the price demanded for the land needed was probably the real cause of the abandonment of the project. Some talk was also had about building another reservoir on the "Big Mound", but the price demanded (\$35,000.00 for a frontage of 300 feet) for this piece of ground was considered much too high.

October 19th, 1838, William Burd, the third Superintendent, was superseded by Peter Brooks, who held the office for eight years. Mr. Brooks was a civil engineer of excellent capacity, and under his charge many improvements were made.

In 1845 a new reservoir was erected on the site of the old one, and was, in fact, a wooden tank 100 feet square and twelve feet deep, divided into two compartments. The walls of the old reservoir were used for the middle support, and the outer edges of the tank were supported by a stone wall, laid without mortar, ten feet high, and five feet thick at the base, making the structure one hundred and three feet square over all. The space between the outer wall and the wall of the old reservoir was filled with earth well compacted. On these supports, and on posts placed between, the sills of the tank rested. The tank was made of oak, well framed and spiked together, the joints made water-tight by caulking with hemp. The capacity of the reservoir was about 820,000 gallons.

Singularly enough, after this tank reservoir was erected, the use of the old one underneath it was not abandoned, but was continued for several years, in order to supply a portion of the city not connected with the upper one. But, being inaccessible for repairs, and the wall having become very much cracked, it became a source of fear to the neighbors, who feared an inundation from its giving way.

For several years the new reservoir answered the purpose for which it was built. During 1849 frequent repairs were required to keep it water-tight, and from this time it gradually failed, until it was finally abandoned in 1852.

Up to the year 1846 the water pipes for the St. Louis works had been supplied by Woods, Stocker & Co. of Tennessee, and Vanleer & Co., the Garrisons, and Gaty & Coonce of St. Louis.

In 1846 the Superintendent of the works first suggested the idea of supplying the city with water from the Meramec River, highly extolling its "Crystal purity", etc. This scheme struck the popular mind with favor, and continued to be favorably received and advanced until 1854, when the then Superintendent made a counter-report, stating the water of the Meramec was unhealthful, owing to the large quantity of magnesia it contained. At no time does there seem to have been any engineering examination either as to the cost or quality of a water supply from this source.

In 1846 another pumping engine (the third since the commencement of the works) was erected by Messrs. Kingsland & Lightner of St. Louis. This was a crank and fly-wheel engine, steam cylinder 20 inches in diameter, seven and a half feet stroke; pump double acting, 15 inches diameter, and same stroke as steam cylinder.

This machine failed to give satisfaction, and injured itself by working loosely, the fault being due to the bad foundation. In 1847 the engine gave out completely, and the old machine had to be relied on to keep up the supply until the Kingsland engine could be thoroughly rebuilt.

The two engines were then used alternately until 1852, when Gaty, McCune & Co. built the fourth engine "Hercules" for the department.

In compliance with the public demand, and the recommendations of a number of successive Mayors, and Superintendents of Water Works, the third reservoir was commenced on Benton St. in 1847, and finished in 1849. This reservoir was 250 feet square, with a depth, when full, of fifteen feet, capacity 7,000,000 gallons. Elevation of high water line 115½ feet. Cost of reservoir \$74,373.10. Size of pumping main leading to it 20 inches.

The wooden tank reservoir built in 1845 was finally abandoned in 1852.

In 1852, Gaty, McCune & Co. built the fourth engine "Hercules" for the department. This engine cost \$25,000.00; steam cylinder 26 inches diameter, ten feet stroke; pump, double-acting piston, cylinder 22 inches diameter, ten feet stroke. This machine, when originally set up, had some sort of a condenser attached to it which proved a failure, and it was dispensed with in 1853.

In 1853 the problem of disposing of the sediment in the reservoir began to force itself on the attention of all those connected with the



works. The sewers built with the intention of "Flushing out" this sediment were found entirely useless for the purpose. During 1853 the reservoir was shut off from the distribution, and four feet in depth of the mud and sand removed at an expense of \$2,067.00. The water was never shut off again for the sole purpose of removing sediment, as pumping directly into the pipes gave rise to great dissatisfaction.

In 1854 the then Superintendent of the water works made a report stating that the water of the Meramec River was unhealthful, owing to the large quantity of magnesia it contained.

In 1854 the fourth and last reservoir of the old system of works was commenced under the supervision of Henry Kayser, Esq., then City Engineer. The main incentive for this structure was the hope of securing clear water by the greater time the water would be in repose, it being supposed that the current through a reservoir of this size would be exceedingly slow. This reservoir was built adjoining the third one, on Benton St. The dimensions were: length 527 feet, width 237 feet, and depth  $47\frac{1}{2}$  feet. The capacity when full was about 40,000,000 gallons. The cost was about \$200,000.00. This work was pushed forward with such energy and success that water was pumped into it August 15th, 1855.

\*12. By resolution and order of the City Council the walls of this reservoir were carried up fifteen feet higher than was originally planned by the engineer. This order was given after the foundations were in, and the walls partially built; for this reason, it is no reproach to the ability of the engineer that this reservoir was found to be more than usually liable to the defects of all overloaded structures. Soon after completion the walls became cracked, requiring frequent repairs, which were made, however, without much difficulty.

The greatest inherent trouble from the beginning was the rapid accumulation of sediment. After ten months' use twenty inches of sediment was removed at a cost of \$1,700.00, on the occasion of making some repairs to the walls, the water being drawn out for that purpose. In October, 1858, there was 12 feet of sediment, and the water was carried at 138 feet above directrix.

At the time the last reservoir was constructed, it was supposed that the one built in 1848 would be used in conjunction with it,—but the demand for water in the higher portions of the city became at once so peremptory that the water line was kept up in the new reservoir to the highest point that allowed of safety. As the pipage system remained

unchanged the difference of water line prevented using the two together, so in 1855 the old reservoir was abandoned, with the exception of such use of it as was required when the new reservoir was being repaired.

To keep pace with the continually increasing demand for water, in 1855 a fifth engine, the "Ajax", was built by Clark, Renfrew & Co. of St. Louis at a cost of \$28,566.33. Diameter of steam cylinder 30 inches, stroke 10 feet, pump cylinder 22 inches, ten feet stroke,—pump double-acting.

In 1857 the old engines, Nos. 2 and 3, were sold for the sum of \$1855.00.

During the year 1858 a new pumping main thirty inches in diameter was laid, and the twenty-inch pumping main was converted into a supply pipe.

In 1859 the collection of the water rates was put in charge of an officer called "The Register of Water Rates", and the results were more satisfactory. It was found that the collection of this tax, like all others, requires the attention of one fitted by experience and ability, in order to secure the best results.

In the fall and winter of 1859-1860 the embankment surrounding the reservoir was added to in order to strengthen the structure and enable an increase in the height of water, the increasing demand calling for additional head.

In the summer of 1861 some work was commenced by the United States Government on the western corner of the reservoir embankment to fit it for the reception of artillery. The city authorities remonstrated with the United States officers, and the work was suspended.

In 1862 Daniel H. Donovan, Superintendent of the works, was removed by Gen. Schofield, the Military Commander of the department. Mr. Willis R. Pritchard succeeded Mr. Donovan as Superintendent.

The additions to the reservoir embankment (made in 1859 and 1860) not proving to be sufficiently compacted with the old one, slid down, carrying with it about one hundred and fifty feet of the retaining wall. This accident occurred in January 1863, and shortly after this date a similar accident carried away about as much more of the wall. The accidents cost about \$1,500.00 to repair.

In 1864 the sediment had deposited to the depth of twenty feet.

\*13. During the running of the works the contract price of coal has varied from eight cents per bushel in 1835 to nineteen and three-quarter cents per bushel in 1864.

Willis R. Pritchard remained in charge of the works until the appointment of the Board of Water Commissioners in 1867, and was continued in office by the Board as Superintendent of the distribution until 1871.

From 1860 to 1867 very little new work was done. The pipe distribution was extended somewhat, but no attempt was made to secure a better distribution or head in the city.

\*14. In the foregoing sketch no indication has been given of the numerous able discussions and reports made by the officials and public men of St. Louis on the subject of appropriate water works for the city. A review of them would be interesting, and would show that at all times the question was of great interest to those in charge of the city government.

When I assumed control of the works in 1867 I found the storage capacity of the Benton St. reservoir was exceedingly limited and (that) the capacity of the pumps was but slightly in excess of the daily consumption.

The first duty required of me by the Commissioners was to prepare some plan by which a portion of the sediment could be removed from this reservoir. (On) May 17th, 1867, I reported three plans to accomplish this purpose. The one recommended most favorably, and adopted by the Board, was to construct a small, temporary reservoir on Gamble St. near Garrison Ave. that could be used to pump into while the Benton St. reservoir was being cleaned out. This work was so arranged that the 20-inch pipe laid on Cass Ave. should connect with the 30-inch pipe then used as a pumping main, and that the water should be distributed from the reservoir through a 20-inch line of pipe laid on Garrison, Ewing and Franklin Avenues to 14th (St.), and then connect with the existing 20-inch distributing main. The pipes were all planned and laid so that they would form part of the general distribution when the new work went into operation. While making the plans for the river portion of the new works, I found that a dredging machine would be needed to excavate the site of the engine foundations, and it was suggested that this machine be procured in ad-

vance of its want for this purpose, and be used in the excavation of the sediment from the Benton St. reservoir. As small as the storage capacity of this reservoir was, I felt the risk it would occasion to draw the water off, and for this reason considered it very desirable that, if possible, we should get out what sediment we could and retain the water in case of any serious accident. The plan of cleaning out the reservoir with the dredge was adopted, but the scheme was only moderately successful. Although some thousands of yards of material were removed, the expense of removal was more than was anticipated.

When the building of the Gamble St. reservoir was proposed, it was believed that its construction would be the only temporary work required in order to keep up the supply until the new works would go into operation, but after this work was under contract and partially built, my attention was called to the exceedingly precarious condition of the water supply by an accident to the engine "Ajax". This engine was the only reliable one at the works, the "Hercules" being small and nearly worn out. The accident spoken of was the breaking of the head of the main pump, breaking the pump valves and destroying the pump rod;—all caused by a stick of drift (-wood) getting into the pump. By great energy the Superintendent was enabled to make the repairs and get the engine at work again before the water was completely drawn out of the reservoirs. The risk to the supply by this mishap was so great that I immediately made a report to the Board, urging them to have additional pumping power erected without delay, and recommended that an engine of the same style as the "Ajax" be constructed. The Board approved the suggestion, and bids were received for a new pumping engine. The contract was awarded to Messrs. G. B. Allen & Co., and the machine completed May 20th, 1868. The cost of this engine, known as the "G. B. Allen", complete, set up, and in running order, was \$31,730.59, exclusive of foundations. The steam cylinder 34½ inches in diameter, pump double-acting, and 28½ inches in diameter; each 10 feet stroke.

The daily consumption at this time, 1868, was from 6½ to 7½ millions of gallons, so that the erection of the "Allen" engine gave ample pumping power and insured the continuance of the supply against ordinary accidents. The Bates St. machines were kept in operation until April, 1871, when the pumps at Bissell's Point were started, and the old machines shut down.

Soon after starting, an accident happened to the base plates of the High Service pumps, and the Bates St. engines were again put in ser-

vice, to allow the contractors for the new works to replace the broken castings.

Work was continued at the Bates St. station until June 19th, 1871, since which date no service (was) required of these engines, although, as a matter of precaution, this machinery was kept in order, and an engineer familiar with that type of engine left in charge up to January, 1875. At this time the station was put in charge of a watchman who acted as keeper of this pipe yard.

During the winter of 1874-75 the engines "Ajax" and "Hercules" were dismantled, and the scrap sold, (See May report of the Board for 1875), and during the latter part of the same year the "Allen" engine and other machinery, and a portion of the buildings, were sold at auction. The amount derived from the sale was, machinery, \$3,099.19; building, \$161.00, (and the scrap) furnished iron for about 100 tons of 6" pipe. After the machinery was removed, that part of the property lying west of the wharf line was fixed up as a pipe yard to store valves, pipes, and other water works fixtures, and all the property east of the wharf line delivered to the Harbor Dept. of the city for wharf purposes.

The cost of the temporary work built to keep up the supply during construction of new works is as follows:

**GAMBLE STREET RESERVOIR.**

Real Estate .....	\$ 29,483.27
Budd, Decker & Ault, Contractor for building Reservoirs..	14,699.15
Work done by City .....	1,197.03
Labor, cleaning out sediment from Benton St. Reservoir..	14,593.32
New Engine-house for "Allen" Engine .....	12,345.51
G. B. Allen & Co. contract for pumping engine .....	31,730.59
New pumping main connection .....	4,715.29
Engineering, Inspection and Superintendence .....	5,517.73
	<hr/>
	114,281.89
Less cash received for sundry materials .....	1,751.00
	<hr/>
	\$112,530.89

**NEW WORKS.**

The origin of what may be termed the "New Water Works" commences in 1863 by the General Assembly of the State passing an Act entitled "An act to enable the City of St. Louis to extend the Water Works thereof, and for other purposes".

This act empowers the city, through a Board of Commissioners, to construct works to take the water from any point on the Mississippi River, and conduct it through suitable ducts to the city. The Board of Commissioners (was) to consist of four members to be elected by the Common Council. The city was also authorized by the act to issue bonds for the construction of the works, not to exceed three millions of dollars.

At the May session of the City Council in 1864 Ordinance No. 5339 was passed to regulate and establish the Board of Water Commissioners in conformity with the Legislative Act of 1863, but, owing to delay and dissatisfaction, no action seems to have been had under the ordinance, and in January, 1865, the Legislature amended the act of 1863, giving the appointment of the Commissioners into the hands of the Governor. Under this amendment the Governor appointed as Water Commissioners Dwight Durkee, Dr. Philip Weigle, N. C. Chapman and Stephen D. Barlow.

This Board held their first meeting March 18th, 1865, and organized by calling Mayor Thomas to the chair, Dwight Durkee acting as Secretary. March 27th the Board recommended to the City Council James P. Kirkwood for appointment as Chief Engineer of the New Works, and the Council confirmed the appointment April 22nd. Mr. Kirkwood recommended to the Board the appointment of Henry Flad as Principal Assistant Engineer, and the Board so appointed him.

May 11th, 1865, the Board, by resolution directed the Chief Engineer to examine and survey the ground at the Chain of Rocks (a point on the Mississippi River about 5½ miles above the north city line), and other points on the Mississippi River, for the purpose of making plans and estimates for a system of water works for the city.

The surveys and examinations being completed, Mr. Kirkwood reported to the Board a plan of works, accompanied by a detail estimate of cost, August 29th, 1865. The plan was approved and adopted

by the Board October 6th, and reported to the City Council for its approval October 12th, 1865.

The report embraced a description of the work proposed, giving drawings of the more important features, and an estimate in detail of the approximate cost.

- Mr. Kirkwood proposed to locate the low service pumping station, the settling basins, and the filter beds at the "Chain of Rocks". From this point the filtered water was to be conducted in a brick conduit to the High Service pumping station located on the Bellefontaine Road. At this point the water was raised to the reservoir which was to be located on what is known as "Rinkel's Hill". The high-water line of this reservoir was to be 204 feet above city datum. The water was to be conducted from the reservoir to the City through a line of 42-inch main. An auxiliary reservoir was to be built at Compton Hill in order to secure a full head of water to the south end of the city.

The estimated cost of the work (to be) built in accordance with this plan was \$5,179,267.24, as follows:

Three settling basins .....	\$ 435,676.85
Three filter beds .....	405,442.23
Low service pumping works .....	481,388.00
Brick conduit (3¾ miles) .....	504,572.00
High service engines and stand-pipe .....	373,371.00
Lands and damages .....	21,000.00
Storage reservoir (capacity 166,000,000 gal.) .....	614,864.14
Pipe mains .....	2,089,058.00
Compton Hill reservoir (capacity 30,000,000 gallons) ...	150,000.00
Land damages .....	103,895.00
	\$5,179,267.24

In his description of the proposed works Mr. Kirkwood says:

"The entire plan above described is certainly not more comprehensive than the prospective wants of the city of St. Louis require. It is not so much so as the plans of the New York and Boston Works were designed to be, though in both these cases the amount of water used has entirely exceeded the expectations and calculations of the designers of the works, and the inconvenience of a deficient supply is already in each case apparent,—nor so much so as the water arrangements for the city of Brooklyn.

"The St. Louis works, as already intimated, are arranged to meet the growth of the city for a period of thirty years, with an estimated daily consumption of water, then, of 33,000,000 gallons. The Brooklyn works, for a population but little exceeding (that of) St. Louis, are arranged to meet an ultimate delivery of 40,000,000 (gallons).

"The general plan described is rendered for the time being, incapable of execution in its entirety by reason of the existing law which limits the expenditure to three millions of dollars. But the plan may be considered divided into two parts, the construction of both being necessary to the completeness of the scheme, but the first only indispensable to the delivery of clear water into the city.

"The first part comprises the construction of the works at the river, and between the river and the stand-pipe, including the pumping engines. By laying a temporary main from the stand-pipe to the city, connecting, near the existing reservoir, with the city mains, the city, on the completion of this first part, can at once be supplied with clear water."

The estimated cost of this first division of the works is \$2,633,193.80.

Mr. Kirkwood further adds "The construction of the second part I look upon as equally necessary with the first, as indispensable, indeed, to the economical maintenance of the works and to the safety of the city".

The report of the Board of Water Commissioners, with the estimates, plans, etc., were referred to a Committee of the City Council, who (which) made a report advising that the plan be rejected, and submitted the following resolution:

"Be it resolved by the Board of Common Council of the City of St. Louis, that the plan of new water works submitted to this Board for approval on the 12th day of October, 1865, by the Board of Water Commissioners of the City of St. Louis, be and the same is hereby rejected."

The Council Committee appointed a sub-committee of its members to take the testimony of various parties in regard to the matter of location and plan proposed. The location being under consideration, the report states "Among all the gentlemen examined before your Committee, there is not one who is not of the opinion that water, when taken from the main channel of the river at Bissell's Point, is equally

as pure as that taken at the Chain of Rocks." In conclusion, the report recommended the abandoning of the filter beds, and that the works be located at Bissell's Point, and in this shape the report was adopted March 20th, 1866.

During the time the City Council had the question under consideration the Chief Engineer, Mr. Kirkwood, was sent to Europe by the Board of Water Commissioners, with directions to examine and report upon the modes and devices in use there for the filtration of water for cities.

The first Board of Commissioners having resigned in April, 1866, a second Commission was appointed by the Governor consisting of Amadee Valle, G. W. Dreyer, C. E. Salomon, and Geo. K. Budd. These gentlemen organized August 2nd, 1866. Geo. K. Budd was appointed President, and C. E. Salomon Secretary.

November 20th, 1866, this Commission reported to the Council a plan and estimate made by Truman J. Homer (the City Engineer) for raising the water line of the reservoir then in use, and putting in a new pumping engine at the Bates Street Station.

The estimated cost of this work was \$581,069.32. The high water line was to be 160 feet above city datum, and the capacity of (the) reservoir 23,750,000 gallons.

On December 21st, 1866, the Commission reported another plan to the City Council, made by Mr. Kirkwood in obedience to the following resolution passed by the Board, viz.:

"Resolved,—That the Engineer be directed to prepare a general plan of works founded on the following basis, to-wit:

"That the water be taken from the Mississippi River in the neighborhood of Bissell's Point.

"That settling reservoirs be established there without the accompaniment of filtering works.

"That a small storage reservoir be constructed on the City Commons.

"And that the whole be arranged, so far as practicable, so as to admit hereafter of the convenient addition of whatever further works may then become expedient or necessary, and that the Engineer be instructed to report the estimated cost of the works in question."

The plan of works reported in conformity to the above resolution is substantially the plan upon which the new works were constructed.

The estimated cost of the works by this plan was as follows:

Divisions 1 and 2—River works and low service engines..	\$	365,629.00
Division 3—Settling basins, capacity, 14,500,000 gallons each . . . . .		461,244.30
Divisions 4 and 5—High-service works and engines.....		389,070.00
Divisions 6 and 7—Stand-pipe and pumping main.....		833,930.00
Division 8—Compton Hill reservoir, capacity, 56,000,000 gallons . . . . .		308,632.63
Division 9—Land and damages	\$180,000.00	
Engineering	155,000.00	
		<hr/>
		335,000.00
		<hr/>
		\$2,693,505.93

Under date of March 23rd, 1867, the Board of Commissioners reported to the City Council as follows:

"After submitting for your consideration the reports of November 20th and December 21st, 1866, with accompanying plans and estimates for new works, the Commissioners necessarily, in conformity with law, awaited the action of the City Council thereon for authority and means to prosecute the works."

On the 9th day of February, 1867, an ordinance entitled, "An ordinance approving the plans for an additional reservoir and pumping machinery, and authorizing the reconstruction of the reservoir now in use", which had passed the Council on February 5th was approved by the Mayor. This ordinance authorizes the issue of 275 bonds of \$1,000.00 each for the extension of the works now in use, in accordance with the plans and estimates submitted in November, 1866, and also authorizing the Commissioners "To cause said work to be begun at the earliest possible time, and to prosecute it with all the vigor the emergency demands."

"Under this authority" (the report continues) "Work would have been commenced immediately, had not the Commissioners been informed that a bill was then pending before the State Legislature which, if passed, would make material changes in the existing laws, relating to the construction of new works."

On the 8th of March (1867), the Legislature not having passed the bill alluded to, the Commissioners made requisition on the Comptroller for the bonds, and appointed Truman J. Homer, Superintendent, with instructions to proceed with the greatest vigor to carry out the plan as proposed by him in November, 1866. This scheme seems to have ended here, as no further mention is made of it, nor does there seem to have been any work of the kind commenced. The report and plans to which this order refers were printed as the "Second" report of the Board of Water Commissioners.

On the 13th of March, 1867, the Legislature passed an act appointing a new Commission, and authorizing the issue of bonds to the extent of \$3,00,000.00 for the construction of new works.

The Commissioners appointed by the act of March 13th, 1867, were, Adamee Valle, Alexander Crozier, and Henry Flad. Some question having arisen as to the legality of the appointment of Amadee Valle, he being a member of the Legislature that passed the act, Mr. Valle retired, and Geo. K. Budd was appointed in his place. Under the Commission thus constituted the new works were constructed.

The Board organized on the 22nd of March, 1867. On the 23rd the former Commissioners placed in their possession all the books, papers (and) records belonging to the department. It was shown by the record that on the 18th of March, the former Board had revoked the appointment of Mr. Kirkwood as Chief Engineer, thus the first duty of the new Board was to fill this vacancy. On the 26th of the same month Mr. Kirkwood was requested to resume the position. This he declined to do. The Board then requested him to recommend someone for the position, and upon his recommendation the position was offered to Thos. J. Whitman, who accepted and reported for duty on the 7th of May, 1867.

I found the supply of water to the city in a precarious condition, and by the direction of the Board it was made my first duty to construct temporary works that would keep up the supply during the building of the new works. A detail statement of the work done for this purpose will be found at the conclusion of the "History of the Old Works".

The first question to decide in regard to the new works was the location. All my knowledge of the proposed work at this time had been obtained through the reports of Mr. Kirkwood, therefore I felt convinced that the proper location would be the Chain of Rocks. Subse-

quent examinations confirmed this opinion, but as the scheme for locating there had been positively rejected by the City authorities, and the latter plans (see 3rd Report of the Board of Water Commissioners) and estimates had been based upon the Bissell's Point location, in answer to the Resolution of the Board to give my opinion on the location, I reported as follows:

I have always felt that it was unfortunate that the need of progress with the new work was so imperative, and that I could not give more time to the examination of location. At this time (1867) the City Engineer, Mr. Homer, had commenced building a costly dyke at the Chain of Rocks, by which it was intended to throw the flow of the river to the east of Gabaret Island. This work was in progress, and about one hundred thousand dollars invested in it. My surveys showed that a much more favorable location for our works, as regards foundation, could be had at a distance of about three-fourths of a mile above Bissell's Point. At this location the bed-rock was rising to the north and sinking to the east, so that little trouble would be experienced in so establishing the height of foundations as to put most of the work, settling basins, etc., on the rock, and save a large amount of money, for it was shown that very expensive foundations would be required at the Bissell's Point location. The objection to going higher up in the "Sawyer" bend was, that if the authorities were successful in bringing the river to the east side of the Island, then works located higher up than Bissell's Point would not be located on the running stream. I had a long personal interview with Mr. Homer on this question, and he gave me every positive assurance that without question he should flow the river to the east of the Island, and that if the works were located higher up (on the) river than Bissell's Point (unless they were put above his dyke at the Grand Chain), they would be out of water. To my mind, this settled the question. Without money enough to go to the chain, we could not go higher than Bissell's Point except at the risk spoken of, so that there was but one thing to do.

During the year 1868 Mr. Homer died, and the building of the dyke at the chain was continued but a short time. As soon as the dyke was abandoned, and it was decided that the river would continue to flow in the old channel, then it was feared that the gradual encroachments to the west of the river above the works would endanger them, and that the river might possibly wash in to the west of where we were building. To ascertain what and how much danger there was in this report, I continued my surveys and had borings made to ascer-

tain the height of the rock for a long distance above the works, and found that the rise of the rock continued so uniformly that the river could move but a very short distance more to the west before it would meet with a rock shore. This survey convinced me that there was no danger from the river damaging the works by working in to the west of their location, but it developed more clearly that a great saving in cost of construction would have been had (made), could we have been free to locate about one mile higher up (on) the river.

#### NOTES.

- \*1. Only that part of the Bates Street site lying east of the wharf-line was turned over to the city government for wharf purposes. The part lying west of the wharf-line was retained for a pipe-yard, and was used as such up to the year 1889.
- \*2. The plans for this work were made by Thaddeus S. Smith, C. E.
- \*3. This lot was situated on the river bank at the foot of "Bates Street", now Dickson Street.
- \*4. Estimate made by "A competent civil engineer",—name not given.
- \*5. For some unknown reason this settling reservoir (or basin) was not used. Water was pumped directly from the river into the storage reservoir.

November 2, 1920.

\*5a. THE CHAMBER OF COMMERCE,

St. Louis, Mo.

Attention of the Secretary.

DEAR SIR:

The National Acme Company of Windsor, Vermont, is engaged in preparing a history of the machinery industry in this town, and in tracing it back to its beginning find at the very start an interesting connection between it and the early days of St. Louis and its Chamber of Commerce. The story may be of interest to you, and is as follows:

In the year 1828 Asahel Hubbard, of Windsor, Vermont, made and patented a Rotary Gear Pump (called by him a Revolving Hydraulic Engine), and founded the National Hydraulic Company in this town for its manufacture. This was the first manufacturing machine shop

here, so at the same time he laid the foundations of the very large industries of today in Windsor and Springfield, Vermont, which trace their descent in a direct line back to this old pump concern.

The Hubbard pumps soon became well known and were sold very widely, men being sent out from Windsor to demonstrate and to install them. In the year 1830 an order was received from the city of St. Louis, Mo., for one of these pumps, to be fitted with a 20-horse-power steam engine, to pump water out of the Mississippi River, to force it 1300 feet through an iron pipe, and to discharge it into a reservoir 104 feet above the level of the river, from which reservoir it would run by gravity into the city. This was undoubtedly one of the first (if not *the* first) City Water Works of St. Louis.

The big pump was immediately built, and when finished was loaded into an ox cart and thus carried from Windsor, Vermont, to Albany, N. Y., Asahel Hubbard going along with it to superintend its installation. At Albany it was placed upon a canal boat and carried to Buffalo, where it was placed upon a lake boat and carried to Chicago. Here it was again placed upon a wagon and hauled across the prairies to St. Louis.

Hubbard installed this pump, started it up, and everything worked satisfactorily. When it came to settling the bill, however, it was found that the city treasury was so low that there was not enough money to pay for the pump. The Chamber of Commerce then stepped in and took up a collection from the citizens and business houses. Still there was not enough. Finally the Chamber located the best saddle horse which they could find (it was a pure white one) and presented it to Asahel Hubbard. He called it payment in full.

Taking his money in a belt, he set out from St. Louis on horse back, and rode his white horse across the prairies to Chicago, where he and his horse took a boat to Buffalo, then a canal boat to Albany. He completed his journey by riding his white horse over the Green Mountains to Windsor. This white horse was a well known animal in this town for years afterwards, and was known as "The St. Louis Horse". Old inhabitants up to a few years ago remembered it well, and remembered also the story connected with the animal.

If you know anything further about this old Water Works, or if there is anything known about the old pump, we will be extremely interested in hearing about it, or receiving photographs relating to it. Any expense incurred by you in getting any such material will gladly



be paid by us, and we will be very much obliged to you for the information.

I hope that you will likewise find this information interesting, and to further this interest am sending under separate cover a photostat copy of the old pump patent. If you have any use for it a photograph of one of the pumps will be sent you.

Trusting that I will hear from you, I beg to remain

Sincerely yours,

(Signed) GUY HUBBARD.

The foregoing letter from Mr. Hubbard was received by the St. Louis Chamber of Commerce and may identify the "Rotary Pump" or pumps which furnished the power for supplying water to the first reservoir built in St. Louis, in 1831 or 1832. As far as known, there is no reference made to this particular pump in any of the Water Division records available at the present time.

- \*6. On Dickson Street, one block east of Broadway.
- \*7. Supply pipes at this time were of 2, 3 and 4 inch diameter.
- \*8. From 1831 to 1834 the pumping engine was in operation (usually) only a part of the time each day. This was sufficient to supply water for all ordinary household and commercial needs. Increased pumping, of course, was necessary when fires occurred.
- \*9. The "Big Mound" was located at the northeast corner of Mound Street and Broadway. The crest, or highest point, was 100 feet east of Broadway, and about 35 feet above the grade of the adjacent street.
- \*10. During the period from 1831 to 1846, pipe for the St. Louis Water Works was also supplied by Woods, Stocker & Co. of Tennessee, and by Van Leer & Co., the Garrisons, and Gaty & Coonce of St. Louis.
- \*11. About this time Wimer was succeeded by Wm. Burd as Superintendent of Water Works.
- \*12. The foundations and walls of this reservoir were designed for a head of 32.5 feet.
- \*13. The contract price of coal in 1855 was 11½ cents per bushel.

- \*14. In his message of May 14, 1860, Mayor O. D. Filley called attention to the "Irresistible influences" demanding the extension of the Water-works. He also stressed the importance of a "Most thorough investigation of the best plans for accomplishing this object".

On October 8, 1860, Truman J. Homer, City Engineer, in his yearly report states, "It is time something was done towards a permanent supply of water to the city." To accomplish this, he recommended "That a commission of three be appointed immediately, provided with ample means and clothed with ample powers" to investigate and report upon this matter. He continued, "A few thousand dollars expended judiciously in this way will save mistakes, committed in ignorance, that may cost the city millions to correct."

On November 27, 1860, an ordinance (#4758) creating a commission, and providing the necessary funds for this purpose, was passed by the Common Council, over the veto of Mayor Filley.

On January 5, 1861, the chairman of this commission, Erastus Wells, after visiting nine large cities, and conferring with eminent engineers, reported to the committee the results of his investigations. He was convinced of the "Calamitous consequences of short-sighted and narrow views of economy, as well as the blessings inevitably following in the wake of a liberal and comprehensive course of action." He also stated that his visits confirmed his belief that St. Louis was "Far behind the age in her water-works, and that she has been blundering in the dark, blind to her best and dearest interests as a commercial and manufacturing metropolis."

On January 8th, 1861, after a visit of inspection to the Louisville, (Ky.) water-works, the commission employed Mr. T. R. Scowden, a mechanical and hydraulic engineer of long experience, who had designed and built the water-works at Cleveland and Louisville and other cities, and was then Chief Engineer of the Louisville and Portland Canal. Mr. Scowden was instructed to "Make a general plan and approximate estimate of cost for works capable of furnishing the City with a copious supply of pure water to answer present and proximate wants, and susceptible of such extension and enlargement as the distant future might render necessary."

On February 18th, 1861, Mr. Scowden submitted to the commission a very able and comprehensive report, embodying designs and



estimates for two (alternative) plans for a new water-works for St. Louis.

In his "First Plan" the existing site at Bates Street (now Dickson) was to be used for the intake and pumping plant. A reservoir of 150,000,000 gallons capacity was to have been built on the site of the present 86,000,000 gallon reservoir on Compton Hill (Grand and Lafayette Avenues). The total cost of the works under this plan was estimated at \$1,434,841.54.

In his second plan, the intake and pumping plant were to be located on the site of the present pumping plant and intakes at the Chain of Rocks, about seven miles above the "Bates Street" plant. A settling reservoir of 150,000,000 gallons capacity was to be built on a "Tableland" of 100 acres extent, 180 feet above City directrix, and about a quarter of a mile back from the river bank. The settled water was to flow by gravity through 40" and 30" cast iron conduit to a storage and distribution reservoir of 75,000,000 gallons capacity at Compton Hill. A gravity distribution from Compton Hill was to supply the city with the settled water. The total cost of the works under this plan was estimated at \$2,536,575.25.

Mr. Scowden earnestly recommended the adoption of the second, or Chain of Rocks plan. He considered this locality as "Naturally adapted to water-works purposes", with the inestimable advantage of "A pure and healthful supply of water, beyond the influence of town drainage". He also dwelt on the great economy of operation resulting from the short, direct pump main (1,700 feet for the "Chain" plan, 25,400 feet for the "Bates Street" plan).

On February 26th, 1861, the commission submitted to the Common Council a lengthy report, recommending in the strongest terms the adoption and execution of the second, or "Chain of Rocks" plan. They called attention to the fact that "A pure and wholesome water supply will bring a large increase to the number of our population, while bad water would serve to disperse that we now have." They also pointed out that, in the event of a serious epidemic that might be charged to a water supply tainted with town drainage, "St. Louis would be heralded to the world as an unhealthy city, and the calamitous effects of this would be incalculable. "St. Louis is behind the age and her own rank in her water-works system, and it will require decisive action to bring her up to the position which she should occupy."

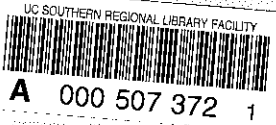
Before recommending the "Chain of Rocks" plan, the commission discussed several other plans for a city water supply. To quote from their report, "It was thought by some that a dam might be thrown across the lower part of the valley of the river Des Peres, making a lake that would retain all the rain that falls upon its water shed, pumping from it into a reservoir" (on Compton Hill). "The Meramec River has been spoken of, but the water is unsuited to mechanical and domestic purposes, the water not as healthy as that of the Missouri River." "It has been proposed to pump water from the Missouri River, at a point some distance above St. Charles, to a reservoir on the divide between the river and the Meramec, and convey it thence in an aqueduct eighteen miles long to a point six miles west of the city, and from thence in a cast iron conduit four or five miles long into a reservoir" (on Compton Hill). "By pumping from the Missouri River into a reservoir on Charboniere Hill" (near the Missouri River, due west from Florissant), "the water might be brought into the reservoir" (on Compton Hill), "through a cast iron conduit seventeen miles long."

Owing to the chaotic conditions prevailing in the city at that time, due to the civil war, no further action was ever taken on this report. It is interesting, however, to note that on August 28th, 1865, Mr. James P. Kirkwood, then Chief Engineer of the water-works, presented a report and estimates for a pumping station, settling basins and filterbeds at the Chain of Rocks, and a high service pumping station and stand-pipe near the junction of the streets now known as Broadway and Riverview Drive. The locations were substantially the same as those finally adopted for the existing works (1924) except that the high service station was located about seven-eighths of a mile farther south of its proposed location, and the stand-pipe about three miles south of the station.

Finally, after sixty-three years, the proposal, "To pump water from the Missouri River, at a point some distance above St. Charles, to a reservoir on the divide between the (Missouri) River and the Meramec, and convey it thence" to the city, will be realized through a bond issue of \$12,000,000.00 for water-works on the Missouri River, etc.

For a long time we have had the best water in the world, but were getting perilously near our limit of supply. When the new works are completed, we will have an unlimited supply (adding units as needed). Then with our other advantages, natural and acquired, our city will take her rightful place as one of the foremost cities in the world.

- \*15. This act was approved March 23, 1863.
- \*16. This ordinance was approved June 23, 1864.
- \*17. This amendment was passed Jan. 18, 1865.
- \*18. Thos. C. Fletcher was Governor at this time.
- \*19. James P. Kirkwood was the first Chief Engineer of the Missouri Pacific R. R. The City of Kirkwood was named in his honor.
- \*20. This was the present "Chain of Rocks", near the northern end of the City Limits of 1876.
- \*21. A "Gravity" flow of filtered water was contemplated in this conduit.
- \*22. The "High Service" pumping station mentioned, and a stand-pipe were to be located about three and one-half miles south of the Chain of Rocks, at the junction of the "Bellefontaine Road" (now Broadway), and the "Columbia Bottom Road" (now Riverview Drive).
- \*23. "Rinkel's Hill" was situated on the "St. Charles Rock Road" (now Easton Avenue), just east of what is now Hamilton Avenue. This "Main storage reservoir" was to have been of 166,000,000 gallons capacity.
- \*24. The "Auxiliary reservoir" was to have been of 30,000,000 gallons capacity, on the site of the present 86,000,000 gallons auxiliary reservoir at Compton Hill, at Grand and Lafayette Aves.
- \*25. This estimated daily consumption was reached within 20 years. The daily consumption during the months of July, August and September of 1886 was in excess of 33,000,000 gallons. Ten years later, on August 8th, 1896, 73,921,000 gallons were consumed in one day. The average daily consumption during the months of July, August and September of this year was over 60,000,000 gallons.



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