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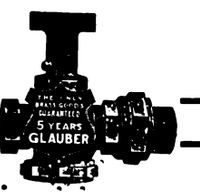

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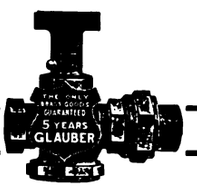

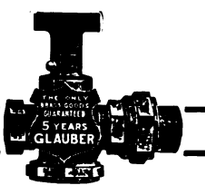

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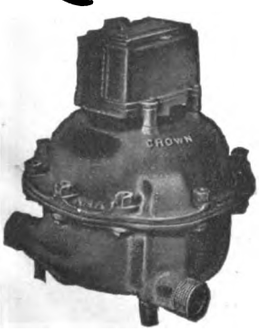

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The Water Supply at Mobile, Ala.

By EDGAR B. KAY

The legislature of the State of Alabama in the year 1820 authorized the formation of a corporation to be known as "The Mobile Aqueduct Company." Lewis Judson, Addison Lewis, Archibald N. Gordon, William H. Robertson and Francis W. Armstrong, their heirs, etc., were named as incorporators. This act, approved December 20, 1820, states that "Whereas, it has been represented that it would be of singular advantage to the health and convenience of the city of Mobile to be supplied with water from some running stream in its vicinity, . . . and whereas, it has also been represented that certain individuals have agreed to associate themselves together for the purpose of conducting a supply of water from a creek called the Three Mile creek, otherwise Bayou Chatogue"—and provided that said corporation should construct an aqueduct of logs "with a caliber large enough to contain and conduct a sufficiency of water to supply the citizens and other persons of Mobile with water," and that the corporation should "have and enjoy the exclusive right and privileges of conducting and bringing water for the supply of said city, for a period of 40 years," at the expiration of which time the works were to become the property of the city. Under the terms of this act water was to be supplied to the city within three years. The above corporation failed to construct the works provided for in the legislative act, and on December 24, 1824, the legislature of the State of Alabama transferred to, and vested in, the corporation of the city of Mobile, for the use and benefit of the inhabitants thereof, "all the rights, privileges and immunities, powers, prerogatives and authority" which appertained to the above aqueduct company. Nothing was done by the city for six years. In 1830 a committee was appointed by the mayor and aldermen of the city to procure information on the subject of bringing water into the city, and on November 10 of the same year a report was submitted, giving the following data with reference to a spring which was recommended as a source of supply: "A spring situated about three-quarters of a mile north of the Three Mile creek, a tributary of said creek, and near the residence of Judge Lipscomb, at Spring Hill." The committee states that said spring is about six and one-half miles distant from the east side of Commerce street, and has an elevation of 36 feet 7½ inches above the surface of the ground at the intersection of Dauphine and St. Joseph streets." December 12, 1830, articles of agreement were made and concluded "by and between the mayor and aldermen of the city of Mobile and John L. Martin, William McCullan, John S. Glidden and Thomas Torrey, that they shall, on or before the first day of January, 1832, construct and finish an aqueduct for the introduction of water into the city of Mobile from a spring near the late country residence of Judge Lipscomb, at Spring Hill, to the city of Mobile." The pipes or conduits were to be made of yellow pine of good quality and laid to the city in the most direct route so as to cross the Three Mile creek just below Page's old place at Spring Hill, and at or near the place where Eslava commenced a canal; thence in a straight direction, as the ground would permit, of the Spring Hill road; thence along said road to Dauphin street. The caliber of each pipe or conduit to be 5½ inches in diameter from the spring to Pollard's Hill, and from thence to town or intersection of Dearborn and Dauphin streets, 4½ inches. Up to December, 1836, wooden and cast-iron distribution pipes had been laid by the corporation of the city of Mobile in the middle or center line of the following 14 streets:

WOODEN DISTRIBUTION PIPES

Dauphin street, Dearborn street, to the river; Claiborn street, Dauphin street, to Government street; Government street, Claiborn street, to the river; Conception street, Government street, to St. Michael street; St. Michael street, Conception street, to the river; Water street, St. Michael street, to Church street.

CAST-IRON PIPE OF 3-INCH BORE

Dearborn street, Dauphin street, to Conti street; Lawrence street, Dauphin street, to St. Louis street; Joachim street, Dauphin street, to St. Louis street; Conception street, Government street, to Church street; St. Samuel street, Government street, to Eslava street; Water street, Church street, to Eslava street; Conti street, Dearborn street, to Royal street; St. Francis street, Franklin street, to Joachim street; St. Louis street, Hamilton street, to St. Joseph street; Eslava street, St. Emanuel street, to Water street.

The above-mentioned aqueduct and the distribution pipes laid in the middle of 14 different streets of the city formed or constituted the Mobile city water works. December, 1836, the mayor and aldermen of the city of Mobile leased to Henry Hitchcock the above-mentioned Mobile city water works for the term of 20 years. December, 1837, the legislature of the State of Alabama incorporated the Mobile Aqueduct Company. No company was formed, and in 1838 Henry Hitchcock surrendered up the said water works, and all appurtenances thereto belonging, unto the mayor and alderman of the city of Mobile. On January 17, 1838, Mr. Hitchcock addressed a letter to the mayor and alderman of the city of Mobile, in which he offered to transfer his contract with the city to the newly organized company, provided the corporation assume his notes for $26,000, held by the city, buy certain property for the privilege of the charter. This proposition was accepted, as noted above, and Mr. Hitchcock called into consultation an engineer, Albert Stein, of New Orleans, who submitted the following report:

NEW ORLEANS, January 29, 1838.

HON. H. HITCHCOCK:

Sir: You have again complimented me by asking my opinion regarding "the best mode of introducing water from the Three Mile creek into the city of Mobile, the plan of the reservoir, steam engine and pumps, the length and bore of the main pipe, etc., with the cost of the works, and their probable income." I examined the creek last year and found it to contain an abundant supply of excellent water—fully adequate to furnish a population of 50,000 or 60,000 persons with wholesome water for all domestic purposes, and at the same time to furnish an ample supply for public objects, in cleaning the street and extinguishing fires. The mode of introducing this water must be by constructing a reservoir about 1,000 yards from the margin of the creek, where there is an eligible site; the reservoir to be filled by forcing pumps, and the water so obtained to be conveyed to the city, as far as Dauphin street, by a main pipe 2,700 yards in length. It would be invidious and useless for me to give a plan for this reservoir, steam engine and pumps, not to be constructed by myself. This must be left to the engineer actually engaged, and their dimensions based on the quantity of water necessary for all public and private purposes. In considering the cost and income of the works, it will be necessary to recollect that 10,000 feet of cast-iron pipes have already been laid which can be rendered available, and that there are 6,000 feet of 6-inch pipes on hand, thus considerably diminishing the outlay; and it will be equally essential to remember that, while the cost of materials and labor are gradually becoming diminished, in the course of time the demand for water will be commensurate with the increased population of Mobile; so that the cost of construction and maintaining the works must be gradually lessened, while the revenue arising from their use will be as certainly augmented. The estimate of cost must be based on a knowledge of these facts.

I send you a plan of your city, that you may perceive the necessary distribution of pipes through the streets, and also a profile of the line of pipes from the creek, where the engine and pump house shall be erected, to the site of the reservoir; thence to Dauphin, and along Dauphin to the river. From the creek to the reservoir 1,000 yards of pipes of 10-inch bore will be required, and the main pipe from the reservoir into the city should be of 12-inch bore. The pipes required in Dauphin street, 1,350 yards, should be 10-inch and 8-inch, being for about 2,400 yards. Fire plugs are to be erected along the line of the pipes for the purpose of extinguishing fires and washing streets, and stop-cocks placed to shut off water from pipes for repairs, making attachments of cleaning them. The mean height to which the water has to be raised from the creek into the reservoir is 40 feet. The site for the reservoir is 20 feet higher than the highest ground in the city. I have made a minute enumeration of all required to raise and distribute 600,000 gallons per day, and an estimate accordingly, including reservoir, engine and pumps, the pump house. But it is not necessary for me to give you the particulars in detail. You may, however, rest assured that I have endeavored to be accurate in every particular, and you can be satisfied of the result thus briefly given of the probable cost:

Distribution pipes, agreeably to plan	$65,171.00
Reservoir	25,000.00
Engine and pump house	10,000.00
Engine and pumps	12,000.00
Incidental expenses, etc.	7,828.50
	$120,000.00

The whole outlay, exclusive of the land for the house and reservoir, would therefore be $120,000. The distribution (as set down) embraces a line of pipes from the pumps to the reservoir, thence to Dearborn in Dauphin street, thence along Dauphin to the river. In Dearborn from Church street to Adams, and in Joachim street the same distance, amounting in all upwards of 425 miles of pipes, including those necessary for fire plugs. In ascertaining the probable income, we must calculate the annual cost of supplying the water, the quantity of water likely to be required and consumed by the people of Mobile. As the creek water is of a very superior quality, and as all families capable of having it conveyed to their premises are almost certain to be customers, we may believe that at least 2,000 families will daily require its supply. Counting six persons in each family, and allowing each 30 gallons per day for every purpose, the quantity required per diem for consumption and supply will be 360,000 gallons. To raise such a quantity into the reservoir and distribute it through the streets and hydrants, would not cost more annually than $5,000. And if a larger quantity be hereafter necessary, the annual cost will be very little increased; so that, while an increased consumption of the water by families will certainly increase the profits of the works, the increased supply will augment their cost of maintenance. This difference must be greatly to the advantage of the corporation, and will be more sensibly felt in three or four years. At present, however, the probable income will be ascertained on the above data.

2,000 families at $20.00	$40,000.00
Annaul cost	5,000.00
Receipts	$35,000.00
Interest on capital, $200,000 at 6%	12,000.00
Net income	$23,000.00

You will perceive that had I assumed that 2,500 families would require water, as in a very few years will be the case, or had I assumed $25 or $30 as the annual average charge for each family, the clear income would be much greater. In conclusion, I am clearly of the opinion that the works can be easily constructed; that the creek can afford an abundant supply of limpid and soft water; that the Mobilians will generally use it, and that the works will shortly bring you a handsome income.

I have the honor to be your most obedient,

ALBERT STEIN.

The public did not respond to Mr. Hitchcock's proposition, and no company was formed. Mr. Hitchcock deeded to the city his interests in the water works, and the same was taken up by Mr. Stein on his own responsibility. He signed a contract with the city for a 20-year term, December 26, 1840. This contract provided that Mr. Stein deliver water to the city within two years; also that at the expiration of the 20 years the value of the works constructed should be determined by six arbitrators and the amount agreed upon be paid Albert Stein by the city, or any time thereafter, when the works would become the property of the city of Mobile. All pipe on hand and all pipe laid were to be purchased by him from the city at the price they could be delivered at Mobile at the time of the purchase.

January 7, 1841, the agreement between mayor, aldermen and common council and Albert Stein was confirmed by the legislature of the State of

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Alabama. The charter for the transportation of a supply of water from the Three Mile creek for the use of the citizens and other persons residing in the city of Mobile, is a contract between the State and the corporation of the city, which cannot be transferred, for a term of years, to a third party, without the consent of both parties. For this reason it was stipulated in the contract that the mayor, aldermen and common council of the city of Mobile shall, as soon as possible, obtain from the legislature of the State of Alabama an act sanctioning the agreement and the stipulations thereof, as contained. And that Albert Stein will commence the aforesaid works within one month after obtaining the consent of the legislature of the State of Alabama to the stipulations, agreements and transfers, herein made and contained.

It seems, however, that the plan outlined above in the letter of Mr. Stein to Mr. Hitchcock was modified considerably, and the point of intake on Three Mile creek moved upstream several miles to the site later purchased by the city and used as an auxiliary station. At this place it appears, from all the writer can gather, that both an undershot wheel and a steam pump were installed and operated until purchased by the city in 1898; the engine operated by steam was probably an auxiliary unit for use in dry weather, but later used continuously when the water wheel was abandoned. In 1880 the population of Mobile had increased to more than 30,000, and there was an opportunity for another water company to do business. The Bienville Water Supply Company was incorporated April 9, 1886. Land was purchased by Samuel R. Bullock & Co., of New York, in the same year and the Bienville Water Supply Company's plant erected on Clear creek. Water was delivered through the mains of the new system to the citizens in 1887. The following year the Bullock property was transferred to the Bienville Water Supply Company. The Bienville and Stein plants were operated independently until 1898, when the city of Mobile decided to take over the Stein works. At this time the majority stock of the Stein corporation was held by R. D. Wood & Co., of Philadelphia, who declined to abide by the decision of the arbitrators appointed to determine the value of the Stein (Mobile water works) property, the ascertained value of the property or price to be paid by the city of Mobile having been fixed at $55,000. After some litigation the city succeeded in acquiring possession of the Stein property. On account of the increasing demands for additional water supply and a delivery at higher pressure, the city of Mobile decided to erect a new pumping station, build a larger storage reservoir and a new 30-inch supply line. During the year 1900 the present Spring Hill pumping station, reservoir and 30-inch force main were put into service, with M. F. Sullivan as superintendent. From the annual reports of that official it is evident that the operation of the new Spring Hill equipment was unsatisfactory from the start. The furnaces had to be rebuilt, the speed control of pumps required constant attention and the water in the lake was so shallow that it became polluted with vegetable organisms. It was proposed to clean out this impounding reservoir and increase the depth of the water in it, but the unprecedented rainfall of June 26, 1900—12½ inches in 24 hours—caused the dam to be washed out, and a sluiceway was constructed in its place. This sluiceway consisted of a canal 21 feet wide, of rectangular form, the sides being of 2-inch vertical sheet piling. The piling on the east and north sides of this sluiceway have been removed.

C. W. Soost succeeded Mr. Sullivan as superintendent in 1903, and made his first annual report in the spring of 1904.

On July 1, 1901, the operation of the old Stein plant was discontinued, and the machinery disposed of in 1902. Most of the cast-iron distribution system was taken up and relaid or sold. In 1904 so many connections to the new works had been made that the supply in the Three Mile creek at the Spring Hill station was insufficient to furnish the required supply. An auxiliary pumping plant of 3,500,000 gallons daily capacity was installed on the site of the old Stein plant. The equipment consisted of one B. & W. boiler of 42 four-inch tubes, 18 feet long, with 42-inch drum, 5 feet 10.5 inches long; a Webster Star vacuum heater and one Worthington pump, No. 2,039, with high, low and intermediate steam cylinders, with 14-inch suction and 12-inch discharge connections. This auxiliary plant was put into operation on October 2, 1905. On January 8, 1907, the Bienville Water Supply Company deeded its entire holdings to the city of Mobile in the consideration of $350,000 city bonds, which were authorized by an election held August 6, 1906. On July 1, 1908, the small auxiliary plant on the old Stein site was put out of service, and has not been operated since that time. The Spring Hill and Bienville plants have both been operated continuously since the city acquired the latter plant. On October 1, 1911, the aldermanic form of government of the city of Mobile was changed to the commission form, and Hon. Harry Pillans, city commissioner, became vested with the control of the water works department of the city. It is interesting to note that in 1836 the amount of water estimated to be supplied to the citizens was 30 gallons per capita for all purposes, as compared with 214 gallons per capita in 1912, excluding the water used by the large manufacturing, railway, light and power concerns and water used by vessels.

POPULATION

Mobile was incorporated as a city December 19, 1819. The growth of the city is shown in the following table:

Year	Population
1820	2,672
1830	3,194
1840	12,672
1850	20,575
1860	29,258
1870	32,034
1880	29,132
1890	31,076
1900	38,469
1910	51,529
1912	54,179

In the year 1870 the area of Mobile was reduced and the name changed to the Port of Mobile, which explains the falling off of population as indicated in the census of 1880. From the above table it will be seen that the city of Mobile had a population of about 3,200 inhabitants in 1830 when the Mobile city water works was contracted for. The population had increased to 12,672 in 1840, when Mr. Stein entered into a 20-year contract. In 1900, or three years after the construction and operation of the Bienville Water Supply Company's plant, the population had reached 38,469. In the 12 years that have since elapsed the population has increased 41 per cent., and the new conditions again demand immediate attention.

1912 DAILY CONSUMPTION.

Average consumption:	U. S. gallons.
Daily, for all purposes	12,433,301
Daily, large users	1,313,000
Daily, domestic purposes	11,120,301
Per capita, for all purposes, daily	230
Per capita, for domestic and public use, including waste, daily.	205

Approximately 10 per cent. of the Mobile water consumption is used by the railroads, shipping interests and manufactories, while 90 per cent., or 205 gallons per capita daily, represents the water consumption for domestic and public use and the water waste. The following table gives the average daily consumption of water at Mobile, total number of taps and consumption per tap as shown by the reports of the water works superintendents, published in the annual reports of the city of Mobile:

Year.	Total consumption, gallons.	Avg. daily consumption, gallons.	Total No. of taps active.	Consumption, per tap.
1903.....	3,148,820,275	8,546,300	6,219	1,400
1904.....	2,613,483,644	7,162,967	6,935	1,135
1905.....	2,360,849,290	6,468,081	6,518	992
1906.....	2,687,036,718	7,635,718	6,864	1,112
1907.....	3,565,673,829	9,767,123	9,880	1,041
1908.....	5,701,692,129	15,678,400	9,901	1,583
1909.....	4,566,143,139	12,509,981	10,422	1,200
1910.....	4,751,893,065	13,018,886	10,755	1,210
1911.....	4,792,682,357	13,120,000	11,300	1,141
1912.....	4,538,154,966	12,433,301	11,651	1,067

The average daily consumption of water was 126 gallons per capita in the first year of operation of the Spring Hill pumping station. The consumption reached a maximum of 253 gallons in 1910 and gradually decreasing, being 248 gallons in 1911 and 230 gallons in 1912. The enormous pumpage during the year 1908 does not appear to have any justification, and the writer seriously doubts the correctness of the records. For the first half of the year 1908 all these plants were in operation, the Stein plant being credited with approximately 100,000,000 gallons per month. In the month of July, when the demand should have been a maximum, the Stein plant furnished 2,000,000 gallons and was put out of commission, and the other two plants furnished about the same amount of water for the last half of the year as for the first half. It may be that there was an unusual demand for water during the first half of the year in question, but no evidence has been found by the writer to prove it. The writer believes that the reported amounts from the pumping stations were incorrect. It is seen that with a somewhat decreased rate of consumption, doubtless due to the increased percentage of taps metered, Mobile is consuming approximately three times as much water as is actually needed. With no means of measuring the water consumption at present other than the revolution counters on the pumps at the pumping stations, there is no way except by an underground survey of obtaining accurate information regarding the flow of water in the various parts of the distribution system.

Bulletin to Ontario Fire Chiefs

The annual convention of the Provincial Association of Fire Chiefs will be held in the city of Kingston on August 28, 29 and 30, 1913. At a meeting of the board of directors held in Sault Ste. Marie on May 24 the following topics were arranged for:

Topic No. 1—"Fire Insurance and Its Relation to Incendiarism," President F. N. Wetmore and Chief Thomson, Owen Sound.

Topic No. 2—"Inspection of Buildings and Contents by the Uniform Force."

Topic No. 3—"Municipal Fire Departments, their organization and control from the underwriters' point of view." The Canadian Underwriters' Association have been asked to allot this subject their attention for the benefit of the chiefs' association and the good of the service.

Topic No. 4—"Ontario Fire Prevention Association, its Aims and Objects." The Ontario Fire Prevention Association has been asked to contribute this information.

Topic No. 5—"Spontaneous Combustion and its Causes; In what places it is likely to occur."

As the Provincial government is about to take up the matter of appointing a fire marshal for the Province of Ontario at the next session of parliament, the board of directors asked the secretary to prepare a law setting forth the requirements of this law as seen from the practical or fire chief's point of view, and to present the same at the coming convention for the purpose of discussing its merits and demerits, that a suggestion may be forward to the government to assist them in creating a law that will give the best results to the people of the province. This latter business is of the most vital importance, and the people of Ontario are looking to the men of the professions for results in their particular lines. Now it is up to the fire chiefs to show that they are worthy of the profession they follow by taking an interest in the way of giving their assistance to the work of building a fire marshal law. It may not be entirely convenient for us to give so freely of our time in this cause, but it is a duty in great need of attention, and I believe it is demanded of us as fire chiefs to respond to this call of duty, even if the councils of the municipalities do not see the advantages to be gained, but I would refer you to the Canadian fire losses as criterion for the need. There will be a large exhibit of the firefighting machinery and detail equipments there which will be valuable to your city in the matter of guiding you in what to buy for your work. In fact, it will be a college for information to the firefighting fraternity, and can you afford to miss it? Of course there are some who are so far advanced that we look to them for the teaching part, therefore we have the benefit of the experience of the best at this convention, and it gets you acquainted with the people of the work. We extend, through you, an invitation to your mayors, chairmen of fire committees or aldermen to attend the convention and assist in the work that is in such need of being done. I have said it before in communications to you, and it is worth saying again, that "it is not a credit to us as fire chiefs to be at the head of fire departments in a country that has such a shameful record in the matter of its fire losses." We may not be directly to blame, it may be the people; then the intellectual standard of the people cannot but be lowered where such conditions exist that will permit of such losses. We now have an opportunity of having a say, or, at any rate, placing ourselves on record in behalf of the improvement. Will you write me and let me know if I can be of any assistance to you in the matter of interesting your committee to send you to this convention? Fraternally yours,

L. G. FINCH,
Secretary P. A. F. C., Chief Fire Department, Guelph, Ontario.

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