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## REMARKS OF SUPERINTENDENT AYRES.

*Mr. President, and Gentlemen of the Association :*

I have been requested by your Secretary to give you a little informal talk about the Portsmouth water works. The works were chartered in 1797, and were built in 1798. The construction would be considered rather crude today, but still it answered very well for the purpose. They used what they called pump-logs cut in lengths of from 14 to 16 feet, with a bore 5 inches in diameter, and hooped at each end. To connect them they used oak tubes, which were turned to taper at each end and were then inserted in the logs and the logs driven together. The cost of the first main laid in 1798 was approximately \$7,000. The Company had at first 127 water-takers and received from them in 1798 \$638. In 1800, the number of water-takers had increased only 15, making 142 water-takers, paying \$710. In 1805, they had increased to 245, paying \$1,325; in 1810, they had increased only 20, to 265, and increased the revenue \$50, paying \$1,375; in 1820, only 20 more had been added, there being 285 takers, paying \$1,400; in 1830, they had increased to 340, paying \$2,000; in 1840, there had been an increase of takers up to 459, paying \$2,800; in 1850, they had increased to 700, paying \$5,000; in 1860, they had increased 400 to 1,100, paying \$6,500, an increase of \$1,500 in the last ten years; in 1870 they had increased to 1,400 takers, paying \$18,000; in 1880, to 1,700 takers, paying \$19,000; and in 1890, the last year of the existence of the old corporation under the name of the "Proprietors of the Portsmouth Aqueduct," the number of takers had increased to 1,900 and the water rates amounted to \$23,000.

In 1808-9, some ten years after the first construction, a second main of the same character, old pump logs, was laid from the same source of supply, which was springs not over 4 feet deep, and from which the water has flowed ever since and is now flowing to our pumps from the same spot at the rate of three or four hundred thousand gallons a day. Those springs supplied the city directly, without any expense of consequence, until 1850, when a distributing reservoir was built holding 500,000 gallons.

Perhaps it will be well enough to say here, before I go any further, that the demand for water in those days was simply in the

cellars of the houses. A good many of the service pipes were wood logs of an inch and a half bore. Lead was costly, probably, I think it was imported from England, and consequently wood services were used.

In 1850 this distributing reservoir was built. The increase in the revenue from 1840 to 1850 was owing largely to the establishment of the breweries, some of the takers using at least 250,000 gallons a day, and the small works were taxed sometimes pretty severely to supply the demand and to keep up what little head there was, for the pressure was light.

My father was superintendent of the work for nearly fifty years, and I grew up as a boy with the works and have been acquainted with them from the time I was big enough to know anything, being around and about them all the time, and particularly in the summer when any work was done I was very apt to be on hand and to see what was going on.

In 1890, the works were sold to the City of Portsmouth, to be delivered on the 1st of January, 1891. Commissioners were appointed under the bill granting the city the right to purchase, the works were taken and the city proceeded to construct a modern system, using, however, the same sources of supply that the old company had acquired and had used. Between 1860 and 1890 the company had added three sources of supply, one some miles to the north of the original source, one about three-quarters of a mile to the south, and another about half a mile to the east, each having a different elevation. In 1875, in the locality at the north we put down two 8-inch driven wells that have proved very successful. One is 70 feet deep and one 60 feet deep. The two are within 250 feet of each other, and from each of them I think there could be easily pumped a million gallons a day, any day in the year. We simply use them now in extreme drouth in summer. Some years we do not have to use them at all. We have an auxiliary pump located there. The city, after buying the works, built a pumping station and concentrated all these different supplies of water at the lowest point, and put in a 2,000,000 Deane pump, and an auxiliary 1,000,000 Deane pump. Last year they changed and put in a 3,000,000 gallon Worthington. The demand for water this summer has been very large, although some of our largest takers are partially supplying themselves with water from their own works. The largest

day's pumpage was 1,800,000 gallons, and I think we have averaged 1,350,000 gallons a day since the first day of June.

Perhaps you may be interested to know of some of the troubles we experienced with the old pump logs. As late as in the sixties one of the mains was not furnishing nearly as much water as the adjoining one. After considerable search we discovered that a tree some 30 feet away had thrown out its roots and the fibers had grown through the thinnest part of the log near the point, and had filled it, for 5 feet in length, nearly solid full, stopping it up almost completely. The durability of the old logs under the pressure we had was somewhat astonishing, the last three of those laid in 1798 being taken up in the seventies. Instead of being 5-inch bore they were 8, with the knots protruding in all directions, the knots not having worn away as fast as the soft wood, and being as fine and smooth as polished mahogany. If any of you have questions to ask which I can answer I shall be pleased to do so.

MR. HOLDEN. What pressure was on the old logs?

MR. AYRES. Until 1860, there was about 24 pounds pressure. Logs, as we all know, would be good for nothing except under light pressure. We used some Wyckoff patent pipe under 35 pounds pressure from the springs we added in 1875, and it answered very well, except through a clay swamp, where we found it almost worthless, as the bands were eaten off very quickly. But after 15 years of use we could see no deterioration in the pipe which was laid through gravel.

MR. FULLER. How were the joints for the service pipe made?

MR. AYERS. The joints for the service pipes, after we commenced to use lead, were simply bored, and the lead pipe pushed in and wedged with dry, clear pine.

MR. FULLER. A short piece of lead pipe connecting the main with the wooden service pipe?

MR. AYERS. Yes, when we used wooden services. We have used all kinds of services, and perhaps some kinds that some of you gentlemen have never seen. At one time for people who could afford it and were somewhat afraid of lead and wanted something different, we put in what was called glass-lined pipe, manufactured by a party in Boston. This was a cast-iron pipe an inch and a half in diameter, through which was run a glass tube about half an inch

thick, and between that and the iron pipe it was filled in with calcine. Then, later, parties wanting a glass pipe purchased what they called a glass enamelled pipe made in England, a  $\frac{3}{4}$ -inch pipe costing 57 cents a foot, and 1-inch pipe costing some 70 cents, I think. That was simply an enamel of glass inside and out on a wrought-iron pipe. The first pipe I spoke of, the cast-iron lined with glass, cost 50 cents a foot in those days. Some of the older people, however, would never have anything but wood.

MR. BISBEE. Was this wrought-iron pipe threaded, did it have a thread on, or was it put together with lead joints?

MR. AYRES. The first I named was put together with lead joints. It was a perfect pipe, as far as carrying the water was concerned, if they kept the frost out of the cellars. I never knew but one to freeze, and that was in one of our best houses. The weather was very cold, below zero, and the parties left the big cellar door some four feet from the pipe open over night, and in the morning they had no water. Complaint was made that they couldn't get any water, and that there must be some trouble with the works. The water froze in some 4 or 5 feet of pipe and the glass was shivered in all shapes.

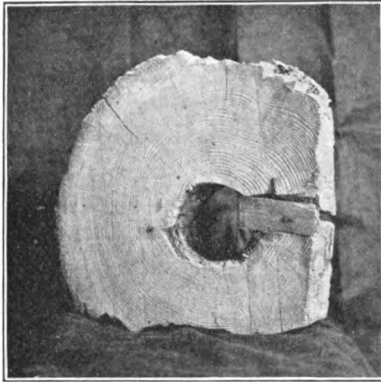
MR. FULLER. I suppose there were no hydrants connected with the old mains?

MR. AYRES. All the fire protection was from reservoirs, which the old company filed for the city free of cost. They never charged the city for water for fire purposes or for school-houses. Perhaps I might say further that there were very few years but what the old company paid a dividend. I should like to show you the old record book of 1798, for I think the handwriting of the old fellow, who has passed on, and some of the entries he made, might interest you.

THE PRESIDENT. Is there any of the old log pipe in existence at the present time?

MR. AYERS. None that I know of. I should be pleased to see any of you in my office before you go back, or all of you who can get in there. (Applause.)

On motion of Mr. Hill the thanks of the Association were extended to Mr. Ayers.



SECTION OF WATER LOG.

This log or wooden water pipe was a part of the Boston Aqueduct laid in 1836, and was taken from under the house of Wendell Phillips in Essex Street. This illustration is from a piece presented to Mr. Henry F. Jenks by the Ashton Valve Co.

THURSDAY, September 15.

The convention met at 10.20.

The Secretary read the following names of applicants for membership, the applications having been approved by the Executive Committee:

RESIDENT-ACTIVE.

P. D. O'Connell, Superintendent, Somersworth, N. H.; A. H. Burse, Superintendent, Pittsfield, Maine.

On motion of Mr. Crandall of Burlington, the Secretary was directed to cast the ballot of the Association for the applicants, which he did, and they were declared elected.

Mr. Stacy moved the appointment by the chair of a committee of five to make nominations of officers for the ensuing year. The motion was adopted and the chair appointed the following as the committee: Messrs. Stacy, Kieran, Codd, Holden and Cook of Woonsocket.

AMENDMENT OF THE CONSTITUTION AS TO PLACE OF MEETING.

THE SECRETARY. There is a report of the Executive Committee of the Association containing a recommendation for an amendment