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THE LOG WATER-PIPE SYSTEM

By W. B. STOCKTON, C.E. 3

EDITOR'S NOTE: A very good specimen of wooden water pipe may be seen in Professor Prior's office in Brown Hall.

Last summer, the Edison Power Company, while excavating in LaSalle Street, near Monroe, Chicago, encountered a water pipe of an unusual type. It differed from our present day pipes in that it was a tree trunk with a hole about 5 in. in diameter bored lengthwise through its center.

Primitive as this may seem, it was a vast improvement over the system of 1837 when Chicago's population of about 350 were having their water supplied by private enterprises which reaped a financial harvest in operating water carts. These carts traveled to and from Lake Michigan with water that was sold to the public at from five to ten cents a barrel, the price depending on the competition.

The need of a more efficient system became so noticeable that a group of the townsmen formed the Chicago Hydraulic Company. In 1840 the company laid a 320-ft. iron suction pipe from Lake Michigan to a reservoir in the town. The water from the reservoir was distributed through 2 miles of log pipes. The pipes were mostly cedar logs of ten-foot lengths and bored lengthwise through the center with a hole of 5 in. diameter for the mains and 3 in. diameter for the sub-mains. They were joined together by a junction consisting of dowels and a cast-iron thimble. Some of the pipe instead of being bored was cut in half lengthwise; the centers were then gouged out of the two halves, which were placed together as before and held together by iron bands 3 in. wide and $\frac{1}{4}$ in. thick, placed about 2 ft. apart. The wooden mains of 8 in. to 10 in. thickness were laid 4 ft. below the street level, which was slightly below the permanent moisture line.

The pipes proved very unsatisfactory because of the poor drainage and the inadequate sewer system. In winter the pipes would become so disarranged by the frost heaving them that frequently the hydraulic plant would have to stop the engine until some hours had been spent caulking the joints by pouring water on them. The life of the wood was remarkable, especially if kept constantly saturated; but because of the frost action the cast-iron pipes took their place in 1845.

It was during this period that American cities were first beginning to enjoy piped water. New York was the first city, when Aaron Burr, in 1798, organized the Manhattan Company which used wooden pipes to supply water to the residents. Philadelphia was second to supply its citizens with water by means of wooden pipes. Gradually the number of cities using the wooden pipes increased until it became the popular thing to do when servicing the population with water. Within the past decade these systems have been uncovered

and the wood has been found to be perfectly preserved; but the iron bands used to hold the logs together had rusted away. There was one instance in Boston in 1926, of a workman while excavating for a high pressure water main, finding a pipe whose joints were perfectly notched and in such good state of preservation that it was difficult to saw.

The history of the wooden pipe goes back to the time of the Romans and perhaps farther though investigation has been unable to state definitely when it was first used. It is a known fact that wood will last indefinitely if put in extremely arid regions or where continuously water-soaked. For this reason municipal water systems consisting of bored logs have frequently been discovered in the ruins of former cities. During the sixteenth century it was common practice to convey water by log pipes, while in England logs still intact with bark and sapwood have been used successfully for centuries.

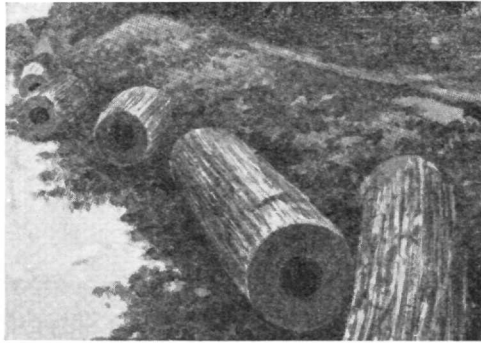
In the "Book of Days" published in Edinburgh, Scotland in 1864 by W. and R. Chambers (vol. 11, page 393) it is recorded that "elm pump logs were laid for over 400 miles in London, England, in 1613, in fields known as Spa Fields." Some of these pipes were taken up in good condition from Piccadilly extending from the Duke of Devonshire to Charges Street in 1862, after being down 249 years.

The method of making the pipe was generally by hand. On one end of the log the workman tacked a nail and by sighting on this he could work the auger through from the other end through the entire length of the log. This procedure was exceedingly slow and laborious, but a skillful pipe-maker about 1800 was paid 25 cents a rod or about $1\frac{1}{2}$ cents per foot. The joining practice of the pipe varied but it was generally accomplished by having one end of each timber tapered while the other end was reamed so that the tapered end of the adjoining pipe would make a tight-fitting joint. The other method was to use iron bands and dowels to hold them in place, but the bands gave considerable trouble due to corrosion.

The use of log pipes has practically passed out of existence, but wooden pipes are being used where durability is desired, especially where acids are present or electrolysis will occur.

The author wishes to acknowledge the cooperation of the Michigan Pipe Co., of Bay City, Michigan, in furnishing certain descriptive matter for this article.

In 1929 a total of 385 railroad grade crossings were eliminated on the federal-aid highway system, according to a report issued by the U. S. Bureau of Public Roads. Crossings eliminated by the construction of grade-separating bridges carrying the highway over or under the railroad numbered 48.—*Engineering News-Record*.



Sections of Log Water Pipe