

REPORT OF CITY ENGINEER

To the Honorable City Council of the City of Worcester:

Gentlemen: As the ordinances of the city require a report with reference to the supervision of dams that may be built by the city, such report for the fiscal year ending November 30, 1918, is herewith respectfully submitted.

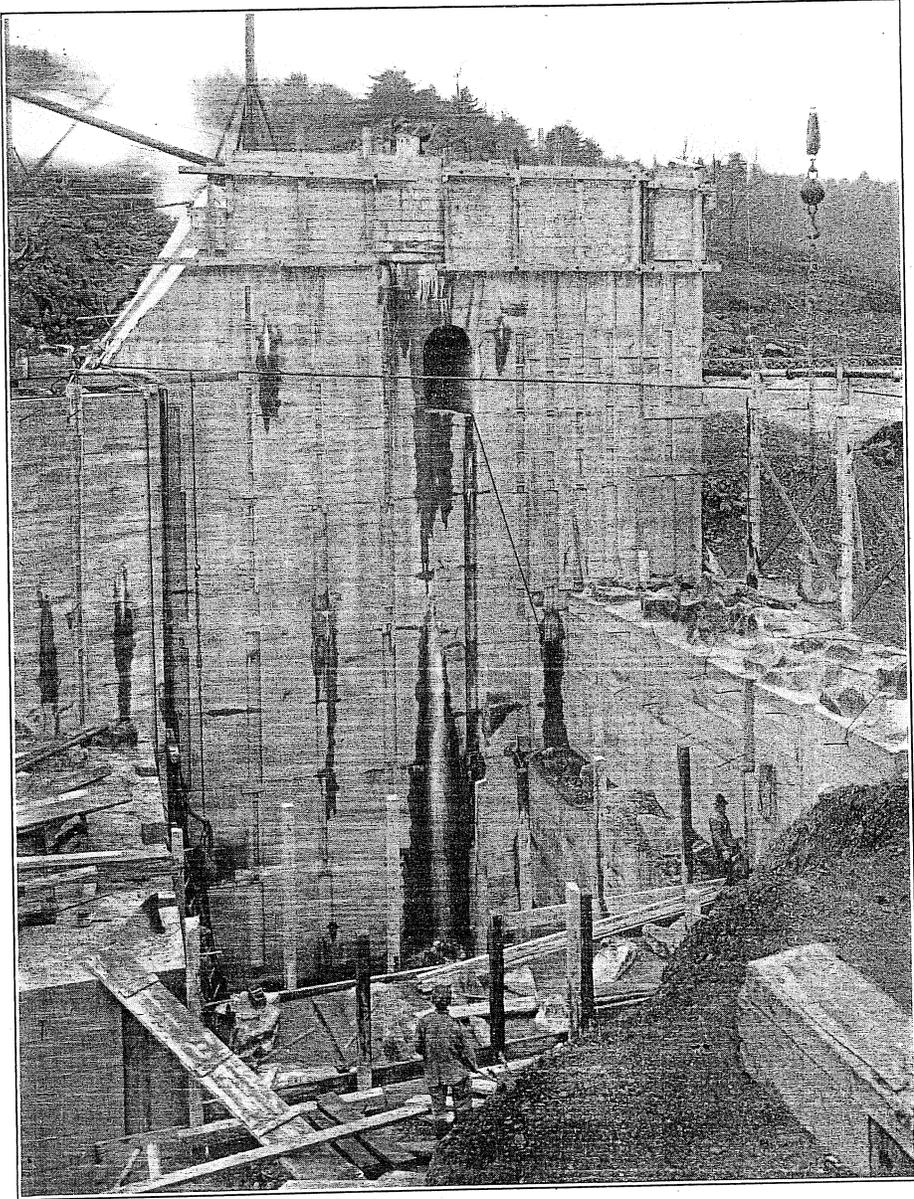
The dam and reservoir work for the past year was confined solely to the further building of the Pine Hill dam in the town of Holden. This work has proceeded slowly, as many of the men heretofore engaged have entered the service of the United States or sought other employment, and it has been impossible to obtain anything like an adequate force for a work of this size. During the winter months of 1917-1918 the few laborers obtainable were employed in the quarry and in further excavation of the site of the dam. These excavations for the most part were from forty to fifty feet in depth below the original surface of the ground and extended into the ledge. The ledge was found to be shattered to such an extent that it was necessary to remove considerable quantities to obtain suitable hardness to build upon. The numerous seams and crevices allowed the passage of water so readily that it became necessary to drill still further into the rock, and numerous holes were sunk to a depth of twenty-five or more feet, in order to reach a less porous material. By testing these holes with water under pressure it was found that certain groups were connected through fissures in the rock, and by traversing the area under treatment it was possible to isolate different groups into convenient clusters for sealing and making water-tight. To accomplish this a short piece of two-inch iron pipe was connected with each hole, caulked and made fast and tight with a pet-cock in the top of each, so that the circulation of grout could be controlled. One of the pipes was connected with a grout mixer in which the cement and water were thoroughly mixed under air pressure and forced into the group of holes under treatment. This was done without let-up until the seams refused to take more. In some cases two or three twenty-four hour days were necessary to effect complete tightness. In order to close very small crevices, the grout was mixed in the proportion of 60 to 1 and applied under pressure of ninety pounds to the square inch. This treatment has been applied throughout the work and will be continued until completion.

With the small number of men available the work was necessarily slow, as it was necessary to constantly change the occupation of the force from one procedure to another, and it was frequently necessary to employ skilled workmen temporarily at the pick and shovel, or on the quarry and stone crushing plant in order to proceed at all. The willing co-operation of the men in this manner enabled us to maintain the organization and to keep intact certain essentials in order to proceed with the work. As the season draws to a close, applications for work show signs of reviving, and it is hoped that men in sufficient numbers will report so that preparations can be made for full activities when spring opens.

The fuel situation required the greatest economy in the use of coal, and wood was accordingly used under all boilers with suitable grates.

The Pine Hill expenditures for the fiscal year are as follows:

Automobile—maintenance and hire.....		\$671.79
Chauffeur.....		831.60
Buildings—construction and maintenance.....		640.12
Clerical—labor and supplies.....		1,566.99
Cement—on hand Nov. 30.....		3,500.00
Dam:		
Diversion, pumping and care of water.....	\$10,311.10	
Earth excavation and sheeting.....	13,547.81	
Rock excavation.....	2,143.51	
Drilling and grouting.....	2,528.93	
Concrete masonry.....	47,644.72	
Foundation for pool.....	872.13	
		<hr/>
		\$77,048.20
Engineering and supplies.....		4,901.21
Fuel (on hand Nov. 30th, 447 tons).....		14,123.12
Incidental labor—storehouse, repairmen, watchmen, etc.....		8,468.46
Incidental supplies—gasoline, grease, oil, paint, waste, packing, etc.....		1,293.69
Land—fencing and court cases.....		1,027.48
Lumber—cost and handling.....		2,116.82
Machinery and tools.....		15,727.39
Medical and Workmen's Compensation Act.....		548.82
Railroad—material, maintenance and operation.....		2,778.94
Roadways and drives.....		207.02
Telephone—rental, repairs to line (Holden).....		134.04
Transportation of workmen—car fares.....		3,732.99
Trucking—material and supplies from city.....		315.49
Vacations—qualified workmen.....		2,799.60
Water Supply—piping and pumping.....		1,668.47
		<hr/>
Total.....		\$144,102.24
On hand Nov. 30, 1917....	\$201,123.14	
Revenue.....	3,349.83	
	<hr/>	
		\$204,472.97



VII
VIEW OF NORTHERLY END OF DAM AT CLOSE OF SEASON OF 1918.
THE SMALL ARCH AS SHOWN, IS ABOUT AT GROUND LEVEL.

Expended during 1918... 144,102.24

Balance Nov. 30, 1918..... \$60,370.73

The cost of labor in the above items amounted to \$96,775.89.

Earlier in the year, following the city's petition to the legislature for permission to extend its water supply, a special act relative thereto was enacted, as follows:

"SECTION 1. The mayor of the City of Worcester is hereby authorized to appoint a commission of three members, of whom one shall be the mayor, to investigate, consider and report, with the advice of the state department of health, upon the question of an additional water supply for the said city, and upon all questions relating to the quantity of water to be obtained from available sources, its quality, the best methods of protecting its purity, the construction, operation and maintenance of works for storing, conveying or purifying the water, the cost of the same, the damages to property and all other matters pertaining to the subject.

"SECTION 2. The said commission shall have power to employ such engineering and other assistance and to incur such expenses payable by said city as may be necessary for carrying out the provisions of this act, but not exceeding the sum of fifteen thousand dollars. Before incurring the commission shall from time to time estimate the amounts required and shall submit the same to the mayor and city council of Worcester for their approval, and no expense shall be incurred beyond the amount so estimated and approved.

"SECTION 3. The said commission shall report fully, with plans and estimates, to the general court on or before the first Wednesday of January, nineteen hundred and twenty, together with drafts of such bills as may be necessary to carry out its recommendations.

"SECTION 4. This act shall take effect upon its acceptance by the city government of the city of Worcester.

"Approved May 28, 1918."

Under the authority of the above act the mayor appointed the city solicitor and the city engineer to co-operate with him as a commission in the investigation of a possible supply of water for the future needs of the city.

Subsequent action by the city council appropriated the sum of \$3,000 as a preliminary amount to defray the expense of such investigation, and surveys are now being made.

Respectfully submitted,
 FRED'K A. McCLURE,
City Engineer.