

year around, so far as injury from moisture is concerned, if dragged at the proper time after every rain. There is one factor, however, that we have to consider and that is a long dry period. It is rather difficult to do much with an earth road during long periods of dry weather. Our roads are kept in much better condition with frequent rains.

We try to divide the roads into sections of about ten miles each and employ someone living about the centre of the section to work five miles each way. Of course, the length of the section depends on whom we get to do the work, as some of our men look after as much as twenty miles, but with this distance to travel they very often cannot get over it all when they should. But with a ten-mile section, and living in the centre, a man should keep the road in good condition. If the soil is lighter in one direction, it makes an ideal condition. He goes over the light end first, which dries quicker, and then over the heavier soil. Under normal conditions we have had this work done for seventy-five cents per mile for each time the road is dragged. Now the cost is higher.

#### Intelligence Needed in Dragging

We are now coming to our greatest problem, the one which is the cause of more complaints than all others together, especially from the man who uses a motor car, and that is our difficulty to obtain the services of men to drag our roads who will take an interest in the work, who will do it at the proper time and not wait days until they have nothing else to do, and who will stay off the road when it is so hard and dry that they are wasting time and money.

In conclusion, I wish to say that in Alberta, at least, owing to the rapid development of the province, I believe that for years to come we will have to be satisfied with earth roads; with a little surface of sand on clay where necessary; or clay on sand where the sand will not carry traffic during dry weather; or gravel surfacing where such material is available. However, in Alberta, as yet, we have done very little of even this class of work. Almost all our roads are constructed and top dressed with material from the side ditches or by balancing cuts and fills.

The Reid-Newfoundland Co. are operating a cold storage plant at St. Johns, Newfoundland, with a present capacity of 6,000 tons of fish, and it is their intention ultimately to increase the capacity of the plant to 25,000 tons, making it one of the largest in the world, says Sir Frederick N. McGrath, chairman of the Food Control Board of Newfoundland. The British Government has contracted for practically the entire output of the present plant until the end of the war.

Sir H. Dalziel, in the British House of Commons, on July 1st, asked the Prime Minister whether Mr. Chauvin, managing director of the Siemens Co., who are government contractors, is a German naturalized since the outbreak of the war? whether his name was previously Von Chauvin? whether, on the winding up of the business as an enemy concern, it was a condition of purchase that Mr. Chauvin's services should be retained? whether, in view of the close relations of this firm to the government in the production of war material, he will consider the possibility of employing a manager who was British-born? and whether Mr. Chauvin was also a director of the Deutsche Bank? In replying, Sir A. Stanley said: "The Prime Minister has asked me to answer this question. Mr. Chauvin, whose name was previously Von Chauvin, is of German birth and has been naturalized since the outbreak of war. So far as I am aware he has never been a director of the Deutsche Bank. On the sale of the shares of Siemens Brothers and Company, Limited, there was no condition with regard to the retention of Mr. Chauvin's services, and the agreement under which he now acts as managing director of the company was, I understand, entered into by the new directors appointed by the purchasers of the shares."

#### LEAKAGE FROM HIGH-PRESSURE MAINS AND ITS VARIATION WITH THE PRESSURE\*

THE high-pressure fire system in the Borough of Manhattan, New York City, due to the fact that New York has not permitted any private connection to its fire mains, gives an opportunity to make tests on a distribution system of 128 miles of mains, 2,728 hydrants and over 4,748 valves, covering an area of 3,675 acres. The system has received during its 10 years' life most trying tests. Each year it has had the pressure raised from, say, 35 lbs. to from 125 to 250 lbs., an average of over 2,000 times a year, due to fire alarms within the district, and for each period of 12 hours in duration which no fire alarm has sounded, the pressure has been raised for one-half hour to 200 lbs. for testing out. It is hard to believe that any other water system in the world has gone through similar service conditions. The system includes the following pieces:

	Number.	Per cent.
Pipe, full lengths, 8 ins. to 24 ins...	44,134	54.4
Bends and offsets .....	10,834	13.3
3-ways, 4-ways .....	4,279	5.3
Short pieces .....	21,950	27.0
Total .....	81,197	100.0

The mains were all laid in the lower portion of Manhattan Island, where subsurface conditions are most congested. This subsurface congestion shows readily in the figures given in the table by the large number of bends and short pieces of pipe used, even after the city had availed itself of its right to order moved gas mains and other interfering subsurface structures.

After the mains were laid they were subjected to an acceptance test of 450 lbs. for a period of 10 minutes for the earlier contracts and for 20 minutes for the later ones, the leakage being measured and for acceptance had to come within the limit of 4 gallons per linear foot of pipe joint per 24 hours.

#### Leakage Has Increased Considerably

In testing, the test sections were in all cases between valves and doubtless a portion of the loss was due to water passing the valves limiting the section under test.

The mains were limited in the acceptance test of 450 lbs. per square inch to a leakage at the rate of about 800 gallons per minute for the entire 128 miles. The actual gross leakage of all the tests was 452 gallons per minute. To-day there is a leakage, as shown on the Venturi meters, of 950 gallons per minute at an average pressure of 33 lbs.

Investigations have been made to locate the leaks, but due to lack of force the work has not been systematically carried on. However, due to the wide range in pressure, property owners have themselves reported eight connections which had been placed evidently by mistake. There may be others not placed by mistake in which advantage is taken of the higher pressure available at times to fill tanks. The occasional erratic movement of the pen in the Venturi chart may be an indication of this.

An aquaphone test of each hydrant made by a most careful and competent inspector who covered every one of the 2,728 hydrants showed but 51 (1.9 per cent.) on which any sound could be detected, indicating leakage which could not be stopped by tightening the valves.

Of course, it might be said that a certain number of hydrants might be not tightly closed at all times in such

\*From Journal of American Waterworks Association.