

section is a large one, necessitating larger than a 2-in. meter, it is well to make a supplementary by-pass with small meter around the larger one. The section to be tested should be carefully laid out, all gates located beforehand to eliminate delay, and tested for tightness. The test for a leaky gate is simple. Close the gates to be tested and open a hydrant on the line between, removing the suction cap. Then open one valve slightly until the water in the hydrant barrel rises to the level of the suction nozzle and just flows out. Then close the valve again. If the water continues to flow from the nozzle, one of the valves must be leaking. Of course, for a few minutes the flow might be from the houses in the district, but this should stop shortly. If the level of the water lowers, it shows a leak somewhere in the cut-off section, below the level of the hydrant nozzle; but it would indicate a good-sized leak, as the open hydrant removes all pressure from the line. Aquaphones may be used on each gate, as further tests of tightness. The best hours for the actual testing are from 1 to 4 a.m., when the flow is less than at any other period of the twenty-four hours.

### Microphone Detector

If all the gates are tight it is evident that no water can enter the section so cut-off unless it passes through the meter on the by-pass. If readings of the meter are taken at set intervals, and gate by gate the area of the section covered by each test-pit lessened, it can be seen with ease that the leak will be discovered to be within a certain pair of valves. After its general location has been determined in this manner, the exact point where the water is escaping can be determined by looking for any luxuriant growth of vegetation at the side of the road, by dampness on the surface of the street, by driving down a bar and noticing any moisture on removing it, by means of an instrument magnifying the hissing sound of escaping water or by using any other convenient method. In this manner, a whole city or town may be covered.

The instrument just mentioned is contained in a small, light box. A small, four-legged brass table is set on the ground over the pipe in the vicinity of where the leak is supposed to be. The box has a raised bottom, so that it may be placed over the table to keep out foreign noises. On the table is a microphone-detector with wire connection to an amplifier battery contained in the box. Very sensitive ear receivers are wired to the battery. When the instrument transmits a rushing noise to the ears, it is evidence that the leak is close at hand. The affair is set at different points along the pipe line until the point where the noise is loudest is reached. The leak will be found directly under the spot. Used in connection with a wireless pipe locator it will be found to be satisfactory.

### Can Use Fire Hose

The beauty of the test-pit scheme is that it is permanent; the pits are always ready in time of need. If it is not desired to construct the manholes, the same results may be obtained by connecting two hydrants with fire hose, one hydrant being inside and the other outside the district to be tested.

Another method, quite as accurate, but probably more complicated and requiring more delicate apparatus, is the use of the Pitometer. There are also several special methods. One was described before a meeting some years ago, by F. J. Hoxie, and is called the "caustic soda method." Another is a special device making use of water hammer. It works on the principle that the sudden closing of a valve produces an impulse which travels through the water in a wave, decreasing in intensity in passing an

opening in the pipe. It is claimed that the relative distances from the instrument to the break and to the suddenly closed valve is readily determined, but with what accuracy I cannot say.

From our experience in Milton, we believe the test-pit method to be as accurate as any, and simpler than most. It proved its value this spring when we found our daily consumption, which had been away above normal all winter on account of water being run to prevent services freezing, was not at all reduced when mild weather set in. We were using at the rate of 500,000 gal. daily, which was 56 per cent. above normal. The leak was discovered in short order, and the average daily consumption was reduced by 180,000 gallons.

## GOVERNMENT RAILWAYS MERGED

**A**NNOUNCEMENT was made last week by the Minister of Railways and Canals that an order-in-council had been passed, transferring the management and operation of the Canadian Government Railways to the Board of Directors appointed to manage the Canadian Northern Railway System. This transfer now places all railways owned by the Government under the direction and operation of this new board.

There have been added to the board Thomas Cantley, of the Nova Scotia Steel and Coal Co., of New Glasgow, N.S.; A. P. Barnhill, of St. John, N.B.; and Sir Hormisdas Laporte, of Montreal.

This change now makes a unified Government system of about 14,000 miles, extending from Sydney, N.S., to Vancouver, B.C.

The Board of Directors a few weeks ago reorganized the Canadian Northern System, and will now proceed with the further changes that are necessary on account of the addition to their system of the Intercolonial and Transcontinental lines.

It is understood that C. A. Hayes, who has been general manager of the Intercolonial Railway, will become general traffic manager of the whole Government railway system, with office in Toronto. F. P. Brady, general manager of the Transcontinental Railway between Winnipeg and Quebec, becomes assistant to the general manager of all Eastern lines. T. S. Brown, general superintendent of the Intercolonial Railway, will be chief operating officer of the Intercolonial Railway under Mr. Brady.

Arthur Hall, chairman of the Toronto section of the American Institute of Electrical Engineers, stated at a meeting of the Institute held last week that 5,200 graduates and undergraduates of the University of Toronto have been or are on active military service.

According to a statement made by the Canadian Mining Institute, the total number of members resident in Canada or on military service entitled to vote for officers of the society for the coming year is 909, divided as follows: Alberta, 158; British Columbia, 153; Nova Scotia, 112; Ontario, 351; Quebec, 134.

The general annual assembly of the Royal Architectural Institute of Canada will be held at Montreal, January 17th and 18th, 1919, at the same time as the annual convention of the Province of Quebec Association of Architects. The programme of the assembly will be sent to all members of the Institute next month. Alcide Chausse, hon. secretary.

Industrial Commissioner Sclanders, of Windsor, Ont., upon returning from a trip to Chicago, declares that the prospects are very encouraging for industrial expansion in the Essex border cities, viz., Walkerville, Windsor, Sandwich, etc. "Several of the largest corporations across the border have been looking eagerly toward this district," says Mr. Sclanders, "but have been held back because of war conditions. They are now favorably inclined toward the idea of acquiring factory sites in Canada, and are only waiting until peace has been absolutely assured, and conditions return to normal before actually opening business here."