

## MUNICIPAL DEPARTMENT

### THE USE AND WASTE OF WATER.\*

(Continued.)

Waste in domestic use.—The efforts toward the restraining of waste have been confined to reducing the amount which is willfully wasted by placing meters on the services of business consumers, and making them pay by measure for the water they use. The placing of meters on private residences is not permitted by law, or, more properly speaking, the compelling of the private consumer to pay for a meter for the water which passes through it is not authorized by the city charter.

For several years a considerable reduction of waste from unseen and not readily discovered sources, such as leaking fixtures and main pipes, was effected by reducing the head of water in the pipes. This did not, as is generally supposed, diminish the quantity a consumer could use legitimately, but it did lessen the quantity lost by leakage, and so increased the quantity available for actual use.

Reduction of pressure.—It was by a skillful application of the reduction of head that the supply of necessary water was kept up for the whole city during the years from 1883 to 1890, while the new aqueduct was building. The gates at the reservoirs and the stop-cocks in the distributing mains were partly closed, so that just enough water would pass through them and into the several districts of different elevations to rise not higher than the first or second stories of the houses, thus furnishing water enough for use and also for supplying the diminished leakage caused by the lessening of the head on the orifices which were constantly open, whether they were underground or in the plumbing of the houses. The deterioration of the pipes kept on increasing with little or no effort to stop it, and the defective plumbing was not repaired except when it caused inconvenience to the occupant of the house. The increasing loss from invisible leaks was overcome by decreasing the pressure on the pipes.

Then in July, 1890, the water from the new aqueduct was turned on and the throttled gates and stop-cocks were opened up, and the full pressure from the water in the reservoirs was turned on the pipes. The head on the distribution mains increased 20 to 25 feet. The result was an immediate enormous increase in the consumption of water. In the first half of 1890 the consumption was about 105 million gallons a day. In 1891, 153 million gallons a day were used, and by 1895 the consumption of water had increased to 180 million gallons a day.

Additional leading mains from the reser-

voir to the lower portions of the city were laid, and the increase during the next year was 20 million gallons a day; and in 1897 and in 1898 the laying of a line of large mains from the reservoir to Chambers street enabled the head of water in the lower part of the city to be increased still more, and the consumption of water advanced to 226 million gallons a day in 1898 and 246 million gallons in 1899. That this increased consumption was not due to an increase in the actual rate of use of water by consumers is shown by the fact that the water used by 25 per cent. of the consumers was measured during the entire period from 1889 to 1899, and the rate of use by that 25 per cent. of the consumers was not materially increased, if at all.

In 1889 there were 19,040 consumers taking water through meters, and the average use of water by them was 1,428 gallons per day each. In 1899 there were 35,755 consumers taking water by meter, and they used 1,417 gallons per day each. There is no reason to suppose that the average actual use of water by consumers of any class increased materially during that period of ten years. The number of unmetered consumers increased about 40 per cent., but the amount of water furnished to them which disappeared somewhere increased 160 per cent. Dividing the total unmeasured water by the number of unmetered taps, the daily rate increased from 907 gallons a day in 1889 to 2,248 gallons in 1899. It is not unreasonable to say that it was impossible that 75 per cent. of the watertakers doubled their use of water in about seven years, when it was proved that the remaining 25 per cent. taking water under the same conditions, except as to

measurement of the use, did not appreciably increase their use. If the increase of pressure had increased the legitimate use of water in the metered buildings, it would have shown in the records of the measured water. That it did not increase such legitimate use, but merely increased the waste from orifices either undiscovered or left open by design, is clearly established by the fact that where such orifices did not exist the use of water did not increase.

Newton Kerr has been appointed city engineer of Ottawa, Ont., as successor to Mr. John Galt.

Mr. T. O. Bolger, city engineer of Kingston, Ont., died in that city on September 17th, after a long illness. Mr. Bolger was appointed city engineer in 1887.

A Provincial Good Roads Association for British Columbia was formed at a meeting held at Kamloops recently. Mr. F. J. Deane was elected president, Mr. J. R. Anderson vice-president, E. T. W. Pearsen secretary. The Provincial Government will be asked to make a grant to enable the association to distribute literature bearing on road making.

The cost of cleaning asphalt pavements in Minneapolis during 1899 is analyzed by City Engineer G. W. Sublette, as follows: Cleaning, machine sweeping and washing, 1.45 cents per square yard; hand sweeping 5.74 cents; total 7.19 cents. There were 199,978 square yards cleaned by hand by the block system. The sweepings were put into galvanized iron cans at street corners, from which they were collected by teams. Five teams paid \$3 and \$3.50 a day, and 31 men paid \$1 to \$1.75 per day were employed on the work.

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Extracts from a report by Mr. James J. R. Coates, M. Am. Soc. C. E., to the Engineering Committee of the Merchants' Association of New York.