WATER WASTE PREVENTION BY INDIVIDUAL METERS versus DISTRICT METERS.*

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THERE are many cases where it would be difficult to make an equitable charge for water consumed unless the quantity was measured. These are industries, institutions, premises requiring water in very small quantities for sanitary purposes, and large consumers. But the large majority of consumers do not actually need much water, although it is well known that an inordinate quantity is used or misused. This has arisen in some instances from the fact that it was considered more economical to supply than to check; in other cases it is due to indifferent management and neglect until the waste has created serious disabilities on the part of some of the water authorities.

There is now a general movement for the conservation of water and the principal means taken is to install individual meters on all water connections. The object of this short paper will be to discuss the question as to whether the general installation of individual meters or the provision of district meters is to be advocated.

Waste of water must be eliminated as far as practicable and economical, for the keynote of successful management of all businesses is to stop leaks of all kinds.

A waterworks system loaded with a high rate of supply is not unlike a ship which has a constantly leaky water ballast, for neither the waterworks nor the ship can be operated to its full legitimate capacity, nor made to be revenue producing to the extent it should. The proprietors of the waterworks who propose to install a general meter system so as to reduce some of the leaks may be compared with the shipowners who have some of the leaks in the ship's hull repaired and pumps provided to reduce the water ballast. Carrying the analogy still further, the waterworks proprietors who install bulk and district meters, a few individual meters and by means of efficient inspection reduces all leaks to a minimum are similar in purpose to the shipowners who have the ship's hull thoroughly overhauled and ample pumps provided to keep the water ballast empty. In both these cases the property is maintained in an efficient condition and made to produce the maximum revenue at the minimum cost.

Most of the cities are relatively small, and if it be assumed that the average size is about 20,000 population, it will doubtless represent a large number of towns. The unrestricted total consumption is, say, 150 gallons per head daily. In such a city there would be about 3,500 water connections, and if all are metered there would be that number to fix and maintain. The water authority, to secure full control over the meters, would buy the meters and rent them out

Adopting the careful analysis of costs made by the Wisconsin Railroad Commission and mentioned in their report of 1911, the average annual cost is as follows:—

Labor, moving and resetting meters	$0.18
Labor, meter and fittings department	0.34
Supplies, meter and fittings department	0.12
Maintenance of meter	0.35
Reading meters and delivering bills	1.35
	$2.54

To these must be added:

Depreciation, say	$0.50
Interest	0.36
	$0.86
Total per meter per year	$3.40

The cost of metering will fall on the consumers and in this case it would amount to $11,900 per annum.

The cost of filtered water at the works will be about $3.50 per million gallons.

Individual meters measure the water entering the premises and consequently constitute good waste detectors. The saving in the quantity of water used before and after installing meters varies greatly, but in all cities metering has effected a tangible reduction in the quantity of water pumped. Published figures are often misleading because the diminution in the quantity consumed by the people is often small compared with the losses on the mains. When the total quantity of water registered by individual meters is ascertained, the unaccounted-for losses amount to from 20 to 66 per cent. of the total quantity pumped. It will be fair to expect 33 per cent. reduction in the pumpage by universal metering. Supposing the head of the pumps is 100 feet and the price of coal is $4 per ton, then the saving in fuel due to diminished pumpage will be about $1,200 per annum. The cost of labor will remain practically the same.

District meters could be installed in this city for about $3,000; a small number of individual meters would be required, as explained in the commencement, and inspectors would be employed to make a systematic and frequent survey of the whole waterworks. The annual expenditure in this case would be as follows:—

Interest on $3,000	$ 150	
Depreciation	150	
		$ 300
Two inspectors	$2,500	
Clerks, etc.	1,500	
		4,000
250 meters @ $3.40		850
Miscellaneous		250
Total		$5,400

By careful and diligent inspection the pumpage should be gradually reduced to one-half and the saving in fuel on the same basis as before would be $1,800.

The above estimate is liberal. The writer had control of waterworks and by means of this method was able to supply the public on less than 30 gallons per head daily for all purposes; the railroad companies were large consumers. The London Water Board use from 1,300 to 1,400 Deacon meters to detect waste and by discovering and localizing leaks the average supply is under 45 gallons per head daily. By means of pitometer survey at Ottawa, Canada, leaks amounting to 5,300,000 gallons per day were remedied in a short time. Washington has in seven years detected leaks aggregating 40 million gallons daily. Three permanent self-recording district meters have been installed in Regina, but systematic inspections have not yet been started. The record obtained from the district meters enable the officials to detect leaks and to localize them, and by this means keep the consumption at a reasonable figure. Such meters and records are a check on the pumps and on the daily occurrences in the district controlled.

The reduction of waste is equivalent to increasing the capacity of the waterworks to meet growing demands and at a reduced cost or with increased revenue.

*Paper submitted last week to the Illinois Section of the American Waterworks Association.