## CITY WATER WASTE.

There is, as has been often mentioned in this journal, a considerable waste of water in some of our Canadian cities. A report to the council of the city of Ottawa on this subject by a special committee appointed to examine into it, probably partially applies to the state of affairs in many other cities and towns. In Vol. 21, No. 8, August 24th, 1911, of The Canadian Engineer, we published a table regarding the cost of water supply in a number of Canadian municipalities of comparatively small size. It may possibly interest some readers to look this up in connection with the present article

The report reads:—

At the last Council meeting there was referred to this committee the question of water waste in the supply system throughout the city. In order that the committee may be in a position to immediately take up the consideration of this important question, I have prepared certain information which I beg to place before you along with my recommendations in the matter. I have, of necessity, gone into this question in detail so that the seriousness of the existing conditions may be quite apparent.

**Rate of Consumption.**—During the past year the amount of water pumped each day averaged 17.7 million Imperial gallons. The highest consumption, amounting to 20.6 million gallons, occurred on Saturday, July 13th, and the lowest consumption, amounting to 15.0 million gallons, occurred on Sunday, October 27th. On Wednesday, February 12th, of this year, the consumption amounted to 19.7 million gallons, and the daily average for the month of January amounted to 18.0 million gallons.

**Pumping Capacity.**—The present pumping capacity is actually about 30 million gallons per day, made up as follows:

| | | |
|---|---|---|
| Pump No. 1 | 3 | million |
| 2 | 3 | " |
| 3 | 3 | " |
| 4 | 5 | " |
| 5 and 6 | 8 | " |
| 6 and 7 | 8 | " |
| Total | 30 | gallons per day |

Of this amount 16 million gallons is accounted for by the two units, five and six, and seven and eight, most recently installed. The water wheels to operate these four pumps are in one wheel case so that when an accident occurs, as in October last, to any part of these water wheels fully one-half of the available pumping capacity is thrown out of business. This leaves the city with 14 million gallons available for its use, whereas last year the consumption averaged 17.7 million gallons per day, and as stated previously, reached as high as 20.6 million gallons on Saturday, July 13th last. Furthermore, at certain periods of the day, notably between 9 a.m. and noon, the rate of pumping would rise as high as 23 million gallons per day. Even with one of the large units being out of business, the capacity would be reduced to 22 million gallons per day. Any break-down occurring to any one of the old pumps would not materially affect the output as they are in smaller units and operate independent of each other.

It will plainly be seen that additional pumping capacity is urgently required unless an immediate and vigorous policy of waste prevention is pursued.

**Consumption per Capita.**—The rate per capita during 1912 was 185 gallons per day. The highest it ever reached during any year was 192 gallons per day during 1907. On February 12th last, however, the consumption amounted to 206 gallons per capita, while on Sunday, the 9th of February, it amounted to 194 gallons.

The pumping station records show that from midnight to 3 a.m. the amount of water pumped is about 85 per cent. of the average rate of pumping for the 24 hours. In other words, while the average daily consumption during 1912 was 17.7 million gallons, the rate of pumping during the night amounted to 15 million gallons per day. A very small portion of the water pumped at night represents legitimate use, nearly all being waste, and this waste so shown can be safely assumed to go on to a large extent throughout the 24 hours. If no such waste existed, then the night rate of pumping would be a small fraction of the average rate of pumping, certainly not more than 10 per cent. as against 80 to 90 per cent. as at present.

Let us consider the rate of pumping for February 12th last. The total quantity pumped that day was 19.7 million gallons, or a per capita rate of 206 gallons daily. From midnight to 3 a.m., the rate of pumping was 87 per cent. of the daily average. In other words, the quantity pumped per capita during the whole 24 hours was 206 gallons, the rate of pumping from midnight to 3 a.m. was 179 gallons per day. The figures for last Sunday, the 16th, are as follows:—

| | |
|---|---|
| Total quantity pumped | 18.3 million gals. |
| Quantity per capita per 24 hrs. | 191 gals. |
| Rate from midnight to 3 a.m. | 173 " |

or the night rate was 90 per cent. of the average daily rate.

It is rather striking to observe that the consumption per capita per day increased from 101 gallons in 1889 to 168 gallons in 1893, an increase of 67 gallons per capita per day in four years time. I have so far been unable to find any satisfactory reason for this sudden increase.

At least 75 per cent. of this daily average is wasted without benefit to anyone. Both Sir Alexander Binnie and Mr. Allen Hazen state that 75 per cent. is wasted, and for this statement Mr. Hazen gives the following reason:—

A. There are no great manufacturing uses of water; manufacturing establishments are mainly located upon the river and obtain their water from it for manufacturing purposes and do not draw from the city works.

B. The experience of other cities which probably need to use, and do use, as much water as is used in Ottawa where systematic study has been made of the waste of water and intelligent efforts have been made to cut off such waste as far as possible, indicate that the amount actually used is not more than one-fourth as great as the amount pumped in Ottawa.

C. The night rate of pumping indicates this. Most of the actual use of water is in the day time. There is no reason why any large quantity of water should be used during midnight and 3 a.m.

From these statements, not more than 50 gallons per capita daily should be actually necessary.

**Effect of Waste of Water upon the System.**—The effect of allowing this enormous quantity of water to waste is that the whole waterworks system must be built larger than would otherwise be necessary. The distribution mains must be larger and the pumps must be of greater capacity. If the water is purified, the purification plant must be made larger in size and if the supply comes from a distance, such as is proposed by bringing the water from the Gatineau Hills, large additional storage must be provided for besides the enormous cost of laying main supply pipes so much larger in diameter.

No amount of reasoning can justify the necessity of this useless waste. No one derives the slightest benefit from it,