

MUNICIPAL DEPARTMENT

MAINTENANCE OF A SEPARATE SYSTEM OF SEWERS.*

By T. HARRY JONES, A. M. Can. Soc. C. E., Brantford.
(Concluded.)

In addition to the fungus growth above mentioned, the leakage of sand into the pipes has helped to cause this sewer to back up.

Excepting the 18 inch iron syphon under the canal, through which the plunger is passed twice during the year, none of the sewers above 12 inches in diameter have yet required special treatment in this way.

FLUSHING APPARATUS.

Instead of using the ordinary copper or wooden spherical "pill" which has a diameter 2 inches less than that of the sewer to be flushed, we have found the following apparatus to be much more effective.

It consists of a reel or plunger, formed of two rubber discs of the same diameter as the sewer to be flushed, cut from $\frac{1}{4}$ inch rubber belting. These are backed by wooden discs, from $1\frac{1}{4}$ to $1\frac{1}{2}$ inches in thickness and from 2 to 3 inches less in diameter than the sewer. These discs are strung about 8 inches apart on a $\frac{1}{2}$ inch iron rod, and are kept apart by a piece of gas pipe sliding on the rod, and are held in position by a collar near one end of the rod and a nut at the other end. The rod is provided with an eye at one end, and a swivel at the other end, for attaching the ropes, which are each some 25 feet longer than the distance between the manholes.

METHOD OF FLUSHING.

In flushing a sewer the plunger is usually put through twice. The sewer is first flushed block by block, beginning with the lowest block on the sewer, and using the plunger suitable for a smaller pipe. Then the sewer is flushed straight from the upper end, using the plunger which fits the pipe.

Beginning at the upper manhole of the block of sewer to be flushed, the leading rope is passed through the pipe to the manhole below. Then the plunger follows, and is taken through principally by the pressure of water backed up behind, the trailing rope serving to keep the plunger from going too fast, while the leading rope is serviceable if the plunger is inclined to stick. The usual method of passing the leading rope from manhole to manhole, by means of a float with a string attached, having been found to cause so much delay, we adopted the following plan: Elm strips 2 inches wide, $\frac{1}{2}$ inch thick, and 12 feet in length are bolted together end to end by two iron straps and four stove bolts to each joint, the straps being

* Paper read at the annual meeting of Ontario Land Surveyors.

1 inch by $\frac{1}{2}$ inch by $6\frac{1}{2}$ inches and the bolts 1 inch by three-sixteenths of an inch.

These form practically one long slat which will reach from manhole to manhole, and will bend readily, and can be pushed down the manhole and through the sewer. To this the rope is attached.

These strips can easily be pushed 400 feet through a 9 inch pipe, and 100 feet through a 4 inch pipe, and are of great service in locating faults and stoppages.

RATE OF FLUSHING.

A gang of three men will flush about 700 feet in a day.

HOUSE SEWERS.

The sewer assessment adopted by this city of seventy-nine and one-tenth cents per foot frontage or 4 cents per foot for 40 years, covers also the cost of the construction of the house sewers by the city to the street line. The lot portion of the house sewer is usually put in by the plumber, but all under city inspection. We have found that in street mains 10 feet in depth or over that T junctions laid on the back with stand pipes carried straight up, are preferable to the Y junctions, as the house sewer can then be carried out to the main on its ordinary grade, and connected with stand pipe by a T junction. When bends are used to make connection with the main, it is important to see that they have not become contracted or flattened in burning.

STOPPAGES IN HOUSE SEWERS.

These generally occur at the junction with the main, which formerly had commonly been made with a bend, and are usually caused by foreign substances from the buildings having been allowed to enter the sewer.

In two or three instances stoppages have occurred from the roots of trees having forced themselves through the joints. We have found that the roots of soft maple, elm, poplar, and willow are inclined to follow the sewer on account of the dampness, and will work through any joint not well cemented. When even almost invisible root fibres once find an entrance into the sewer, they will spread rapidly and soon completely fill the pipe.

One 9 inch sewer which was laid in a shallow trench, became completely blocked by the roots of trees, some of which stood forty feet from the sewer. If all joints are well made with good cement, the pipe being clean before the joint is made, there can be no trouble from this cause, and when it occurs the only remedy is to re-lay the pipes.

We have had on an average about fifteen stoppages per year and the cost of removal has been about \$4.25 each.

In the great majority of cases the cost of this work has been repaid to the city, the householders having been shown to be at fault.

INSPECTION.

The more important manholes are inspected every fortnight, and the iron gratings placed at the foot of the sewers from the Ontario Institution for the Blind, the Hospital, and the Grand Trunk Railway station are cleaned every two weeks. The flush-tanks are inspected

monthly, and the whole system twice a year.

RECORDS.

Plumbing plans are filed by licensed plumbers, and the plumbing tested before connection is allowed with the sewers, a fee of \$2.00 being paid with each plan. A working and final plan of each sewer is prepared.

Permits are issued for each connection with the sewer, and a plan of each connection entered in a specially prepared book. Complete plans and records are kept of all work done.

MAINTENANCE ACCOUNT.

	1893	1894	1895
	\$	\$	\$
Stoppage in house sewers.....	30	25	33
Flushing with the plunger.....	127	97	68
Repairs.....	128	130	144
General maintenance.....	225	223	224
	510	475	469

About 50 per cent. of the cost of flushing and repairs is chargeable to the Clarence Street sewer.

The rate of wages paid has been \$1.60 for a working foreman, and \$1.25 per day for the men.

The prices given in the above table do not include any allowance for engineering or inspection.

THE PURIFICATION OF SEWAGE.

The following is a summary of the conclusions arrived at as the result of experimental investigations by the State Board of Health of Massachusetts upon the Purification of Sewage:

1. The suspended matters of sewage (sludge) can be mechanically withheld by straining slowly through suitable material.

2. The filth accumulated by this straining material can be destroyed, and the straining medium restored to a clean condition by mere aeration.

3. The successive alternate operations of fouling and cleansing can be carried on indefinitely without renewal of the straining material.

4. The purification obtained by this straining process practically equals that accomplished by chemical precipitation, and is sufficient to admit of discharge into any considerable body of water not used as a source of domestic supply, or for manufacturing purposes requiring great purity.

5. Such filters can be maintained in constant and efficient operation by suitable aeration.

6. The erection of a plant capable of purifying large volumes of sewage upon a relatively small area calls for no costly construction. Repairs and renewals are merely nominal. The attendance required is but slight. There is no outlay for chemicals, etc. The only expense of mechanical operation is the driving of the blower or air-compressor.

7. The process admits of wide variation in the selection of filtering material, and nearly every community can find in its local resources something suitable for the purpose.

HISTORY OF HOUSE NUMBERING.

Berlin is preparing to fete the hundredth birthday of the house number. In the London and Paris of a century ago ciphered houses did not exist. The coat of arms, the house name or the sign board were the only indications to guide our ancestors' wandering feet by day or dark. Berlin began to number houses in 1795. Starting from the Bradenburg gate, the Prussian ediles counted straight on to infinity, neither beginning afresh with fresh streets nor numbering the houses by odds and evens. Vienna adopted the latter reform in 1803, and Paris followed in 1805.