

MUNICIPAL DEPARTMENT

THE CHEMICAL SYSTEM OF SEWAGE DISPOSAL.*

After stating the importance of pure water and good sewage and their intimate connection with each other, and also touching lightly on early and primitive methods of securing them, Mr. Wisner discussed the Chicago Drainage Canal, which he said was decided upon by a commission of experts as the only means of effectually ridding that big city of its excrement and converting it into a fit place of habitation. It has cost millions and has given rise to much national and international discussion because of its presumed effect on the lake levels, but it is still a question whether the scheme that has been pushed with so much vigor will give the best results obtainable by any possible means.

This commission decided against the system of disposing of sewage by chemical precipitation, estimating that it would cost Chicago \$35,000,000 for the plant and \$2,000,000 a year to run it. When it is considered that in London, with more than 4,000,000 inhabitants, the sewage is being treated by the chemical process at an annual cost of only \$755,000, with a plant costing, including six ships for transporting sludge, only \$4,729,000, this estimate seems excessive. The commission says, furthermore, "that to discharge the sewage from cities into comparatively large bodies of water is often the best method for its disposal." Considered merely as a means of getting rid of sewage, this opinion might be admissible, but since such bodies of water are the sources from which water for domestic purposes must be obtained, the method cannot be too strongly condemned.

There is scarcely a city on the lakes that is not in danger of epidemic from the bad effects of such a system. Excluding, therefore, the method of water disposal, there remain practically only two methods of sewage disposal which have given satisfactory results—land disposal and chemical precipitation. In Europe the former has met with popular favor where there has been land suitable for filtration beds.

At Berlin, previous to 1870, the river Spree, which flows through the heart of the city, was said to have been as filthy as the Chicago and Cuyahoga rivers are now, but since the completion of the disposal works nobody would suspect that the filth of a city of 2,000,000 people was being discharged into it. The country surrounding Berlin consists of sandy land, in every way suitable for sewage treatment. The city secured 11,000 acres and

prepared it with sub-drainage, so that the filtered water from the sewage irrigating ditches is conducted back to the river in a comparatively pure condition. In Paris the same method is employed. In the London watershed there are 39 towns and cities that dispose of their sewage in this way, the effluent going into the Thames, but it may be stated here that all water from this river delivered to consumers is carefully filtered first. In London proper the cost of disposing of sewage by chemicals is 20 cents per capita, whereas in good American practice such expense is rarely less than 50 cents. This is largely due to the comparatively small amount of chemicals used to produce the resultant effluent free from odor and organic matter in suspension.

In modern practice in Europe and the United States the chemical tanks are made long and narrow and the flow continuous, thus allowing any desired amount of chemicals to thoroughly mix in with the sewage before entering the tanks. In these tanks 99 per cent. of the organic matter in suspension and 60 per cent. of that in solution may be precipitated. The effluent is odorless and the works may be located wherever most convenient without creating a nuisance. The method in this regard has a great advantage over that of land disposal, for the reason that in warm weather the filtration areas of the latter system have but little attraction for any one not suffering from the last stages of catarrh.

Where sewage is discharged into an open lake or river that part of the organic matter which is carried in solution is soon oxidized by coming in contact with the air and the oxygen in the water. The organic matter carried in suspension, however, gradually settles to the bottom of the stream and there decomposes in the absence of air, causing the entire body of water to become foul. At Chicago this deposit of filth is often from 2 to 5 feet deep, and the whole river is so saturated that no form of life is known to exist in it above the Clark street bridge.

The Cuyahoga river is equally as bad, to remedy which it is now proposed to flush it with water pumped from Lake Erie, a plan which is certain to completely pollute the only source of water supply for the city.

In Detroit the sewage is discharged into a river having a flow of 225,000 cubic feet of water per second, yet the pollution is such that the water is entirely unfit for domestic purposes below the city. The water works has been moved once 3 miles up stream to get above the sewage contamination, but the city has already outrun that limit, and the question is being agitated whether the sewage from Grosse Pointe and the floating population on Lake St. Clair and the population along the St Clair river may not be responsible for much of the disease in the city.

The great difficulty in adapting the chemical system to the older cities is the peculiar construction of the sewers for storm and sewage discharge; they would have to be remodeled so as to

separate the storm water before the chemical method could be economically applied. An estimate of cost for disposal works for any city where sewers have already been constructed would have to be based on the change needed in the system, the amount of sewage to be treated in the plant, the cost for construction and maintenance and for disposal of the sludge.

Mr. Wisner closed his paper with a recitation of the number of cities that have been compelled by the courts to find other methods of disposing of their sewage than by dumping it into rivers and lakes, and with a description of the chemical disposal plant which was built for the Wayne County buildings under his direction.

This plant treats from 40,000 to 80,000 gallons per day and cost about \$10,000. The sewage entering the building from the grounds passes through screens and then into the mixing channel, where it is joined by the lime and alum in solution. Along the channel are vertical wings or deflectors to make cross currents and thus mix the sewage and chemicals. The lime is slaked on the upper floor of this house. The three precipitation tanks are at right angles and immediately adjacent to the mixing channel. The sewage after leaving the mixing channels flows through precipitation tank No. 1 and enters tank No. 2 at the further end of the building over a weir and down a flume to the bottom, breaking up surface flow. Through tank No. 2 the sewage flows into tank No. 3, through a float valve. It finally is discharged into the open air at the farther end of tank No. 3, where, after passing over a set of aerating steps on the outfall, it enters a brook. The tanks are 75 feet long by 4½ feet wide, and drain into a sludge well, and may each be thrown out of service for cleaning without disabling the other two. The cost of running and furnishing chemicals is estimated at about 80 cents per capita per annum for a population of 800.

LEGAL DECISIONS AFFECTING MUNICIPALITIES.

PAISLEY V. CORPORATION OF CHILLIWACK.—This was an appeal by the plaintiff from the judgment of Judge Spinks. The case was tried at the County Court, Chilliwack, B. C., and the plaintiff was non-suited. One Ennis had done some work for the respondents under an alleged contract, which was not under seal, and had given the appellants an order on the respondents for payment of the monies alleged to be due to him from the municipality. Subsequently, however, the municipality paid the money to another person. Paisley then brought the action. Held, by the Supreme Court of British Columbia, that the contract must be under seal, and that the language of sec. 82 in the Municipality Act of 1892, is imperative, not directory.

The city assessors' figures show the population of Ottawa to be \$51,540, an increase of 1,866 over last year. The valuation has gone up by \$958,015, and is now \$22,079,735. The increase in real estate is \$795,415, and in personal property \$162,000. The public school supporters are assessed on \$16,467,110, and the separate school supporters on \$5,577,910.

* Abstract of paper by George Y. Wisner, M. Am. Soc. C. E., of Detroit, Mich., read before the Engineering Society of Detroit, August 22, 1896