

MUNICIPAL DEPARTMENT

THE DISPOSAL OF SEWAGE AT OTTAWA.

Mr. Georges Janin, C.E., a noted French engineer formerly of the Noted Corps des Pouts et Chaussées, has submitted a report to the City Council on the best method to be adopted for disposing of the sewage of the city of Ottawa, of which the following is a synopsis:

Last autumn, after the rejection by popular vote of certain plans for the drainage of Ottawa, certain prominent citizens—aware that I had the experience in the matter of sewage disposal in Paris, France, and elsewhere—honored me with a request that I should submit a criticism of the methods which obtained in the large cities of the world, and give my opinion as to the best available system for this city.

In accordance with this request I have carefully studied the existing drains, as well as the various schemes already advanced, and especially those submitted to the city council on the 26th December, 1893, and on the 28th August, 1896.

I have examined the topography of the city and its surroundings, and after careful consideration I have come to the conclusion that any scheme, the object of which would be to place the outlet of the sewers in the river above the city or in any part of the city within the city limits, must be rejected as being absolutely opposed to sanitary laws; and that impure waters must by following the natural declivity, be conducted to the east of the city, and outside of its limits. The best site for the discharge of the sewers would be at the eastern end of Rockcliffe heights, where the outlet of Mackay lake discharges into the river.

But while this site is suitable from an economical point of view by giving to the main sewer the most logical and cheapest route from the western end of the city; while it answers to a certain extent the sanitary requirements by carrying impure waters outside of the city limits, still it consecrates the dangerous principle of the pollution of the river, a principle so absolutely adverse to public health that it has been condemned by all scientific men who have dealt with hygienic questions, and by all engineers who have made a specialty of the subject of sewage disposal. Beyond this, there is a growing consciousness of the danger incurred by making the source of supply for one city the receptacle of the sewage of another. This danger is so great that on the report of the general board of health of England, presented after a succession of epidemics attributed to the pollutions of the stream by such scientists as Dr. Frankland, Prof. Rawlinson, Dr. Smith, Clare Jewel, and others, the British Parliament in 1876 passed a law entitled "The Rivers Pollution Prevention Act," which strictly prohibits the discharge of impure waters into the rivers. Under this law the local government boards were induced to adopt various systems, which I intend to examine hereafter, in order to eliminate the noxious principle of the sewage waters. The example of England was soon followed by France, Germany and other European nations, and there can be no doubt that it is only a question of a few years before the practical acknowledgement of this principle will be adopted by all civilized countries.

The composition of sewage waters necessarily varies from many causes. It will be sufficient here to quote the words of Mr. de Freycinet, chief engineer of roads and bridges and ex-minister of public works in France: "Sewage waters are the most powerful and the most general of all the causes of contamination (of drinking supplies), for they carry all the impurities which human activity generates, from the waste products of manufacture to the refuse of the dwelling house.

SEWAGE AND SAWDUST.

The solid organic substances of sewage deposit themselves with the mineral matters in the order of their weight and size, and form banks of mud, which when exposed to air and sun by the receding of the water undergo rapid decomposition. But it is not necessary that exposure to air should take place, for even under the water a very active putrefaction occurs, and this would be especially observable in a river like Ottawa, where banks of sawdust exist on the bottom. The soluble organic matters are taken into solution by the river and pollute it. The effect of all this is to render the water of the river a suitable breeding place for all sorts of bacteria which find entrance to it. These may be, and no doubt are, for the most part harmless, but disease germs find as favorable a medium of culture in it, and hence the greatest source of danger, for it is evidently quite impossible in a large city to prevent the entrance of disease germs (typhoid, cholera, diphtheria, anthrax, etc.) into the sewage. All natural matters contain oxygen in solution. The organic matters from sewage remove this oxygen, and with its removal the water becomes more than ever fitted to the development and nutrition of many of the most dangerous micro-organisms.

The methods in use for destroying the harmfulness of sewage may be classified as follows:

1. Process of separation, i.e., isolating the solid matter from dwellings, etc., from what is properly known as drain water.
2. Mechanical processes, such as deposition and filtering.
3. Chemical processes, i.e., employment of reagents with the view of precipitating the impurities.
4. Soil purification processes.

The separation system must be condemned as involving great cost, and being far from satisfactory in a hygienic sense.

The filtration process has been thoroughly tried at Birmingham, England, and elsewhere, and has been abandoned.

Chemical processes for the purpose of rendering sewage harmless are very numerous, and it would take too much space were I to attempt to describe them in detail. Suffice to say that they are all falling into disfavor and in most cases have been abandoned after trial.

Soil purification of sewage water is the method now in favor in England, Germany and France. In the last named country I had the honor of co-operating with the learned engineer, Durand-Claye and his emulator, Mr. Masson, inspector of the drainage of Paris. To this process I beg leave to call your attention. It consists in the filtration of the sewage waters through a permeable soil, affording a sufficient thickness and all facilities for the outflow of the purified waters, either by a sufficient slope of the previous stratum, or by artificial drainage. That the soil is the most perfect purifier of waters charged with organic matters is proved, first: by the organic purity of spring waters; second, by careful experiments with impure waters, which are subjected to analysis before and after percolation through the soil. It must suffice here merely to make the following statement. Details are given in my larger report.

The first 8 to 12 inches of earth acts as a mechanical filter of a most efficient type. In the next stratum occurs an oxidation of the organic matter by the oxygen in the soil, aided by living organisms normally present in it. A column of three feet of arable soil suffices to completely purify the most objectionable sewage water and to render it quite free from germs of disease, although these may have been plentifully present in it initially. If the soil employed be first treated with chloroform and thus sterilized by killing the bacteria in it, the soil so sterilized no longer acts as an efficient filter, showing that the presence of lower forms of life in it is actually necessary to the efficiency of the earth filter. Finally, the soil is itself highly enriched by the organic matter which it takes from the sewage, and thus an economical value is given to the method of soil purification. Many analyses of vegetables grown on such soil have been made, and in no case has any diseased or unsafe food product resulted from the use of these fields as market gardens. This system is in use in 150 towns and cities in Great Britain, notably at Edinburgh, Merton, Barking, Wrexham, etc. Also in France at Paris, Reims, Dijon, Toulon, Marseilles, etc., and in Germany at Berlin, Dauszig, Breslau, etc.

Finally, I believe that in advocating the establishment of a sewage farm I am recommending the only method by which the non-pollution of the river can be effected, the health of the citizens guaranteed and the convenience of water carriage of sewage obtained.

I have elaborated the outlines of a scheme of drainage of the city of Ottawa, arranged with a view to the establishment of a system of purification through the soil; and I hope that you will do me the honor of utilizing my service, and my experience.

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