THE

Sanitary Review

SEWERAGE, SEWAGE DISPOSAL, WATER SUPPLY AND WATER PURIFICATION

SEWER GASES AND DISEASE INFECTION.

We publish in this issue the results of experiments and conclusions by Prof. C. E. A. Winslow, being an examination of the possibilities of disease infection being carried by means of sewer air.

Generally speaking, bacteriologists are extremely skeptical as to the theory that zymotic disease germs leave the body of running sewage, are transmitted to the supernatant air and are carried by that air either up and through vent-pipes or by plumbing defects into buildings.

Certainly all the experiments made in this connection go to prove that the danger of bacterial infection from drain air is but slight. Lately, however, Major W. H. Horrocks, of the English Army Medical Corps, has reported a series of experiments on sewer air to the Royal Society at London. These experiments point to the conclusion that where splashing occurs, bacteria may be thrown into the atmosphere and carried by a current of air. In the natural conditions which exist, however, in a drainage system Professor Winslow demonstrates that the danger of infection from this source is even less than that from drinking the water supplied to New York citizens, which invariably shows the presence of B. coli in ten cubic centimetres.

The conclusions, which we publish, will be read with interest by sanitarians, and apart from the possibility of the direct transmission of sewer bacteria to air, we would call attention to the final paragraph, noting the general possibility of gases from decomposing matter having a predisposing influence upon the body, which may cause it more easily to succumb to specific germs.

The general knowledge that epidemics are not directly traceable to sewer air emanations has brought about a more crucial examination of the role played by flies in carrying infection from exposed sewage collections and the ultimate destiny of the sewage with reference to its possible contact with food supply, especially with regard to water and milk.

Note.—The articles appearing in this Review entitled "Sewage Disposal," the first part of which has already been published under the heading "Removing of Solids," the second portion being headed "Removal of Putrescibility," are specially prepared for this Journal by Mr. T. Aird Murray, C.E. We make this announcement as portions of the articles have been reproduced in several technical papers without any recognition of the same. The author reserves the right to publish the articles in book form.

SEWAGE DISPOSAL—REMOVAL OF PUTRESCIBILITY.

CHAPTER III.

Land Intermittent Filtration.

"There can be no doubt that, where the soil is suitable and the area of land sufficient, the organic matters in sewage can be thoroughly oxidised by land treatment." (See fifth Report of the Royal Commission on Sewage Disposal, par. 192, page 137.)

The truth of the above announcement must certainly be admitted; it remains simply a question of suitability of the land and quantity available. The knowledge that sewage properly applied to land will give high purification results is by no means new. We have a capital example of efficient land intermittent filtration in Canada at Berlin, Ont. Here much difficulty was at first experienced in solving the problem of sewage disposal. The sewage of Berlin is exceptionally strong, and rendered complex in character by a large proportion of trade waste effluents. Before any definite scheme was decided upon, several experiments were made with reference to both contact and percolating biological treatment under the auspices of the Ontario Provincial Board of Health. Although several of the experiments gave fair results, considering the characteristic strength of the sewage and the nature and quality of the experiments made, there being a large area of sandy land in the neighborhood, land intermittent filtration was finally resolved upon, preceded, of course, by preliminary removal of solids in settling tanks. These works have continued to give splendid results, and prove conclusively that, with a climate such as exists in South Ontario, land intermittent filtration is a satisfactory method, granted the suitable character and amount of available land.

Before discussing the nature of the non-putrescible effluent rendered by land intermittent filtration and comparing the method and its results with those of artificial biological filtration, it will be well to examine generally what really constitutes a suitable character of land, as well as the area required.

There is no doubt but that efficiency is directly proportionate to porosity, given a sufficient depth of porous soil. Peat land being practically non-porous, is useless, while strong clay is equally so, while the best results are to be obtained by a land consisting almost totally of sand as at Berlin (Ont.) The British Royal Commission publish the result of systematic observations and investigations of land treatment at a large number of so-called sewage farms. The Commission obtained the best results at Nottingham (Eng.), where the soil is a light sand loam and gravel overlying gravel and sand. Here over 10,000 gallons per day per acre are treated, the percentage chemical purification representing a removal of putrescibility of 99 per cent., calculated on oxygen absorbed from permanganate at 26.7° C. (80° F.) in four hours. At South Norwood, where the land consisted of clay soil resting on London clay, only 4,000 gallons per acre per day were treated, and a purification on the above basis of only 81 per cent. was obtained as against 99 per cent. at Nottingham.

The fact that the amount of purification is relative to the character of the soil, led the Massachusetts Board of Health, in the first instance to make the valuable experiments referred to in the last chapter, and prove just what may be done with the soil in that State in the case of land intermittent filtration.

There is no doubt that one of the chief reasons for the generally acknowledged failure of land sewage treatment exists in the past tendency to bring into use any sort of land independent of its suitability. The result of this tendency is extremely unfortunate, and is responsible for a prevailing conceit that artificial biological filtration is in every case superior to land treatment. It is very necessary that this