THE

# Sanitary Review

SEWERAGE, SEWAGE DISPOSAL, WATER SUPPLY AND WATER PURIFICATION

## TREATMENT OF WATERS POLLUTED BY VEGETABLE GROWTHS.

Recently we had the question put to us: "Whether would you advise filtration or sterilization with a particular water?" It turned out that the particular water was entirely free from pathogenic bacteria; that, in fact, the source (a small lake) was so situated that any chance of pathogenic contamination was out of the question.

The water, however, on analysis showed an excess of organic matter, the result of vegetable growths. The taste and odor of the water was extremely disagreeable, while the color was decidedly brown. Turbidity, however, was practically nil, there being little or no suspended matter.

Waters of this character are commonly met with, and are generally associated with ponds or small lakes surrounded with growth, in which the water is not subject to rapid change as between inlet and outlet.

Collected water, the result of seepage from forest surfaces, or springs forming small lakes, where the water has to pass through deep layers of decaying vegetable growth, are all marked by the above objectionable characteristics. While such water is incapable of producing any specific disease, it forms a ready medium for the growth of disease germs if admitted.

The characteristic brown color of the water is due to tannin; this also gives the astringent taste. The disagreeable odor and taste are the results of the decomposition of the vegetable growth.

Allen Hazen in "Filtration of Public Water Supplies," page 112, states: "In the removal of tastes and odors from pond or reservoir waters which are not muddy, but which are subject to the growths of low forms of plants, which either by their growth or decomposition impart to the water disagreeable tastes and odors, intermittent filtration may have a distinct advantage. In such cases there is often an excess of organic matter to be disposed of by oxidation."

The correct reply to the question asked of us is neither filtration in the ordinary meaning of the term, nor sterilization.

Filtration, in the sense of straining, is quite unnecessary, as there is practically no suspended matter requiring removal. Sterilization, in the sense of destroying disease germs, is also quite unnecessary, as there are no disease germs to destroy. The treatment required consists of:—

(a) Aeration to remove the gases of decomposition absorbed by the water.

(b) Contact with some material which will absorb the color.

(c) Nitrification and oxidation, in order to reduce the excess of dissolved organic matter.

The processes, (a), (b), and (c), can be accomplished effectually and cheaply in a combined plant consisting, first, of a method of spraying the water over the surface of a filter constructed not of sand for straining purposes, but of rough material of about ½-inch broken stone, with a top layer of about 1 ft. 6 in. of charcoal. Spraying the water will liberate the gases. The charcoal will reduce the color due to tannin, while the rough filtering material will provide a nitrifying bed, similar to that used for purification of sewage.

If the above process be carried out with proper attention given to the relation between the volume of water treated and the amount of nitrifying material, complete success can be obtained, even with very highly algæ-polluted waters.

The important point to observe in connection with the nitrifying bed is that of efficient underdrainage, and further, that the water is never delivered at a rate sufficient to saturate the material, but only at a rate allowing the water to dribble through the material in contact with air in its passage.

We have endeavored to answer the above question fully, as there appears to be a tendency at present to pay particular attention to the respective merits of sand filtration and sterilization without reference to other processes, which are just as important with certain classes of water.

Sand filtration and filtration followed by sterilization may be necessary with many classes of water contaminated with sewage when the object is the removal of disease germs. In Canada, however, we have to depend upon many sources of supply, which cannot possibly be contaminated with sewage, but, on the other hand, are charged with objectionable matter, the removal of which does not depend upon either sand filtration or sterilization.

## SOME NOTES ON THE SEPARATION OF SOLIDS FROM SEWAGE AND WASTE LIQUORS.*

By James P. Norrington.

In the fifth report of the Royal Commission on Sewage Disposal it is clearly demonstrated that of all the processes for the treatment of sewage which are commonly in use to-day that which costs the least in upkeep has for its preliminary process quiescent settlement without chemicals. On the other hand, the initial cost of the tanks required is higher than all but one of the five preliminary processes compared in the report. The area of filter required, however, to follow the preliminary quiescent settlement tanks is found, as a rule, to be considerably less than with most

* Read before the Association of Municipal and County Engineers, England.