THE

Sanitary Review

SEWERAGE, SEWAGE DISPOSAL, WATER SUPPLY AND WATER PURIFICATION

VALUABLE PROCESSES FOR THE PURIFICATION OF SEWAGE.

We have just received from Dr. Elzear Pelletier, secretary of the Board of Health of the Province of Quebec, a copy of the address he delivered at Sherbrooke last August on the above subject. Dr. Pelletier has taken the matter up in a very thorough manner, and has outlined the various methods of purification. Commencing with methods suitable for small quantities, he gives the various methods employed both for preliminary treatment and final treatment. He mentions broad irrigation, intermittent filtration, precipitation, biological purification and the treatment of storm waters.

Dr. Pelletier has issued his address in pamphlet form, and it will be found very interesting to those having to deal with these problems.

STANDARDS OF SEWAGE EFFLUENT.

Mr. John C. Thresh, County Medical Health Officer for Essex, England, in an address delivered before the Association of Managers of Sewage Disposal Works, outlines the standards agreed upon in connection with the pouring of sewage effluent into the Thames River. They are as follows:—

It was found that a single contact bed produced an effluent up to this standard:—

(1) The effluent shall be free from putrid odor, and have no tendency to become putrid. (This tendency to be determined by the three-minute oxygen absorbed test, applied to an average sample, first, immediately after collection; and secondly, after keeping excluded from air for five days at 98 deg. Fahr.) Should the effluent at the end of five days have developed an offensive odor, and the oxygen absorbed by the incubated effluent exceed that absorbed by the fresh effluent, it shall be held to be unsatisfactory, and not to conform to this requirement.

(2) The effluent upon analysis shall conform to not less than three of the following requirements: (a) The suspended matter shall not exceed 3 grains per gallon; (b) the albuminoid ammonia shall not exceed .15 grain per gallon; (c) the oxygen absorbed in three hours shall not exceed 1.5 grains per gallon; (d) the nitrogen in nitrites and nitrates shall be at least .25 grain per gallon.

In another English town the following standard was required by the Government Board:—

(a) Each gallon shall not contain more than 4 grains of solid matter in suspension.

(b) The effluent shall have no offensive odor, and when kept for three days at a temperature of 98 deg. Fahr. in a full-stoppered bottle shall not develop a putrefactive odor.

(c) The impurity figure, as ascertained by the method described in these regulations, shall not exceed 16.

THE DIGBY-SHENTON METHOD OF PRODUCING ELECTROLYTIC CHLORINE.

In this issue we publish a contribution from Mr. C. H. Shenton of Westminster, England, re "Disinfection of Sewage."

Mr. Shenton takes objection to certain statements and conclusions made in Phelps' recent valuable report on the experiments recently made in chlorine disinfection, reviewed at some length in The Canadian Engineer.

Phelps claims that hypochlorites electrically obtained are inferior to chemical hypochlorites.

In view of the point raised by Shenton we quote the portion of Phelps' report dealing with the question as follows:—

Numerous processes of the first kind have been developed, of which the Hermite and Woolf processes have already been mentioned. The commercial preparation, called "Chloros," is made in this way. The most recent, and probably the most improved, cell of this type has recently been described by Digby and Shenton. The reaction by which the hypochlorite is produced from chlorine and caustic soda in cold dilute solution is:

(1) $2NaOH + 2Cl = NaOCl + NaCl + H_2O$.

In the paper just cited Digby proposes the reaction,

(2) $NaOH + Cl = NaOCl + H$.

He bases his view on the observation that the electrochemical efficiency of the cell is over 50 per cent. Aside from the obvious impossibility that a reaction can produce at one and at the same time nascent hydrogen and a strong oxidizing agent, it is apparent that reaction (1) if it were carried out completely, would yield a product containing not 50, but 100 per cent. of the available chlorine initially present. The conception that this reaction represents a loss of half the available chlorine is due apparently to a mistaken idea of the term available chlorine, which, as has been explained on page 18, is really a misnomer. The fact is that the oxidizing power, or the available chlorine as ordinarily determined, of the products of reaction (1) is equivalent to twice the chlorine of the hypochlorite, or to the total chlorine present. There is, therefore, no apparent basis for the reaction proposed by Shenton and Digby, which would yield twice as much available chlorine as the amount allowed by the law of electro-chemical equivalents. The reactions of equation (1) are complete only in cold dilute solutions. If the solution is hot, or if it is concentrated, chlorates and perchlorates are produced simultaneously. It is for this reason that the disinfectant value of these two sets of compounds was determined in an earlier part of the present investigation. It was found that they possess practically no disinfecting power, and that their production in the cell represents a loss of energy. Economy in electric current demands strong salt solutions and high current densities with consequent heating of the electrolyte. Electrical efficiency is, therefore, opposed to chemical efficiency, and the problem in designing cells of this type is to balance the two efficien-