

# THE Sanitary Review

SEWERAGE, SEWAGE DISPOSAL, WATER SUPPLY AND  
WATER PURIFICATION

## IS PURIFICATION OF WATER BY STERILIZATION A DREAM?

Mr. Allen Hazen, of New York, the other week at a meeting of the Canadian Society of Civil Engineers at Toronto, in answer to a question referring to ozonization of water, made answer that, to his mind, the question of sterilizing water was a dream.

He admitted that he had no experience with ozone treatment in practice, although he was conversant with a few experiments.

He stated that a "man" called at his office lately in connection with some work he had in hand for a client and offered to purify water by ozone, giving almost any kind of guarantee. Being curious as to the exact kind of guarantee, he asked for a definition, and was informed that the guarantee consisted of "killing all the pathogenic germs in the water." Mr. Hazen, believing that there were no pathogenic germs in the water, refused the guarantee.

If ozonization of water or sterilization meant dealing with a water whose only impurity lay in the presence of pathogenic germs, one could understand the value of any such guarantee. But, as a matter of fact, purification of water generally means the removal of many things from the water which are not germs, and which are possibly sterile to commence with.

At the time when the above statement was made by Mr. Hazen, Dr. Sheard, Medical Health Officer of Toronto, stated that he had now been examining Lake Ontario water for many years, and had never yet succeeded in discovering any pathogenic germs in the water.

Now it occurs to us that if we have men who are willing to offer guarantees of the above nature, it will be as well to have a definition of pathogenic germs. Turning to Gilbert E. Brooke's "Essentials of Sanitary Science," we note a definition on page 186: "Bacteria which cause disease in the higher animals or man are dubbed 'pathogenic.' The pathogenic germ which is most feared in our water or milk supply is certainly the 'typhoid bacillus'; and this bacillus is seldom, and one may say, never found in water, no matter how intense the examination may be.

Rickards in the "Quarterly Bulletin, Ohio State Board of Health" for July-September, this year, states:—

"During the last few months, when typhoid has been very prevalent, especially in the rural districts, the hygienic laboratories have been called upon to make more examinations of private water supplies than ever before. Perhaps a third or more of the requests for examinations of water from private sources because of typhoid in the family or neighborhood have been, not

requests for sanitary water analyses, but for an examination for the typhoid bacillus itself. As all bacteriologists are unanimously of the opinion that such examinations are useless, we have invariably refused to make them, and have instead, where the circumstances warranted it, made chemical and bacteriological examinations. The former tests show the amount of organic matter present; the latter show us the total number of bacteria of all kinds, and a further test is made for the presence of bacillus coli, a normal inhabitant of the intestines of man and animals. This organism, which is always found in countless numbers in all human and animal feces, is almost invariably confounded by the newspapers with the typhoid bacillus, and this may account for the widespread impression that we examine for the latter."

If, then, it is next to useless to examine water for pathogenic germs, we must agree with Mr. Hazen that the guarantee offered was of little value.

Is ozonization a dream? Well, if it is, we must confess that there are a lot of very eminent scientific men in the world at present walking in their sleep. Whether it be possible or not to discover pathogenic germs in water, we know that there are occasions when they are present, and we know that there are waters which are so contaminated with sewage that the risk of their presence is constant. The bacillus coli may only be an index to sewage contamination, but we know that the typhoid infection is carried by sewage, and that water is infected thereby. We know that filtration, if properly worked, will remove 99 per cent. of the bacteria in the raw water, and we, therefore, know that for every hundred bacteria in the raw water, we may be left with one. Therefore, we know that water containing 500,000 bacteria per c.c., as some waters do, when filtered will still contain 5,000 bacteria per c.c.

Now, in some places this is the only possible water that people can get to drink, water which contains 50 times more bacteria than is allowed for by the German standard of purity. What are these people to do?

It is all very well to say that sterilization is a dream. But is it? If it can be shown that with waters such as above a further reduction after filtration of another 99 per cent. can be made, leaving 50 bacteria per c.c., then sterilization will prove a most useful adjunct to filtration, more especially for such waters which are known to be sewage contaminated, and contain an abnormal high bacterial count to begin with.

The fact that large sums of money are being spent in Europe in adding sterilizing plants to the present filtration systems proves that the problem has become more real than any dream, and it cannot be dismissed from the question of water purification by any such offhand statement.