THE
Sanitary Review
SEWERAGE, SEWAGE DISPOSAL, WATER SUPPLY AND WATER PURIFICATION

THE TOWN OF LINDSAY AND ITS WATER PROBLEM.

According to reports which reach us, the town of Lindsay has no water problem.

"By faith you can remove mountains"; and by faith the citizens of Lindsay have solved their water problem.

Water filtration has not solved the problem, and by no means has ozone touched it.

The water in its raw state is a fair sample of the general character of water met with in sluggish Ontario streams, which abound with vegetable growth, with the exception that this particular water is very hard—200 parts in 1,000,000 (or 14 degrees of hardness).

The excess in hardness points to spring supply, and compares generally with the spring waters which flow from the gravel beds rising from the north shores of Lake Ontario.

The turbidity is low, judging by the amount of total solids, viz., .021 per 1,000,000. The Provincial Board of Health does not determine between organic and inorganic solids, and suspended and soluble solids; but it is apparent that there is little apart from weedy matter which requires straining or filtering from this water.

The organic content in solution is extremely high, and the water may be said to be almost putrescible. The oxygen consumed test (the measure of organic matter in solution), viz., 5-6, taken with the excessive content of albuminoid ammonia, point to grave suspicion as to the quality of this water. The oxygen consumed test is generally applied to treated sewage effluents as a test of further tendency to putrefaction, and the Royal Commission on Sewage Disposal advise a standard for sewage effluents of five parts in 1,000,000. It is, therefore, apparent that the ozonized Lindsay water, which contains 5-6 parts, does not come up to even this standard for sewage effluents.

The above test is the measurement of the amount of oxygen required to oxidize the vegetable matter contained. It means that there is not a sufficient amount of available oxygen in the water, and that it has to absorb a certain amount of oxygen from the atmosphere in order to render the organic matter inorganic. Consequently, the more oxygen that a water can absorb, the greater the organic impurity.

A useful test which the Board might have made would have been the "methylene blue test," which would have given the time necessary for the water to absorb the whole of its contained oxygen, when putrefaction would commence if sufficient oxygen was not available to complete non-putrescibility.

The content of .238 albuminoid ammonia is in excess of the amount generally permissible in good water, which should not exceed, other things being equal, .1 part. The comparatively small amount of nitrates, viz., .238, compared with a permissible amount of 15 parts in 1,000,000, prove that little oxidation takes place in the water itself, and that it is fairly depleted of available oxygen.

In judging of the purity or otherwise of a water it must be understood that the chemical contents have little significance, except when considered in relation to one another, and all the factors in the case, such as source of supply, character of surface of land, strata and general environment.

The amount of chlorine, for instance, 1.5 parts in 1,000,000, conveys no information whatever, unless we also know the normal chlorine content in the water. Chlorine is always present in solution in small quantities. It may be derived from salts in the strata, brine springs, or exist in sea water in the form of chloride of sodium (common salt). Sea water contains 28,000 parts of chlorine per 1,000,000, and this, of course, does not prove sewage pollution. Fifty parts in 1,000,000 of chlorine may not be sufficient to condemn a drinking water. On the other hand, if the chlorine content is in excess of the normal, and is accompanied with organic matter and excess of free and albuminoid ammonia, then the water is subject to grave suspicion.

It is, however, when we come to consider the chemical analysis of the Lindsay water in its relation to the bacteriological that we do not know whether to admire or deplore the faith of this simple people. "B. coli," an intestinal type of bacteria, are generally found in the water, the raw water containing 60 per cent. positive results in cubic centimeter tests, the filtered water 41 per cent., and the ozonized water 37 per cent.

With 112 samples the average counts show 827 total bacteria per c.c. in the raw water, 577 in the filtered water, and 531 in the ozonized water, the percentage reduction being by filtration 30.23, by ozone 7.97, and the combined processes 35.78.

The tap water contains 528 bacteria per c.c., while the recognized standard for filtered water only allows 100 per c.c.

If the percentage reduction of bacteria had been even equal to that generally obtained in sewage treatment by sedimentation and percolating filters, viz., 80 per cent., the resultant number would have been 166 per c.c.

Reviewing the general character of the raw Lindsay water, taking into account the fact that the main chemical content is organic matter in solution and the evident pollution by intestinal bacteria, it is evident that we have a water which lends itself particularly to rough filtration and treatment by ozone or some other disinfectant. If the aspirators had performed the work required by them and ozone had actually come into complete contact with this water, there is no doubt but that the organic matter would have been burnt up, the bacteria destroyed and the color removed.

On the other hand, we find that the filters in themselves have been insufficient, and that practically no work has been done by ozone. Whereas the filters show 41 per cent. positive samples, the ozone shows 37 per cent.