streets, excreta and other kinds of contamination. In other words, there is one hundred parts in 100,000 to be dealt with. Now take Birmingham, which affords you one of the best existing types of practical sewage purification. There, the first thing they do is to run the sewage as slowly as possible when it gets to the outlet and decrease the flow so that the heavy stuff will settle down where they can remove it out frequently. They run it at the rate of about one cubic foot per minute. That will precipitate or allow about fifty per cent of the heavy stuff in the sewage to settle down. The liquid is then turned into a series of ditches, about three feet wide and eighteen inches deep, which occupy many acres. The liquid flows down and back through these furrows until more than one half of the organic matter has been rid of. That is the best they can do under that system. The dirty water remaining is then run into a septic tank in which the anaerobic germs further liquefy it. So that you have first what is known as the sedimentation stage, and second, what is known as the septic tank stage. You have got left nothing more than an amount of organic carbon, ammonia products, sulphuretted hydrogen and carbonic acid, and everything that results from decomposition. That is all they are doing generally in England today in the way of sewage treatment works. Then they allow the remaining liquid to go into the rivers because they have worked out all the stuff that creates a nuisance or is putrescible.

By the Chairman:

Q. All the nuisance —A. Yes, all the nuisance. That is all they are pretending to do over there. They do not remove the bacillus coli and the bacillus typhosus. If we wish to do that in Canada we have got to do something like what Doctor Houston does with London water. He sediments it and then runs it on the filter beds of sand. Down in Massachusetts the rate they get to is 150,000 gallons per acre per day. In this way they filter it until the affluent comes out as absolutely clear water with an excess of nitrates in it.

By Mr. Chabot:

Q. That is the sand filtration system?—A. That is the system of contact beds and sand filtration. That system has been adopted with a view of getting rid of any putrescent matter. That has been found to be too expensive and too slow and so they have made beds of scoria, or the slag from iron works. These beds are made of jagged pieces of scoria and are full of air spaces. The sewage is sprayed on to these beds and exposed to the air. It is then allowed to run over the scoria beds for four hours, and then intermits for say two hours. The oxygen in the air passes down into the beds and passes the bacteria that have gone into the beds from the septic tank, and the action of the bacteria and the oxygen upon the organic matter enables all the fermentable matter with many bacteria to be got rid of.

Now, what about sewage treatment in Toronto. In that city it would cost to treat a million gallons of sewage, we will say $10. Toronto pumps about 150 gallons of water per head per day. Take it at 100—that is twice the amount pumped at Berlin, and twice what I think is necessary—that would be 100 times 400,000 people. Therefore Toronto is pumping 40,000,000 gallons of water per day.

By Mr. Northrup:

Q. You must add 50 per cent to that. A. Yes, and that would make the total quantity of water pumped, 60,000,000 gallons. Now, under the best French, German or English system—and the wages paid over there are only about one-half of what are paid here—it costs them from $6 to $7 per million gallons. If we take the best we can do here—I am not sure that we could do it any cheaper than in the United States, but let us say the cost would be $10. That would be $600 a day and over $2,000,000 a year, which is not capital expenditure at all. What they have done in Toronto is this. They had intended honestly to deal with the sewage question up to