amined this general process very carefully, with extended tests, and concluded that it was impracticable, and extremely uneconomical.

Sanitary engineers to-day recognize that the only tried and effective means of treating a water supply to remove bacteria and turbidity, are sedimentation followed by slow sand or rapid filtration. A coagulant may be used at times with a slow sand filter, and is always required for the rapid filter. As a finishing process, chloride of lime is available to sterilize. Alone it serves as an emergency process. It does not affect the turbidity.

The situation in Cleveland is of great interest to me, as I represented Mr. Whipple for two months, in 1903. I have followed the situation since. At that time we felt that filtration would undoubtedly be required. How soon, we could not say, as the four-mile crib had only been in operation two or three months, and the sewage had not been intercepted, as originally planned. With the data available, Mr. Whipple reported that filtration would probably be required in a few years. Even if the sewage was removed from the Cuyahoga and the water front and discharged at a point some nine miles to the east of the crib, the crib would still be exposed to occasional pollution. Sewage is still flowing into the Cuyohoga in amount some 40 per cent. of the entire discharge.

Personally, I have never understood why the four-mile crib in Cleveland was located directly in front of the Cuyahoga, even though four miles off shore. Recent tests for the Lake Michigan Water Commission have shown that under favorable conditions a sewage stream may work out even ten miles from shore before finally dispersing. The Cleveland water supply is turbid at times, and is undoubted'y open to suspicion on the ground of bacterial pollution. I have not had a chance to examine the data at hand. I do feel, however, that if there is conflicting data, all hands should get together at once and urge the appointment of a disinterested expert, a sanitary engineer of high standing, to examine into the case in the light of developments since 1903, and report whether or not filtration is not immediately advisable, particularly as the sewage has not been diverted from the Cuyahoga, and may not be for some years to come.

In the meantime, systematic data should be collected daily, particularly on the turbidity of the lake water, as taken from the tunnel at Kirtland street pumping station, its temperature, alkalinity, and bacterial content, in order to have data on hand to help in determining the filter problem. Possibly Mr. Pratt proposes to do this. It would also be very easy for him, in connection with a sewage experiment station, to build two or three small experimental water filters, and try out slow sand and mechanical filters at Kirtland street, in order to have a line on their adaptation to Cleveland conditions.

About eight months ago, in a talk at Detroit, and later before the Illinois Water Supply Association I showed a diagram on which was plotted the typhoid fever death rate of Detroit, Toronto, Cleveland and Berlin. Toronto and Cleveland both have an uneven rate. Berlin has a rate extremely low and consistently so. (See diagram.) At that time I pointed out that the Cleveland supply was open to suspicion. From what I have heard during the last two days I am conwhether filtration is required, at once, and to make the Chloride of lime is an excellent emergency expedient to sterilize the

sterilize the water, and is now in use at the temporary plant. With the modern standards of sanitation it is essential that a city have a clear water supply, always free from tur-

bidity, and above suspicion of bacterial pollution. This is not only a valuable asset, an advertisement of progressiveness, which appeals alike to commercial men and homeseekers, as well as to residents, but is also a distinct gain to the public health, since abundant statistics point to a marked reduction in the general death rate with the accompanying reduction of the typhoid rate, when a pure water supply is introduced. The yearly saving in lives, if estimated at \$5,000 each, would easily pay the interest on the cost of a filtration plant in many cases. If 40 lives can be saved yearly, this would amount to \$200,000, which capitalized at 5 per cent., is \$4,000,000.

The situation in Cleveland is not unique, but is a common one around the Great Lakes to-day, where a city has to



discharge its sewage into the source of water supply. Chicago is the only city which can successfully divert the That is the scheme we are following to-day, sewage. as laid down by Mr. Hering in 1885. Recent investigations have shown that, with the unexpected increase in industrial wastes as well as human pollution, the rate of 3.3 cubic feet per second per 1,000 population is not sufficient. feel, however, that the work was excellently planned, and has fulfilled its purpose. A recent report by Mr. Wisner, our chief engineer, has outlined the means open to us to increase the dilution capacity by settling the sewage in Emscher tanks. Some work must be done at once on the industrial wastes and the city sewage, since the capacity, in accordance with our legal ratio of dilution, will be exhausted in 1922. We have been operating a testing station