methods were at fault, and that other structures designed along similar lines were in danger of collapse.

The Blackwell's Island Bridge over the East River at New York was at that time well on to completion, and one of the New York daily papers led in a campaign, which resulted in an investigation and subsequent report, which go to show refinement in calculations has been carried too far, and that mathematical calculations, necessary and valuable as they are, must be checked by the lessons learned by the field man.

The Blackwell Island Bridge is a double-decked cantilever structure, 3,724½ feet long. There are two river spans, the longer 1,182 feet, the shorter 984 feet; compared with the 1,800 feet river span of the Quebec Bridge it will be seen to be much less. The bridge was designed for pedestrian traffic of 75 pounds per square foot; carriage traffic, 100 pounds per square foot; trolley cars, 4,000 pounds per lineal foot, and two overhead railway tracks, 3,400 pounds per lineal foot making an estimated live load of 12,600 pounds per lineal foot. The possibility of the maximum loading occurring was considered so remote that high unite stresses were used. For the tension members 3.25 per cent. nickel steel eye-bars were used designed for stresses of 17.4 tons per square inch. Mild steel tension bars for stresses of 29.5 tons, and compression members were of extra soft steel having tensile strength of 26.8 tons per square inch.

The original estimated weight of the structure was 37,600 tons, but when four railway tracks were added, increasing the intended live load to 16,000 pounds per lineal foot, the estimate weight was increased to 47,000 tons of steel, or 12.5 tons per lineal foot. To this was added the dead load for railings, etc., of 3.26 tons, or a total dead load of 15.76 tons and a live load of 7.15 tons per lineal foot.

Now comes the report of the commission of engineers that the bridge will not carry with safety the intended load. In fact, it appears to be able for only one-third of its designed load.

So it would appear that the American method of design and American criterions of safety have again failed. To Canadians these facts are of great interest. The Canadian Government have undertaken to rebuild the Quebec Bridge. Three engineers of prominence have been selected for the work—men capable and experienced. There is this great danger, though, that the new commission may not be broad enough. It would appear that the first danger the new commission would encounter would be unanimity. It would be a great misfortune if the new design were adopted without thorough investigation. As has been shown, men working along similar lines are apt to fall into the same errors.

One of the strongest claims that can be urged for increased representation on the commission is that the new members would bring a different school of thought to bear upon the question.

TORONTO SEWAGE DISPOSAL QUESTION.

The result of the publication of a review of the recent "Royal Commission on Sewage Disposal" in this journal and of a large deputation of citizens from East Toronto complaining of the site chosen for the works has resulted in the Board of Control resolving to give the whole matter fresh and further consideration. This in spite of the fact that the plans have been completed and negotiations effected for the purchase of the land now objected to.

The plans and scheme had even been presented and received the sanction of the Provincial Board of Health.

The proposals of the corporation were, in short, to concentrate the greater part of the sewage of Toronto by means of an intercepting or trunk sewer at a point in the east end of the city called Morley Avenue, and there to pass the sewage through sedimentation tanks of the septic character, discharging the tank liquor effluent direct into Lake Ontario without any filtration or bacteriological treatment.

The objections raised by citizens in the locality were two fold. First. That the site chosen was calculated to depreciate the value of adjoining property to a large extent, and prove a nuisance to the neighborhood. Second. That the tank effluent was not being purified by filtration, and was calculated to produce a nuisance at the lake front.

In view of the recent findings of the Royal Commission, and that such findings were not available at the time when the scheme was prepared, we consider that the Board of Control have taken a wise action in this matter.

There can be little doubt, judging from the Royal Commission report, that many of the chief claims of the septic tank have not stood the test of experience, and that the tank effluent presents no special features as far as any degree of purification is concerned, other than those presented by the effluents from ordinary sedimentation tanks. Apart from this, however, there is no doubt that the amount of sludge to be eventually dealt with is diminished by the use of septic sludge treatment.

It would appear, therefore, as far as Toronto is concerned that the point at issue as far as preliminary treatment is concerned, is centred in the question of sludge disposal.

The Commission hold that the results of their extensive experiments at Exeter and elsewhere point to not more than 25 per cent. of the sludge being diminished by digestive, or septic putrefaction, and for this reason it may be advisable and economical to adopt septic treatment under certain conditions.

Just what these conditions are appear to depend on the locality of the site of the works as to the means of disposing of the sludge and any nuisance created by the disposal in the vicinity.

It appears to us that septic preliminary treatment may be usefully installed where sewage works are located at considerable distance from dwellings, but, on the other hand, that such treatment may prove a greater nuisance than the ordinary sedimentation treatment when the works are situated in crowded localities.

The handling of the sludge after removal from the tanks is a matter of considerable difficulty.

In open country the difficulty, however, almost disappears, as there is generally sufficient land on which it can be lagooned or dried without the nuisance being appreciated.

In confined localities it, however appears to be almost essential to artificially treat the sludge by some drying or pressing process before it can be successfully handled.

The Commissioners give a large amount of information as to the comparative costs of drying and so treating sludge, both from ordinary sedimentation tanks and septic tanks, and conclude that it costs just about double the amount to heat septic sludge.

These various points are certainly worthy of consideration, apart from the proposal of the corporation to allow the tank liquor to empty direct into the lake. With reference to the latter proposal, however, we feel certain that the city will give the matter further consideration in the light of the newer knowledge, that such tank liquors are really no better than crude sewage minus the major part of the grosser solids.

There is some talk of sending someone abroad to obtain full information on the subject or of obtaining information by calling in some outside expert. But we think that the Board of Control would do well to first thoroughly digest the Royal Commission's report before taking any action, as it would be impossible for any one person in a lifetime to obtain so great an amount of accumulative and unprejudiced information as is presented in the fifth report of the Commission.