

4th.—A saving in maintenance by the avoidance of frequent removal of the sludge.

Disadvantages.

1st.—A constantly increasing quantity of solids given off with the tank liquor as the process is continued. For example, at Burnley, (England), the suspended solids in the liquor varied from 15 parts per 1,000 after a few weeks working to 35 parts per 100,000 at the end of six months. At Huddersfield, (England), the amounts were 6.6 parts per 100,000 at the commencement, and 23.3 parts per 100,000 at the end of eleven months.

At Leeds from January to June, 1903, starting with a perfectly clean tank, the suspended solids averaged to 12.2 parts per 100,000, and from July to December, 1904, the average was 24.1 parts per 100,000, (see Royal Commission Report, page 24). In all of the above cases an increase of over double the amount of solids in the liquor in terms of less than 12 months.

2nd.—The increase of solids tends to choke the filters and render them useless after short periods of time.

3rd.—The effluent sewage liquor is highly charged with sulphureted hydrogen and causes nuisance from smell when sprinkled over filters.

Septic Tank Treatment as Compared with Ordinary Sedimentation.

1st.—Septic tanks may be run without removal of sludge for 12 months. Sedimentation tanks should be cleaned out at least once every month.

2nd.—Sedimentation tanks produce as far as the tank liquor is concerned, a liquor of less organic strength.

3rd.—In each case the removal of solids by sedimentation to commence with, is equal from 60 to 70 per cent. With sedimentation tanks the removal is constant if attention to sludge removal be given. With septic tanks the removal is reduced about 50 per cent. after a few months' working.

4th.—With septic treatment, the sludge contains about 80 per cent. of moisture. With sedimentation tanks, about 90 per cent. of moisture.

5th.—Sedimentation liquor is practically odorless. Septic tank liquor is very offensive.

6th.—The cost of sedimentation tanks in the first instance is about 25 per cent. less than septic tanks as they are not required to be so large.

7th.—The cost of maintenance is less in the case of septic tanks than in that of sedimentation tanks, as in the former, the sludge is only removed at long periods, while in the latter, at least once a month.

8th.—Sedimentation liquor is more easily and economically purified by filtration, either in land or by means of biological filters than septic liquor.

From the above it will be seen that there are many considerations to be taken into account before deciding as to whether it is worth while paying any royalty claim in the septic process.

All of the above of which is respectfully subscribed to by:—

A. F. Macallum, City Engineer for Hamilton.

T. Aird Murray, Consulting Sanitary Engineer, Toronto, Adviser to the Provincial Board of Health, Saskatchewan.

O. W. Smith, Consulting Engineer of Messrs. Galt & Smith, Toronto.

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Dr. Hodgetts announced that the above statement had been submitted to him and that he considered it a fair and accurate résumé of the present engineering position of the septic tank process.

A general discussion followed, and it was felt that the whole question was assuming great importance, and further that there should be a wider representation of municipalities interested in the question. Up to the present only such towns have been invited who have had notice served upon them by the Septic Company, and the town of Berlin was a notable absentee from the proceedings. Berlin is having a meeting

of its own, due to some unfortunate misunderstanding with the secretary as to the nature of the meeting.

Dr. Hodgetts having explained that this question of septic royalties was one which not only affects the towns where such plants are installed, but also such towns such as Cobalt and Palmerston, and others who are anticipating such schemes, as well as all the private septic tanks in Canada.

It was resolved to adjourn the meeting to an early future date, and in the meantime that the secretary, Mr. Willis Chipman, Consulting Engineer, 103 Bay Street, Toronto, notify all parties directly or indirectly interested in the matter. The date of the next meeting will be duly announced in the Review.

GRADE SEPARATION.

F. L. Somerville.*

Great interest is now being taken in Canada in grade separation. Many of the cities in the United States have had to take the question up and their solution of the problem may be of some interest.

Instead of grouping the works by methods of separation I have taken a few typical cases stated briefly how they dealt with the question, and given references so that fuller information may be secured if desired.

Allegheny, Pa.

Population, 1900, 129, 896.

Railroad Gazette, Vol. 34, p. 374.

The work in Allegheny was made necessary by the elevation of the Pennsylvania System tracks in Pittsburg, which involved the construction of a new double deck bridge over the Allegheny River, which separates the two towns.

The article is mainly a description of the new bridge, but it says that in Allegheny from Anderson Street westerly the railway passes over Anderson, Sandusky and Federal Streets, from Federal Street the grade is descending westerly, and at Marion Avenue the new elevation is seven feet above the old grade, one half of the street will be depressed, making a subway under the tracks. The level of the track at Ridge Avenue will be unchanged, but beyond that point the track will be lowered (the maximum depression being about 16 feet) at North Avenue and Pennsylvania Avenue. These streets will be raised to go over the railway as will also be done at Washington Street, where the railway will be depressed about 3.5 feet, and the street raised about 16.5 feet.

This is necessitated by the railway passing over rising ground at this point, and the improvement of the grade called for depression at this point.

Boston.

Population, 1900, 560,892.

Abolition of Grade Crossings on the Providence Division of the Old Colony Railroad in Boston, by J. W. Rollins, Jr. Journal Association of Engineering Societies, Vol. 14, p. 447.

The work will require the elevation of the tracks of the railroad beginning at Massachusetts Avenue, thence rising on a 0.6 per cent. grade to 18 feet above the existing tracks at Roxbury Station, thence the elevation is maintained at from 18 feet to 20 feet above existing grade to Washington Street, Forest Hill, where grade begins to descend to meet old grade 3,000 feet further south.

This involves a change of $4\frac{1}{2}$ miles of road over which on three tracks is (1894) handled a daily train service of 186 regular trains, and besides numerous extras, and will necessitate 15 road subways five-foot subways and one overhead bridge. Generally the construction is earth filling between retaining walls.

Separation of Grades of N.Y., N.H. & H. Railway in Boston, Railroad Gazette, Vol. 27, p. 383.

The New Haven road runs through a thickly populated suburban district with large numbers of crossings at grade, and to facilitate traffic and prevent crossing accidents the railway company has decided to elevate its tracks.

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