sludge, by using from ½ to 1 cubic foot of air per gallon in a 10-foot depth of tank, but the activity of the sludge cannot be maintained without additional aeration.

If clarification alone was required, aerating the sludge three hours and the sewage one hour would produce the desired results.

Maintaining a sludge blanket near the surface of the sedimentation tank filters the floating matters from the liquor and produces a sparkling, clear effluent, but this blanket is difficult to maintain, as it is quickly affected by temperature changes, variations of flow through and sludge from tank.

The aerating tanks can take care of storm water flow when designed to provide for average dry-weather flow by increasing the volume of air and the activated sludge, but extra sedimentation area must be provided for storm flow if standard effluent is to be maintained.

Conduits cannot be used to carry a mixture of sewage and activated sludge, because the sludge settles too quickly, even though velocities of 2 feet per second are maintained.

The activated sludge precipitated in the sedimentation tanks contains about 99% water. This may be reduced by subsequent settlement for from 1 to 3 hours to 96%.

Overaeration of sludge reduces its volume and its tendency to flock, and decreases its specific gravity.

Sludge can be dewatered satisfactorily from 96% to 75% moisture by either a plate press or pressure press without the addition of lime or other base. The minimum cost for this process is still undetermined.

The filter bags used in the presses must be cleaned frequently to maintain efficiency. This can be done by soaking in a bath of dilute caustic soda and hot water.

Sludge, after pressing, can be stored in a building without creating offensive odors more than 50 feet away, and can be easily handled.

The dewatering of sludge from 75% to 10% moisture can be satisfactorily accomplished by either the indirect steam or direct heat dryers, without appreciable loss of ammonia. The minimum cost for this operation is still undetermined.

Milwaukee sludge, after drying, contains from 4.5 to 5% of ammonia as a fertilizer. There is ample market for such a production when reduced to the proper form.

Estimating four hours' aeration of sewage and two hours subsequent settlement of sludge, eight million gallons of sewage can be treated upon one acre of ground.

Although there are many other conclusions of minor importance which have been reached from the experiments made, those enumerated above are of the most importance in determining the design of the large plant.

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A $2,500,000 coal pier that can load 7,000 tons of coal an hour has been opened by the Baltimore & Ohio Railroad at Curtis Bay, near Baltimore. The structure is of unusual interest because of its capacity, which is claimed to be the largest of any coal pier yet constructed, and because it handles coal by belt conveyors instead of by gravity. This arrangement greatly reduces the breakage by making three feet the maximum fall for coal from the time it leaves the car until it reaches the ship. At the land end of the pier, which is of concrete and steel, are two car dumpers and next to them are balancing bins, into which certain of the belt conveyors empty. On the pier are four travelling loading towers that can serve as many ships, all at one time. They are supplied with coal by sixty-inch belts, having a maximum speed of five hundred feet per minute. Supplementing these are two towers that trim the ships' loads. The functions of the entire plant are interlocked and controlled electrically by push buttons.

# Letter to the Editor

## MR. TYE'S RAILWAY PAPER.

Sir,—In three or four issues of your paper you have published "resumees" of the majority and minority reports of the Commission to Enquire into Railways and Transportation in Canada, as also Mr. Tye's paper in full, in addition to some editorials on the subject. It is somewhat significant, perhaps, that while Mr. Tye's paper was read before the Canadian Society of Civil Engineers in public, and the widest publicity was given to it throughout the country, no advance notice of such a paper was sent out and consequently there was no chance for discussion or criticism at the time it was read.

After the reading comments were invited, but these will be presumably bound up with the proceedings of the society, and will be seen by no one but the members. In view of these facts I would ask you to publish my reply to Mr. Tye as given to the Canadian Society. There are two sides to every question and it is only fair that the railways criticized should have a chance to present their side and to point out the errors and inaccuracies in the originals.

HENRY K. WICKSTEED, B.A.Sc.,
Chief Engineer Location, C.N.R.

Toronto, Ont., June 8th, 1917.

[NOTE.—*The Canadian Engineer* did not know that Mr. Wicksteed had written a letter to the Canadian Society until his letter of June 8th was received. We have pleasure in reprinting herewith the copy of the letter to the society which was enclosed in Mr. Wicksteed's letter of June 8th. The letter to the society was dated April 16th, 1917, and was addressed to the secretary at Montreal. Following is its complete text.—EDITOR.]

The writer has read with much interest Mr. Tye's paper on "Canada's Railway Problem and Its Solution," and must compliment that gentleman on its preparation. At the same time, there appear to be some points in it to which exception may be taken and others which will bear amplification.

Taking Mr. Tye's conclusions in order:—

1. The National Transcontinental, the Grand Trunk Pacific and the Canadian Northern railways are unable to earn their operating expenses and their fixed charges. Canada has built, and is operating, the first of these roads, and Canada and the various provinces have guaranteed the principal and interest of most of the bonds of the other two. As the roads are unable to earn their fixed charges, they must, of necessity, be paid by the country.

Regarding conclusion No. 1.—This gives the impression that the Canadian Northern has not at any time paid, nor has any definite prospect of paying, its fixed charges. Mr. Tye shows further on that so long as the Canadian Northern remained west of Port Arthur it was wonderfully successful, and if his paper had been written after instead of before the publication of the last annual report, he would probably have modified his conclusion as to its prospects in the future. If in the first year of operation of the full system a deficit of only $258,000 is shown, the prospects for the future must be admitted to be very good indeed.

2. The failure of these roads is due to the duplication of lines by all the railways, encouraged and bonused by the government; to the excessive cost of the Grand Trunk Pacific and National Transcontinental railways; to the failure of the Grand Trunk Pacific to provide itself with an adequate