

The colleges must soon realize their responsibility to the hydraulic engineering student. Courses must be remodelled to give the needed instruction if the list of failures in hydraulic design is to be curtailed.

PUBLIC CARRIERS versus THE PUBLIC.

Paralleling the rapid growth of the cities of this continent, in population and suburban area, are the steady and popular demands of civic governments upon city tramway companies for extension of lines, new methods of business, and increased rolling stock. There is no doubt or question of the necessity and need of this twin growth of tramway accommodation, on either the tramway's part or the civic, but there is almost invariably a considerable difference of opinion about the effectiveness and sufficiency of the means adopted by the street railways to keep abreast of the times. It has resulted in considerable antagonism on the part of the people, upon any refusal of public carriers to carry out improvements, especially if the carriers appear to be making money and growing rich. Many people, while believing in the efficiency of company management, and preferring it if the companies can be prevented from waxing unduly rich, yet do not know how they are to be checked from so becoming, and are ready to threaten them with non-extension of franchise in the meantime. Street railways, with their usual comparatively short franchises, are particularly subject to the people, and one would expect would be likely to quickly carry into effect any reasonable civic wishes which did not entirely besmirch their financial horizon.

It seems "riches" and "what is a fair profit" are relative terms, depending on individualism. There have been protestations on the part of public carriers that they were being unjustly adjudged of their wealth and unfairly pressed by the public to the point where they would have to cease doing business. This is of special interest to the engineer, not only in a general way, but because it may open up a new field whereby boards composed of either high-class financial engineers, or possibly engineers and financiers, will be called in to adjudicate between the people and public carriers as to "what are fair demands" to be made upon the latter.

The first big step in this direction is seen in the bill passed in March by the United States Government, whereby a gigantic investigation of the valuation of the property of common carriers and the securing of information concerning their claims, bonds and other securities, has been set on foot. The Interstate Commerce Commission, which has charge, may appreciate the situation and create (it has been recommended to do so) a board composed of nine members, three to be selected by the Interstate Commerce Commission, three by the American Railway Association, and one each by the army, the navy and the American Society of Civil Engineers. This would provide for a non-partisan, impartial and authoritative body, the conclusions of which would be final.

The immediate effect upon the carriers will be the preparation of a complete valuation of all railroad property, entailing an expense of \$3,000,000 to \$5,000,000 to the carriers alone. After the railways submit the data it will be necessary for the Interstate Commerce Commission, through its experts and assistants, to prepare valuations, and this will cost the government at least \$3,000,000 more.

The law provides that the Commission shall make an inventory and classify the physical property as fol-

lows: (a) The original cost to date; (b) the cost of reproduction (new); (c) the cost of reproduction less depreciation, and (d) other values and elements of value.

It is not apparent how the Commission will arrive at the original cost to date of railroads which have no records extending back to the origin of the property, and this will be found to be the case with nearly all roads or parts of roads constructed twenty-five years or more ago. The original cost to date is now available from the balance sheet of any railway company under the head of "Cost of Road and Equipment." It will cost the railroads and the government perhaps \$2,000,000 to ascertain the original cost to date by the laborious method of investigating original records, and the result may be no more accurate and reliable than the information already at hand.

The United States engineering opinion of the investigation is that the net result of securing the valuation of railroad property will likely prove that the railroads are not over-capitalized, and that as a whole they are not earning a fair return on their cost and present fair value.

A further and interesting viewpoint of a street railway management's idea of present money-making possibilities is seen in the statement of the vice-president of the Boston Elevated Railway before the Electric Railway Association. He claimed that if the public were not made to understand and become acquainted with the facts of street railway conditions the companies would not be able to continue to do business. The point to be emphasized was the effect of the demands from the public in the way of extensions of lines, increased transfers, etc. In their case these demands have eaten up the advantages which are supposed to come from doing business for a long time in a growing community. This may be seen from the following data: In 1888 some five or six horse railways were put together, forming a consolidated system, which gave the railway company virtually the monopoly of the business of the city. The operations of this consolidated company began substantially on January 1st, 1888.

In the first year there were gross earnings of \$4,276,000, and the capital invested was about 2.72 times the amount of these gross earnings. The average number of revenue passengers for the half trip in that year was 22.5, the average length of the half trip was 3.62 miles, and the average distance from the centre of the city to the ends of the routes was 4.79 miles. Following along from that time there was a constant tendency to extend to the more sparsely settled territory, and the lines afterward were extended, not only as to the trips that were run, but as to the total length of the routes. The company began also immediately to electrify the lines, so that in 1892 about half of the system was electrified and the number of revenue passengers per half trip had gone up from 22.5 to 28. Four years later, in 1896, the road was 98 per cent. electrified, and there were 29.5 revenue passengers to the half trip.

Later, the rapid-transit system—that is, the subways and the elevated—was introduced with a view to providing more room for the congested district, and with these lines the demands that were made for service cut down the average revenue passengers per half trip, so that these figures in 1903 went down to 23, and in 1912 were only 25.5. In other words, in 1912, with gross earnings of \$16,644,000, only three more revenue passengers to the half trip than with the horse cars in 1888.

These figures are rather significant; what has happened in Boston is probably typical of what will happen in many cities as business increases. Not only will there be more demands for transfers, more demands for ex-