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been saved from some of the confusions into which he has fallen in his attempt to classify inventions by results.

GEORGE E. SCHUSTER

Railway Rates: The Method of Calculating Equitable Railway Rates and Charges for Merchandise Carried on Railways. By the late JOSEPH HORROCKS. (Swan Sonnenschein and Co. Pp. 485. 21s. net.)

IT is almost a surprise to find a man who has spent a great portion of his life in the management of goods traffic on railways seriously advocating "cost of carriage" as "the" equitable basis for railway rates. Yet the late Mr. Horrocks does this, and has written a volume of nearly 500 pages to illustrate the method of calculation. In face of the experience of railways the world over—no one of which has its rates based on cost of carriage—and the verdict of railway managers and economists against this theory of rates, it might at least be expected that the author would attempt to meet the arguments generally recognised as conclusively proving that "cost of carriage" would not be an equitable basis for rates. Yet nowhere does he do this. A general statement that "it is of great importance that traders should pay sums for transport proportionate to the services rendered whenever possible" is considered all that is required, and apart from this there is nothing beyond repeated reiteration of the statement that the method set out is equitable. The words "whenever possible" might be considered to guard the situation. A study of the volume, however, shows that these words are used to prevent the use of averages being objected to, and also to justify certain deviations from strict accuracy which are recognised as inevitable.

The first argument usually advanced against "cost of carriage" as a basis for rates, is that such a basis is impossible.¹ This is the only point seriously combated, and even here the greatest difficulties are ignored or slurred over. The separation of working costs between goods and passenger traffic, and the proportions in which the capital expenditure shall be divided between the two, so that the goods traffic may pay its fair, and no more than its fair, share of interest on capital, are not even referred to. The determination of the proportions in which the several grades of traffic shall contribute to the net profit is such a complex problem that no definite solution seems possible.

¹ Acworth, *Elements of Railway Economics*, p. 51. See also Hadley, *Railroad Transportation*.

In order to arrive at even average working costs, Mr. Horrocks has invented a scheme which he calls "the equalisation of instrumental values." This scheme rests on assumptions, which are quite unjustified and unjustifiable. For instance, in dealing with wagons, Mr. Horrocks contends that if the economic tare for a wagon built to carry "8 tons is 4 tons," then the economic tare for a wagon to carry "10 tons will be 5 tons." "The weights of wagons proportionate to unit weights of loads are intended to remain unchanged in all circumstances." All railways are then to adopt the same proportions, and no deviation from them is to be allowed. How any practical railwayman could make such a proposal it is difficult to understand, since one of the chief advantages of increasing the size of wagons comes from the reduction in tare in proportion to carrying capacity. A similar uniformity in the construction of locomotives and tenders is also advocated, and improvements in the type are to be made use of by all companies simultaneously.

Having simplified matters by this equalisation of the instruments of conveyance, Mr. Horrocks proceeds to propound a plan for merging the cost of conveying the instruments of power in the cost of conveying train loads. Thus, if the train weighs $3x$ tons, and the locomotive, tender and brake van weigh x tons, the train is to be treated as weighing $4x$ tons, and each vehicle is to have one-third added to its gross weight. The rates for conveyance are to be calculated on gross weights, compounded of the weights of loaded vehicles thus obtained and an addition made to them to allow for the conveyance of empty stock. Again, we are met with an assumption which is untrue, namely, that every ton of gross weight on a particular train costs the same to haul—the wagon weighing 4 tons, and loaded with 2 tons, costs just half the wagon weighing the same and loaded with 8 tons. With such inaccurate assumptions as these it is clear that Mr. Horrocks has not even met the first argument against rates based on "cost of carriage."

Even if possible, however, rates based on cost of carriage would not be desirable. The value of the service to the trader is by no means proportionate to the cost incurred by the railway. A ton of merchandise of low value cannot bear a rate which would hardly affect a ton of merchandise of high value. The effect of equalising the rates would be to cut off an enormous quantity of low-grade traffic from conveyance. Mr. Horrocks, without taking any notice of this, groups all general merchandise carried in open wagons in one class, and the low grade traffic will only get a lower rate than

the high grade provided the consignments are larger, and the traffic not bulky in proportion to its weight. Yet this basis for rates is stated in the last paragraph of the book to "approach so near to equity that it may be expected to satisfy any reasonable mind." If the system of rates proposed were put into force in this country, it is absolutely beyond question that the commercial section of the community would be in arms in less than a week.

The figures used throughout the book are admittedly only used by way of illustration, and do not pretend to any accuracy. Accuracy is not to be expected, since, as the late Mr. Horrocks points out, ton-miles, both gross and net, and wagon-miles, both loaded and empty, would require to be kept before figures approaching accuracy could be obtained. At the same time, it is to be regretted that the figures which are used are so far removed from present-day practice, in many instances, as to be seriously misleading.

We lay down the book with a feeling of regret that the late Mr. Horrocks should have expended such a vast amount of labour on the explanation and illustration of a method of calculating railway rates which does not help the solution of the railway rates problem one iota.

W. T. STEPHENSON

Chicago Traction. By RALPH E. HEILMAN. (American Economic Association.)

THIS study of the efforts to secure good service gives an interesting account of the war which has raged for the last forty years and more between the public and the tramway companies of Chicago. Whether in truth peace has now been established for a time depends on whether the methods of supervision of the tramway companies contained in certain ordinances prove in future to be effective or not. The novel feature in these proposals consists in the creation of a Board of Engineers representing both parties: for "the attempt to place police and judicial power in such a Board is an absolutely new experiment in the government of American municipalities" (p. 80). The continued existence of private companies is, however, surprising; for it is "in Chicago that the municipal ownership propaganda has asserted itself more boldly than in any other American city." Though the citizens were mainly moved to action by the badness of the private tramway service, it must not be assumed that a good service would certainly close this controversy. The cause of the recent failure to establish municipal ownership was largely due to the exist-