

**TRANSPORTATION BY RAIL:  
AN ANALYSIS OF  
THE MAINTENANCE AND  
OPERATION OF RAILROADS**

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Transportation by Rail: An Analysis of the Maintenance and Operation of railroads by T. M. R. Talcott

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**T. M. R. TALCOTT**

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# TRANSPORTATION BY RAIL:

AN ANALYSIS

OF THE

## MAINTENANCE AND OPERATION OF RAILROADS,

SHOWING THE CHARACTER AND COST OF THE SERVICE PERFORMED BY  
RAILWAY COMPANIES IN THE MAINTENANCE OF HIGHWAYS FOR COM-  
MERCE, AND AS COMMON CARRIERS OF PASSENGERS, FREIGHT, AND  
THE UNITED STATES MAILS OVER SUCH HIGHWAYS.

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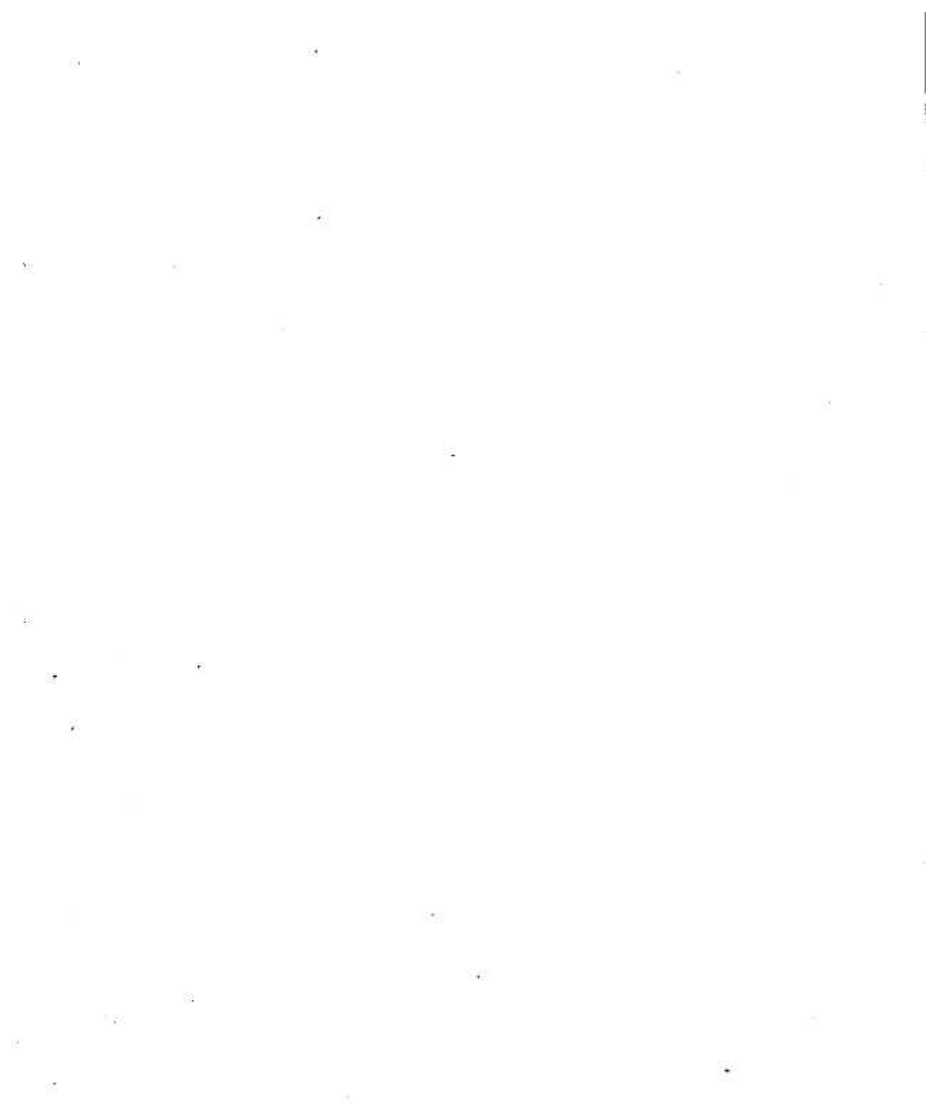
## PREFACE.

THIS monograph is based on the experience of the writer in the construction, maintenance and operation of railways for many years, during a large part of which he had the accounts kept to suit his special method of analyzing the cost of maintenance and operation.

The present method of accounting, as established by the Interstate Commerce Commission, does not admit of the application of this method of analyzing operating expenses, and therefore the present cost of the several units of service cannot be accurately stated; but general managers who wish to know the exact cost of each unit of service on their roads can no doubt have their accounts kept so as to admit of the application of the method of analysis indicated in the following pages.

This method of analysis was applied to a number of Southern roads for periods of from three to ten years, and the units of cost ascertained naturally differed somewhat for the same service, owing to different conditions on the different roads, such as different standards of construction and equipment, varying rates of pay for the service of similar classes of employees, and diversity in the cost of material and supplies during different periods and in different localities, but the variations in cost per unit of service were within comparatively narrow limits. The road, of which statistics are given in the following pages, was selected for illustration because it seemed to fairly represent the general average of Southern roads, which had been in operation a number of years, and were of the same general standard of construction and equipment.

If this book stimulates investigation of the economic questions to which it directs attention, the writer will not have labored in vain.





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# TRANSPORTATION BY RAIL.

## CHAPTER I.

### CHANGES IN PHYSICAL CONDITIONS AND METHODS OF OPERATING RAILWAYS.

**T**HE first railroads were more of a novelty in transportation than a means of cheapening its cost. The superstructure of some of the earlier ones was made by placing thin flat bars of iron on longitudinal timbers, which rested on stone blocks bedded on broken stone ballast to prevent their displacement by frost. In some cases the iron bars were supported by continuous stone sills. Subsequently iron bars of greater thickness were used, and then the H-rail, of fifty pounds per linear yard, resting on longitudinal sills, the weight of the rails being gradually increased to sixty, seventy and seventy-five pounds per yard. Then cross-ties were introduced, resting on longitudinal sills, and finally the sills were removed, and gravel ballast substituted for them.

The first cars used were coach bodies of the ordinary form, placed on frames with four wheels, but they were gradually enlarged, and the form changed until their capacity was increased to sixty passengers, two trucks being used with each car body which could adjust themselves to the curves in the track.

The first locomotive engines weighed only six tons; but they were successively increased in weight to ten, sixteen, twenty and twenty-six tons, and on some of the "freighting roads" locomotive engines of forty tons were used as early as 1854.

An official investigation made about that time to determine the cost of transporting passengers and freight by rail resulted in what would seem now to be an absurd conclusion, that the cost of transporting a passenger or a ton of freight one mile was the same; but it was probably not far wrong then, for at that time the average number of passengers and the average number of tons of freight per train was very nearly the same, and there was little, if any, difference in the gross weight of passenger and freight trains. Since that time the average number of passengers per train has decreased, and the average number of tons of freight per train has increased, making the gross load per passenger much greater, and the