

traffic department may devote more of its energies to obtaining new business and less to the most undesirable and unsatisfactory phase of the freight-handling business. As a general proposition the way station agent is not a busy man, so that insistence on weighing and checking at this point does not work a hardship. At terminals or heavy shipping points such a requirement might increase the burden, but the savings effected would warrant employing additional help. As we see it, therefore, insistence upon weighing at the point of origin is a panacea for many freight-department ills.

LOCOMOTIVE MILEAGE AND ELECTRIFICATION

The electrification of 440 miles of the Chicago, Milwaukee & St. Paul Railroad is by no means interesting only because of the immensity of the project, nor is its importance measured alone by the radical nature of the forward step that has been taken by its sponsors. As it stands, the installation will go further than any of its predecessors toward providing a definite answer to one of the most important but mooted questions of the electrical operation of steam railroads, namely, that of the influence on cost of operation of the large mileages of which electric locomotives are capable.

Heretofore everyone of the electrifications that has been undertaken in this country has covered much too short a route mileage to escape the handicap of the terminal detentions which are invited every time an engine arrives at the end of its run, even though it may be perfectly ready to continue in revenue service at the head of a train. On the St. Paul, however, no such condition will obtain, and as pointed out in these columns when the project was first agitated, electrification will permit each locomotive to take its train over the whole 440 miles of route, setting out bad-order or local cars as are required at the various stations and changing crews in accordance with their physical limitations. Obviously this provides an opportunity to increase locomotive mileage to an extent that is unparalleled in previous railroad practice. With the short divisions of, say, 150 miles that are necessary for steam operation, the time lost at the division points and chargeable only to the terminal delay may actually constitute more than half of the time spent between terminals in revenue service, but with the division points eliminated, practically all of the time thus wasted may be utilized by the locomotives in hauling trains. The vastly increased locomotive mileage thus possible may, and probably will, go far to offset the effect of the lesser traffic density which has been cited from time to time as a reason for believing that the St. Paul installation will not equal the record of 20 per cent return on the investment that has been made on the Butte, Anaconda & Pacific electrification in the same territory.

Traffic density is, no doubt, essential in a large degree for the profitable substitution of electricity for steam as a motive power. But the underlying reason for this advantage is, in the end, nothing more than the fact that it is necessary to make frequent and regu-

lar use of the costly contact and transmission system in order to earn interest charges and profit upon the investment. Exactly the same reasoning applies to the electric locomotives, which constitute from one-half to one-third of the total investment in the ordinary electrification project. If the locomotives are not utilized to their fullest extent, or, in other words, if they do not make the maximum revenue mileage of which they are capable, they become just as much of a financial handicap as an expensive contact system that is used by only one or two trains daily. For example, the St. Paul locomotives comprise roughly 40 per cent of the entire investment for electrification, and if the annual mileage per locomotive now expected should be cut in half for some unforeseen reason, the installation would have to carry 40 per cent more interest on account of the necessity for double the number of locomotives, to say nothing of the increased cost of maintenance per mile that invariably follows reduced mileage. Such an increase in interest would offset the major part of the net earnings, but, on the other hand, if the annual mileage per locomotive now expected should be doubled, the interest on the installation would be reduced 20 per cent as soon as a place could be made for the surplus locomotives, and this would be the equivalent of a corresponding increase in profit.

Pending the results of actual operation it is, of course, impossible to say what the St. Paul locomotives will accomplish in the way of yearly revenue-miles, although as outlined above there is every reason to believe that it will be very high. The main point is that this electrification will at last give an opportunity to show what can be done along these lines by electric units, and when the results are known it is quite possible that the ensuing economies will be sufficient to make hesitation in trunk-line electrification seem like criminal negligence.

EFFICIENCY IN EXPORT

For a country which has made such rapid progress in technical matters it is sometimes surprising that the United States has not done more in a scientific development of its export trade. We have the goods, the men to make them, and the money to exploit them, but our export methods have always been characterized by a *laissez faire* policy which has left our manufacturers far behind in the competitive race with the manufacturers of other countries. This policy has affected the small manufacturing companies much more than the large ones. The latter could afford to have their own representatives abroad to develop the field, arrange for bills of exchange, and, if necessary, help to finance the purchase of their products. The result has been, for example, that representatives from the fleet of the Standard Oil Company are seen in practically every important harbor in the world. But with the small manufacturer it has been an entirely different matter. He could not conduct the complicated business of export trade from his home office, which might be perhaps far from the seaboard. As one small manufacturer testified recently before the Federal Trade