

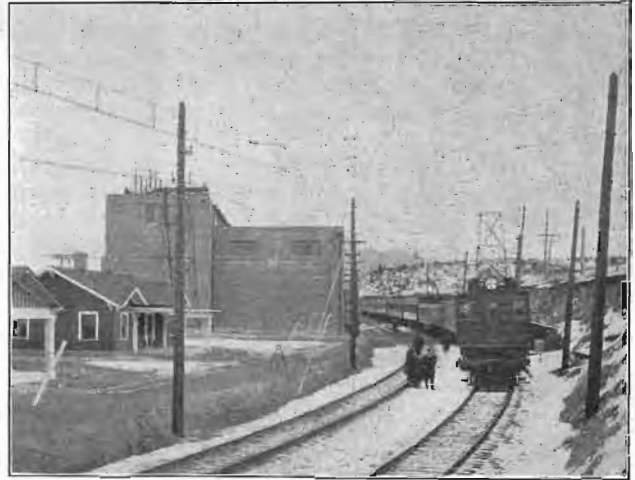
St. Paul Locomotive Tests

Two of These Locomotives Have Handled Larger Trains than Three Steam Locomotives at Speeds More than 50 Per Cent Higher

Details of the tests upon the electric locomotives for the Chicago, Milwaukee & St. Paul Railway, which have been conducted on the first electrified division of that railroad between Three Forks and Deer Lodge, Mont., show that the electrical equipment has met every expectation of its sponsors. The tests began on Dec. 2, shortly after power was cut in on the line and on Dec. 6 two of the electric locomotives took a freight train weighing 2800 tons from Butte to Piedmont across the continental divide, some 16 miles east of the former city, making the total distance of 39 miles in two hours and fifteen minutes. This run includes an up grade of approximately 10 miles in the vicinity of the Janney substation with maximum gradients of 1.66 per cent, and a down-grade of 21 miles on the eastern slope of the continental divide with maximum gradients of 2 per cent. This train made an average speed up grade of 14 m.p.h., and it descended the 2 per cent grade into Piedmont at a practically uniform speed between 17 m.p.h. and 18 m.p.h., the average speed for the entire run being 17 m.p.h.

On Dec. 8 a competitive test between the electric locomotives and steam engines took place under the observation of a large party of officials of the Chicago, Milwaukee & St. Paul Railway, including A. J. Earling, president; C. A. Goodnow, vice-president; R. Beeuwkes, electrical engineer, and J. J. Murphy, superintendent, together with A. H. Armstrong and W. B. Potter of the General Electric Company. In this test a train of forty-eight cars, aggregating 3000 tons in weight, was made up in Butte and run over the mountain to Piedmont with two electric locomotives. The inspection party observed the test from Janney substation, and at that point the train hauled by the electric locomotives was operated at a speed of 16 m.p.h., apparently without taxing the power of the electric machines, the rating of the two engines on the 1.66 per cent grade being 3700 tons based on a rolling friction of 6 lb. per ton. Following the electrically-operated train was another in which there were thirty-seven cars approximating 2200 tons in weight, and this was hauled by three steam locomotives, two of which were of the Mikado type, with the third, a Mallet locomotive, acting as a pusher. This train was able to ascend the hill at a speed of only about 10 m.p.h., in marked contrast to the electrically-operated train that had preceded it.

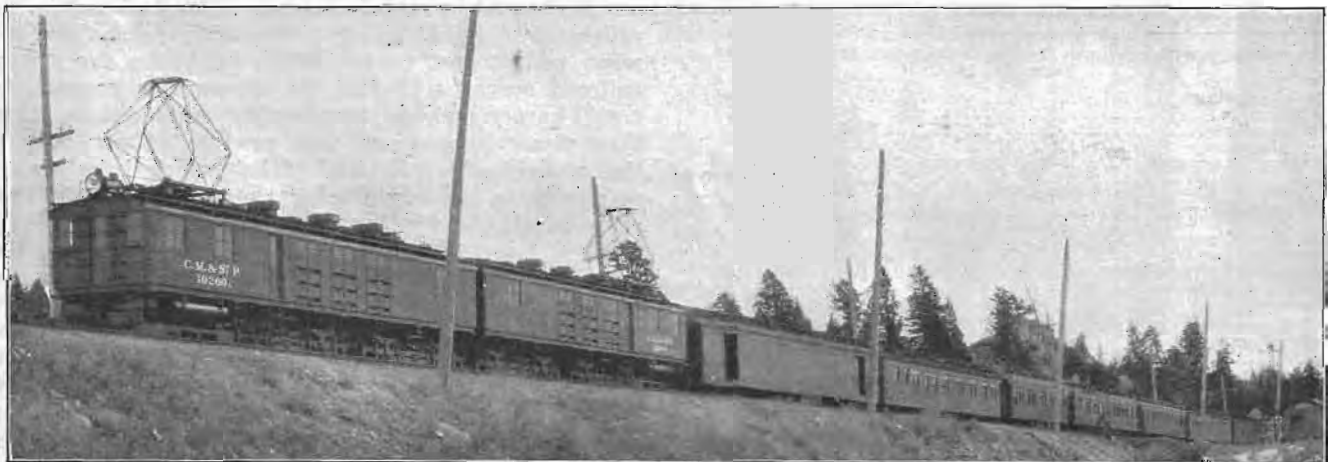
The special train for the party of inspection was made



ST. PAUL LOCOMOTIVE TESTS—SPECIAL TRAIN AT JANNEY SUBSTATION

up of six Pullman cars and this also was drawn by an electric locomotive. It was operated over the divide to Piedmont substation and then ran back to Janney, going up the 2 per cent grade west of Piedmont with greatest ease at a speed of about 22 m.p.h. During the return to Butte the train was operated over the relatively level track approaching that city at a rate of about 31 m.p.h. No attempt at great speed was made, however, because the engine was geared for freight service, none of the passenger engines having yet been delivered. The latter engines are expected to make 60 m.p.h. with an 800-ton trailing load, and judging from the smooth-riding qualities of the freight engine in the test outside of Butte, it is said to be certain that no difficulties will be experienced at the higher speeds.

No troubles of any kind have appeared in connection with the operation of the locomotives, either in regard to their ability to haul trains up grade or in regard to the operating features of the regenerative system on the down grades. In consequence, the four locomotives that are on the 113-mile electrified division, which is at present completed between Three Forks and Deer Lodge, have been placed in actual service and are doing pusher work on the grades to help out the steam locomotives. During the month of December three and possibly four more locomotives will be delivered, and if the railroad company has received a total of eight freight locomotives by Jan. 1, electric freight transportation between Deer Lodge and Three Forks will be established during the first week of the new year. The initiation



ST. PAUL LOCOMOTIVE TESTS—PASSENGER TRAIN ON 2 PER CENT GRADE WEST OF PIEDMONT

of electric operation of passenger trains will depend upon the delivery of the passenger locomotives, which are similar in every respect to the freight engines except for the gearing. However, it is expected that shipments of these units will be made some time after the first of the year.

In connection with this it is of interest to note that some time ago the purchases of steam locomotives for the divisions under electrification were limited by the railway company. In consequence, there is a scarcity of steam motive power at the present time which is being supplied by the electric machines, and this fact would indicate that the steam locomotives which are to be retired are going to be credited to the electrification at their full value. Another item of interest in connection with the electrification was recently made public in a speech delivered at the inauguration of electric operation by John D. Ryan, who is one of the directors of the Chicago, Milwaukee & St. Paul Railway. In this Mr. Ryan said "it was the foresight of the management of the St. Paul road that made its route run close to those water powers and made possible the development of them. The fact is that the development of these great water powers of Montana was possibly largely through the practical assurance that the St. Paul road would take a part of that power. It was through this that we have made possible for all, little and big, to secure the best and cheapest power. It makes no difference whether they use 1 hp. or 10,000. They are able to get it because of the railroad taking this power.

Cost of Motor Buses

Figures Based on Actual Operation of Motor Bus Line in Richmond, Va.

Statements have been made from time to time in this paper about the fleet of motor buses operated last summer in Richmond by the Virginia Railway & Power Company. This company owns the electric railway system in Richmond and found last spring, in common with many other companies, that its receipts were being adversely affected by a large number of jitneys. The company decided if the jitney was a real improvement in methods of city transportation it was in a better position than anyone else to conduct this service. Consequently, it purchased some forty cars in April and operated them on regular schedules in that section of the city where jitney service was being rendered. The test with these cars showed that the business could not be conducted without a loss, and it was discontinued in September. Through the courtesy of C. B. Buchanan, general manager Virginia Railway & Power Company, the following statement of jitney operation is published:

STATEMENT OF RICHMOND JITNEY OPERATION, APRIL 17, 1915, TO SEPT. 14, 1915.	
Gross earnings	\$30,501.28
Taxes	\$671.00
Operation	24,043.79
Maintenance	9,758.70
General expense	1,856.77
	*\$36,330.26
Deficit	\$5,828.98
Bus-hours operated	62,080
Earnings per bus-hour	\$0.491
Expenses per bus-hour	\$0.585
Loss per bus-hour	\$0.094

*Expenses do not include any charges for depreciation, or for rent of garage.

As will be noticed, the earnings per bus-hour were less than the operating expenses, not including depreciation or rent for the garage. The company first undertook to keep a record of its expenses on the bus-mile basis but had to abandon this plan on account of numer-

ous errors in the mileage recorders, so that the statement was prepared on the bus-hour basis. The average miles per hour made by the buses were approximately 12 miles. The company owned the garage where the buses were stored, and in the statement given above no allowance is made for the rent of the garage. No attempt was made to estimate the depreciation on the buses, but Mr. Buchanan says, "It was very great for the short time they were operated." The buses used were five-passenger touring cars of the usual kind. Part of them were Fords and the others Briscoes.

COMMUNICATION

Chicago Smoke Abatement Report

WATERTOWN, N. Y., Dec. 14, 1915.

To the Editors:

The synopses of the Chicago smoke abatement and terminal electrification report, published in the issues of the ELECTRIC RAILWAY JOURNAL for Dec. 4 and 11, while omitting details, are nevertheless complete enough to demonstrate the cosmic dimensions of the whole field of inquiry, and the conscientious and scientific manner in which the task was performed by the engineers, who did the real work. Local atmospheric and combustion conditions have been examined, every railroad electrification in the world analyzed, and the various proposed substitutes for the steam locomotive subjected to engineering scrutiny. It would therefore seem that engineers, at least, can accept conclusions which have been reached with such painstaking care, being based upon a wide survey of the state of the art. There is an impression that the people of Chicago have been encouraged to believe that if the steam locomotive could be banished from their railroad tracks, the city would be relieved from the stigma of atmospheric pollution for which it has so long been proverbial. The writer recently saw a clipping from a Chicago newspaper's editorial column, arguing seriously that because railroad electrification had succeeded elsewhere it would be bound to succeed in Chicago, and cynically impugning the good faith of the committee and the railroads for undertaking the investigation of the matter with a negative answer as a foregone conclusion.

The engineering fraternity, however, is quite prepared for a presentation that shows the problem to be a many-sided one, and can appreciate the difficulty of trying to convince the molders of public opinion of the real nature of the disease and the proper course of treatment for its eventual cure.

The impression one gains from the synopsis is that of inclusive breadth of treatment, applied to a problem that could be stated about as follows: What is the railroads' share of Chicago's atmospheric pollution, and what will it cost to substitute smokeless for smoky railroad operation? And the answer has propounded a still harder problem, how to remove the causes, other than steam locomotives, that produce 95 per cent of the atmospheric pollution? That which interests us primarily is the engineering aspect of electrification as a substitute for the steam locomotive.

Here, two things stand out prominently; first, the economic futility of electric motive power when applied on a tremendous scale to the Chicago terminal system as a whole, under conditions where it is not a physical necessity for train haulage; second, the mechanical inadequacy of the proposed self-propelled substitutes.

Electrical engineers will be impressed not only by the heavy cost of electric rolling stock as given in the estimates, but also by the heavy cost of delivering the electric power to the rolling stock; and are also re-