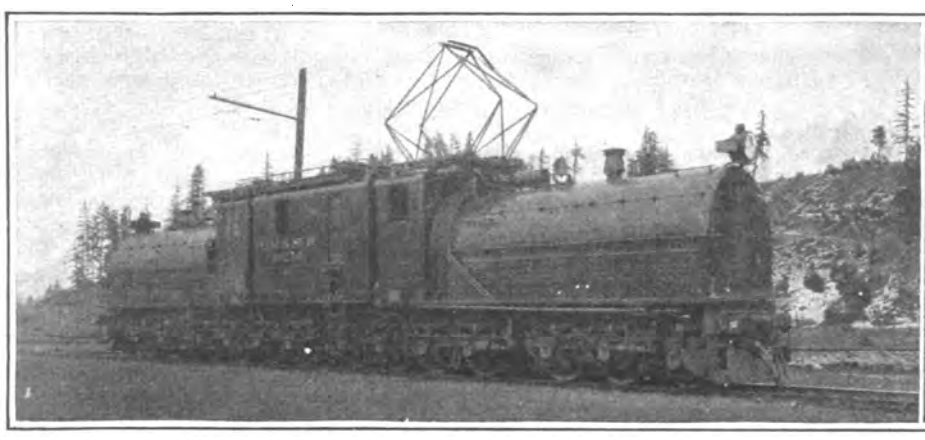


One of the five 3,000-volt gearless locomotives which will handle passenger traffic on the new road

Type of oil-burning locomotive displaced by the electric operation of the C. M. & St. P. Railway

The old and the new in efficient American railroading, or a practical case of electricity vs. steam

The Electric Railroad Over the Rockies

Completion of an Additional Link in the St. Paul's Ambitious Project

By B. S. Beach

WITH the opening on March 6 of the coast division of the Chicago, Milwaukee and St. Paul Railway between Othello, Wash., and Seattle, what is generally acknowledged to be one of the greatest electrical engineering tasks in American railroad annals was brought to a conclusion after five years of constant planning and at an expenditure of nearly $20,000,000.

The United States thus becomes the unquestioned possessor of the longest electrified railroad in the world—almost 700 miles of main line trackage, or the distance between New York and Cleveland, Ohio. To this must be added about 200 miles of extra track bringing the total mileage up to about 900 miles, or nearly the distance from New York to Chicago.

With the exception of about 200 miles still to be electrified between Avery, Ida., and Othello, the complete electrification now extends from Harlowton, Mont., to the Pacific coast, crossing on its way two mighty mountain ranges, the Rockies and the Cascades.

The electrification of the first division began back in 1914. This section was placed in operation in December of the following year, covering a distance of 440 miles across the Great Divide and the Rocky Mountains. The success of this undertaking was so pleasing to the officials of the road that in 1917 it was decided to electrify the coast division now known as the Othello-Tacoma-Seattle electric zone.

This vast electric transportation system in its completed form operates 61 electric locomotives, including passenger, freight and switching locomotives. These locomotives have, in coming, released for service elsewhere no less than 162 steam engines at an annual saving of 300,000 tons of coal and 40,000,000 gallons of oil—for the railroad obtains its motive power wholly from the natural water resources of the surrounding country.

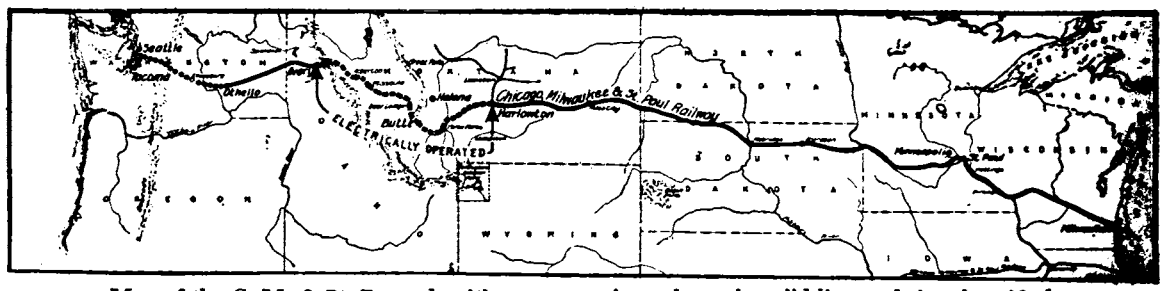
Fifteen hydro-electric power stations make available a combined electric horse-power of 410,000 of which the new division can use 160,000 horse-power. This hydraulically generated current is distributed to the road through eight substations at different points along the line and is in addition supplemented by a 100,000-volt transmission line parallelling the tracks.

Electric rolling stock and equipment for the new division consists primarily of five 3000-volt direct-current locomotives, one of which recently astonished the railroad world by winning a tug of war with two steam engines at the works of the electric company at Erie, Pa. These locomotives, which are the most powerful type of electric passenger locomotives yet developed, are being used in passenger service to haul the "Olympian" and "Columbian," the crack flyers traveling between Chicago and the west coast.

The most interesting feature of the new division is a remarkable 2¼-mile tunnel through the solid rock of a mountain side at Snoqualmie Pass in the heart of the Cascade range. Heavy grades have been unavoidable at many points along the line. In one place a two per cent grade extends over a distance of 20 miles, or a steady upward pull of 105 feet for every mile progressed. Yet the powerful electric takes these grades and others almost as bad at a twenty-mile-an-hour clip, hauling a ten-car passenger train, while on level stretches they make 60 miles an hour.

Traffic on the new road consists of three passenger trains and an average of from five to six freight trains in each direction daily. As illustrating the heights to which the electric locomotives must climb it is interesting to note that the highest point on the road is 6,322 feet above sea level.

The economic features characterizing electric operation on the St. Paul with its new division now opened and the savings effected over the former steam operation are emphasized by the figures. Actual electric operation has effected a saving of 30 per cent in the cost of handling trains, and it is estimated that in addition to the saving in operating cost, 30 per cent more traffic can be handled by the electrified lines than by steam, with the same capacity of locomotives. In other words, the electrified lines will be able to handle about 30 per cent more tonnage than the steam lines, with the same number of locomotives. Of course the greatest saving will result from the elimination of fuel.



Map of the C. M. & St. P. road, with steam sections shown in solid line and the electrified sections in dotted lines

First passenger train hauled by the new gearless electric locomotive, passing through the Cascade range over the Coast Division of the C. M. & St. P.