

THE PROSPECTS OF RAILROAD ELECTRIFICATION IN AMERICA AND ABROAD.

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The world-wide shortage of coal during the great war has emphasized more clearly than ever the necessity of fuel economy in industry, while the present shortage of labor and the certainty of its continuing scarcity throughout the construction period forms another most serious problem. But fortunately we have at our disposal a means that will greatly assist in alleviating both of these conditions; namely—electrification.

The use of electricity in industry saves both fuel and labor. This fact is recognized throughout the world today and in order to secure these advantages, practically all of the nations are now considering plans for the electric generation of power. In England, Belgium and France, among others, these plans are being prepared by official commissions, so that a tremendous activity in electrical power development may be expected with the stabilization following the advent of peace. In all cases, the ideal in view is a broad one: To use electricity for all possible power purposes, including railroad operation.

The operation of the railroads will naturally form an important part of any program of general electrification, for in almost every country the railroads form one of the largest users of fuel and labor. Nor are the advantages obtained from railroad electrification limited solely to economy in fuel consumption and the more effective use of labor. Among others, the following can be mentioned:

1. Greater speed of movement for the heaviest trains, due to the fact that electric locomotives can be made much more powerful than the largest steam locomotives.

2. Greater nicety of control.

3. Increased traffic capacity of existing tracks, terminals, grades, tunnels, and other points of traffic restriction, because when electricity is used, heavier trains can be operated at higher speeds and less time is consumed at terminals and in yards.

4. Operation where the use of steam is impossible or objectionable, as in long tunnels.

5. Independence of weather conditions, since the electric locomotive is not effected by cold weather.

6. More reliable operation, as proved by the statistics of all existing electrifications.

7. More effective use of all rolling stock, due to more expeditious movement of traffic.

8. These are some of the advantages that are now being obtained for the mere substitution of the electric locomotive for the steam locomotive, but they by no means tell the whole story.

Consider electric illumination. When first introduced, the electric lamp supplanted a gas or an oil light because of certain advantages it possessed, and at first it occurred to no one that it would ever do much more. But the electric lamp has within thirty years revolutionized illumination and has given us our light-flooded factories, with their greatly increased production and safety, and our Great White Ways as well.

A further example is the growth of our great city and interurban electric transportation service of to-

day from the substitution of the electric motor for the horse on street cars.

There is good reason to expect that the electric operation of the railroads is capable of a similar development and will in time revolutionize our present transportation methods and provide us with services we know little or nothing about today.

Since the United States has an abundance of coal, railroad electrification here has been determined solely by local conditions. Passenger terminal problems caused the electrification of the New York Central at New York and the Pennsylvania at New York and Philadelphia. The limitations of the steam locomotive determined the electrification of the Baltimore tunnel on the Baltimore & Ohio, the Cascade tunnel on the Great Northern, the St. Clair tunnel on the Grand Trunk, the Hoosac tunnel on the Boston & Maine and the Detroit River tunnel on the Michigan Central. Examples of electrified railroads with freight as well as passenger service are the Norfolk & Western, the Chicago Milwaukee & St. Paul and the New York, New Haven & Hartford.

While the other electrifications are successful and interesting, the last three are more properly representative of general railroad electrification. The Norfolk & Western is an example of electrification under the heaviest conditions of freight traffic on a mountain grade. The Chicago Milwaukee & St. Paul has in operation the longest continuous mileage in the world, and when completed will cross five mountain ranges. The New York, New Haven & Hartford has a very large movement of both freight and passenger traffic. All three installations are successful and profitable and, when financial conditions are stabilized and the American railroad question settled, it is expected that all three will extend their electrified service.

In addition there are sections of railroads about the country where the present congestion of traffic or the availability of water-power warrants the early adoption of electric power. These possibilities alone promise under normal conditions of finance (as no engineering problems now remain to be solved) extensive activity in the electrification of railroads for many years to come.

Different from America, European and South American countries, with the exception of England alone, lack an adequate supply of fuel, but many of them including Norway, Sweden, Switzerland, Italy, Spain and Brazil, have large amounts of water power, while France has a moderate amount. These resources combined with the high cost of fuel make extensive railroad electrification in these countries inevitable sooner or later.

The neutral countries will probably be the first to undertake this work, Switzerland having a program covering a term of years well established, while both Norway and Sweden are giving active consideration to definite projects. In England, a considerable amount of electrification is in contemplation along with the general plan for the electrification of industry. A French Commission, composed of Government and railroad engineers, have already visited the United States in order to thoroughly familiarize themselves with American practice. The Italian Government will continue their definite program as soon as financial conditions permit. An official Belgian Commission is already planning to rehabilitate with electric power at least a portion of the railroads destroyed by the

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