

more accurate, from 1880 to 1883, the French engineer Marcel Deprez conducted some very important experiments on the transmission of electricity, on a line eight miles in length running between the town of Vizille and the city of Grenoble.

This was followed by the invention of the transformer in England by Gaulard and Gibbs in 1882, and of the automatic turbine governor by Piccard in 1885.

Previous to these dates energy had been transmitted by cables at Schaffhausen and at Fribourg, and by water under pressure at Geneva and Zurich.

These component parts of the modern hydro-electric plant were first assembled into a working whole at Lauffen, in Germany, in 1891. The energy was generated at 50 volts, then increased to 13,000 volts and transmitted to the Frankfort Exhibition 75 miles away.

The first development in America was a 15,000 h.p. plant constructed at Niagara Falls in 1893. Since 1895 the technics of hydro-electric work have progressed wonderfully, and the recent improvements in insulation have made possible the economical transmission of energy for distances of two hundred miles and over, whilst the improvement in modern turbine construction has allowed of the commercial development of low heads which could not have been considered ten years ago.

The conflict now raging in Europe has practically called a halt to our industrial development, and it has occurred to the writer that this marking time period is especially adapted for a review of past achievements and a survey of the work which may be done in the future.

Lately our economists, statesmen, and journalists have extolled our water powers and have been pleased to see in the number of our water falls the guarantee of our future industrial superiority. Without desiring to minimize in any way the importance of this national asset, it might be interesting to compare this wealth with the similar wealth of other countries and to examine whether or not we are making or are preparing to make the best possible use of it.

The following table has been compiled from various European sources, from the reports of the United States Geological Survey and from the report of the Canadian Commission of Conservation. It shows the total available and developed water powers in the different countries of Europe, in the United States, and in the various Provinces of Canada; it also indicates the percentage of utilization for each country and the horse-power per square mile.