

soon rains which, it is stated, averaged, over a period of 34 years, $3\frac{1}{4}$ inches per day, for 45 days.

This scheme, as yet incomplete, is nevertheless in operation. It was financed in India and during the first year of operation earned and paid a dividend on its full capital.

Amongst our allies, the United States, faced with similar fuel conditions to ourselves, is taking active steps to mobilize her power resources but is handicapped, as are some parts of Canada, by unsatisfactory water power laws.

Water power is a salient feature in the contrast between the United States-Canadian boundary and the frontiers of Europe. To a traveller journeying along the frontiers of continental Europe in times of peace, the most conspicuous handiwork of man would probably be the mighty fortresses designed for defence against war-like aggression. These must always serve to remind the frontier dwellers that they live in the shadow of a continual war-menace. Here, on the contrary, the handiwork of man has been devoted to the erection of undefended bridges and canals along boundary waters, and of hydro-electric stations, which attract dwellers to the border regions that they may mutually enjoy a natural industrial asset, and must remind them that they live in the light of what promises to be a perpetual peace.

European Construction.

France, until the war an importer of one-third of her coal, was faced by the loss to the enemy of a considerable proportion of her own mines and the rising price and difficulty of transportation for imported fuel. Promptly, and in spite of many difficulties, she has proceeded with hydro developments and by the end of this year will have 1,100,000 horse-power developed, an increase of 450,000 horse-power since 1910, two-thirds of which has been secured since war broke out.

Italy, lacking coal, is an excellent field for water power development and through the famous A.E.G.* the Germans secured a stranglehold on Italian industry and by 1910 515,000 horse-power was developed. Since the outbreak of war, the Italian government has not merely broken the Teutonic hold but has proceeded with an active water power policy. A recent news item states that concessions for 208,000 horse-power were granted in 1917 and that in December, 1917, there were 218 requests for concessions, estimated at 816,000 horse-power, in course of examination.

In Russia, the provisional government has recently appointed a water power committee with absolute control over the development of all water power schemes in the Empire exceeding 300 horse-power.

Neutral countries are well aware that they will have to compete in a much keener market after the war and we see signs of stimulated activities in the Scandinavian countries.

A recent despatch from Mr. Albert Halstead, the United States Consul-General at Stockholm, states that the present capacity of water plants in Sweden is about four million turbine horse-power, of which one million was completed during 1917. This is such an enormous advance from the figure of 850,000 turbine horse-power, reported by Sven Lübeck in 1915, that one is inclined to doubt the accuracy of Mr. Halstead's figures, particularly since former estimates only credit Sweden with four and one-half million horse-power available.

Mr. Halstead states that 92 per cent. of the power is being used for the larger industries and 8 per cent. for illumination and the lesser industries.

Information collected during 1915 by the Dominion Water Power Branch indicated that Norway had five and one-half million water horse-power available, of which 1,120,000 turbine horse-power was developed, 400,000 horse-power being utilized for nitrogen fixation. It would be interesting to learn if progress in Norway has been on the same scale as that reported for Sweden. The governments of both countries are rendering every possible encouragement in the development and use of "white coal."

Denmark has practically no water power and it is interesting to note, as indicating the national importance of power, that a suggestion has been put forward for a triangular agreement whereby Norway and Sweden should export hydro-electric power to Denmark, Norway to make up any power deficiencies caused thereby in Southern Sweden where the water powers are less extensive than in the north.

Barcelona, the "Manchester of Spain," a city of 300,000, is replacing steam power by hydro-electricity and a Canadian company has already completed a large portion of an extensive system of reservoirs and hydro-electric stations on the Noguera Pallaresa and Segre rivers. A recent number of the Journal of the Royal Society of Arts reports the formation of a powerful company to exploit the Douro Falls on the Portugal-Spain frontier where 350,000 horse-power is said to be available.

Switzerland has been called the "Industrial Annex" of Germany, and in 1910 25 per cent. of her two million available water horse-power had already been developed. More recent information is not available; nevertheless, the mere fact that 32 horse-power had been developed in 1916 for each square mile of area is sufficient indication of the economic importance of Swiss water powers.

Central Powers are Well Developed.

Concerning enemy countries, information filters through from time to time and in July last the British Board of Trade Journal contained a special article on the proposals for the centralization and development of electric power supply in Germany as part of the reconstruction policy after the war. In Wurtemberg, the State is to participate in the administration of a scheme for the consolidation of all electricity works for the purpose of the uniform distribution of current. The Saxon Second Chamber in December, 1917, voted forty million marks for developing state electricity works on condition that light and power should be furnished at cheap rates for industrial and commercial use. In Bavaria, a syndicate has been formed to exploit the water power on the Lower Inn, backed by the Deutsche Bank and native Bavarian financial and industrial interests. This syndicate has two million marks at its disposal for preliminary work and it is estimated that the complete scheme will require 150 million marks. Another scheme, backed by the A.E.G. of Berlin proposes a development of Bavarian water power to be begun three months after the conclusion of peace, the estimated output being over 21 million kilowatt hours. Prussia seems to be committed to the policy of State control of electricity supply.

In Austria, the government announces the establishment of a special department of the Ministry of Public Works to control the electrical system which is to be augmented by a great development of water power. This system is to be centralized and future concessionaires, whether private or public, made to conform to the general scheme. In Hungary, similar legislation is in preparation.

*The Allgemeine Elektrizitäts Gesellschaft of Berlin.