

that would secure the maximum advantageous use of the power resources of the river.

The results of the investigation have been published as Water Resources Paper No. 3, which deals exhaustively with the whole question and makes available to the public reliable information as to the various sites, the power available at each and the approximate cost of developing the same. This paper establishes the outstanding fact that there is approximately half a million horse power available on the Winnipeg River within easy transmission distance of Winnipeg, and that the undeveloped portion of this power can be concentrated at seven sites, each of which lends itself to development on a basis that is thoroughly sound both from the engineering and the economic standpoints.

Since the report was published in 1915 certain revisions in power estimates have become possible through the receipt of later stream flow data; these revisions have been adopted in the following brief account of the various power sites.

How Great Power Sites Are Developed

The Winnipeg River in Manitoba is greatly enlarged just before entering the province by receiving the waters of the English River, of almost the same size as the Winnipeg before the junction.

The Upper Winnipeg issues from the Lake of the Woods, the level of which can be regulated by the Norman Dam and which forms, therefore, a controlled storage basin 1,500 miles in extent. This lake receives the flow of Rainy River, in its turn controlled by dams at the outlet of Rainy Lake, 350 square miles in area and, Lake Namakan, of 100 square miles.

Thus the Upper Winnipeg, well controlled naturally by the numerous lakes and muskogs in its 26,750 square miles of drainage basin, has the additional benefit of artificial regulation of nearly 2,000 square miles of reservoirs.

The English River issues from Lac Seul, 340 square miles in area, and is itself virtually a chain of large lakes for 150 miles to its junction with the Upper Winnipeg. Its flow is therefore remarkably well regulated naturally and there are opportunities, not yet availed of, for further regulation by artificial means.

Thus we see that the Winnipeg River in Manitoba drains in the neighborhood of 55,000 square miles of territory and that its flow is well regulated. This flow reaches a minimum of 11,000 second feet. The maximum observed since regular measurements have been taken is 69,400 c.f.s., though high water marks along the river indicate that a maximum of 100,000 has been attained in the past. Careful investigations indicate that, when the river is completely regulated, a dependable flow of 20,000 second feet can be ensured, while the ordinary minimum flow is 15,500 under present conditions. This means that every foot fall in the river represents at 75 per cent. efficiency 1,400 continuous horse-power under present conditions, and over 1,800 under complete regulation.

About 20 miles downstream from the boundary of the province Point du Bois Falls is reached, the site of the City of Winnipeg Municipal Hydro-Electric Station, which has a turbine installation of 47,000 horse-power and operates under an average head of 45 feet. The generator