plies to locate near him, and if as a member of a large manufacturing community he can obtain freight rates and access to markets which as a member of a small manufacturing community he could not get.

Considering the first of these alone, the direct value of the water-power obtainable from the flow from Lake Erie into Lake Ontario is conservatively estimated at $2,000,000,000.

That is the capital value that Professor Fessenden places upon Niagara river as a power proposition—$2,000,000,000. It is an immense asset to the people of this country and one that we are well justified in conserving.

It may be advisable to show how this figure is derived. Estimates of the flow of the Niagara Falls vary somewhat, but we may take as the average flow 75,000,000 gallons per minute. Taking the difference of level between the two lakes as 330 feet, this gives a figure of approximately 6,000,000 horse-power.

Under an adequate development and other conditions such as obtain in a hydraulic plant of this character a horse-power year can be developed at a cost which is at least from $15 to $70 less than that for which it can be produced by steam. Assuming an average difference of only $30, the annual saving in cost from the full amount of power is developed will be $120,000,000.

One hundred and twenty million dollars annually can be saved by the development of this power at Niagara.

This represents the interest at five per cent on more than $2,000,000,000 and the capitalized value of this saving to the people of the province of Ontario may therefore be taken as more than $1,000,000,000.

That is providing the province of Ontario is entitled to half the river and the state of New York to the other half of the river. One billion dollars would be the capital value to the province of Ontario from the river Niagara.

The above estimate is a conservative one. In practice the average cost of a horse-power year produced by steam is found to be considerably greater than that assumed and a value of more than $250,000,000 per annum would be found to be more nearly in accordance with the actual facts.

To produce this horse-power by steam would require more than 60,000,000 tons of coal each year.

This figure is a conservative one as an actual average of the amount now used per horse-power would give a higher figure. As the average tonnage mined per year per man employed in the coal mines is 600 tons, it will be seen that the present waste represents the labour of 100,000 additional men in the coal mines. Incidentally it represents also an annual loss of 300 lives and more than 1,000 serious casualties from accidents in the mines. In this estimate of the value of this water-power to the province no account has been taken of the fact that where coal is mined abroad and brought into the country, so that the money received by the miners is spent outside the country using the coal, the loss from failure to employ available water-power is much greater; nor has any account been taken of the great indirect economic gain accompanying the adoption of electricity for power purposes.

Overlooking some of the computation I desire to give these figures in another way:

The matter may be presented in still another light. It is difficult to grasp the meaning of such figures as $2,000,000,000 or one hundred and twenty million dollars per annum or sixty million tons of coal per annum, or six million horse-power. When, however, we realize that six million horse-power is more than the power of all the steam engines and boilers in the United Kingdom of Great Britain and Ireland we begin to get an idea of what these figures mean.

Since the balance of this report was written Mr. G. T. Beilby has published his presidential address on the subject of the consumption of coal in the United Kingdom of Great Britain and Ireland.

He shows that the entire output of all the steam engines and boilers in Great Britain and Ireland is approximately 5,000,000 horse-power and that the total annual coal consumption for railways and factories is 66,000,000 tons.

So that these figures go almost completely to prove what has been already stated, that it will take about 66,000,000 tons of coal per annum to represent the power that is at present running to waste on Niagara river.

In other words, the water-power derived from Niagara river is capable, could it be transmitted, of operating every manufacturing establishment and railroad in the United Kingdom of Great Britain and Ireland at a small fraction of the cost.

And this again is not a complete statement of the facts for it has been found from an extended practical experience that where electrical driving is used, on the average less than one-half the power is required for reasons given in another part of this report.

So, Mr. Chairman, you have in a nut shell, the total value of the Niagara river as a power proposition. The commission took three guides as its basis of calculation; in the first place it estimated what a 30,000 horse-power development plant would cost; next a 60,000 horse-power development and next a 100,000 horse-power development plant. The result of a careful calculation is that on a 30,000 horse-power development the cost on Niagara river (without transmission and just at the point of generation) would be $8.39 per horse-power; for a 60,000 horse-power development the cost would be $5.89 per horse-power, and for a 100,000 horse-power development it could be developed as low as $4.95 per horse-power for a twenty-four hour day per annum. We can take five dollars per horse-power per annum in round figures for a 100,000 horse-power development, and I suppose a larger unit could be developed at relatively less expense. Adopting that basis and taking the 6,000,000 horse-power run-