

preserve our independent action, fight against geography. It is a well-known physical law, that forces all tend to move along the lines of least resistance. We have, as a nation, undertaken the task of forcing our outlets against the line of least resistance. The Atlantic seaboard is the outlet for the products of the prairies, situated some 1,500 miles inland, and one effort in building railways, with easy curves and grades, in the enlargement of our canal system, and in the improvement of rivers, particularly the St. Lawrence route, has been with the one object of putting a few cents more per bushel into the pockets of our farmers. The enlargement of the Welland Canal will allow the larger type of ship, of 300,000 bushels capacity, to pass down Lake Ontario and the River St. Lawrence to within 120 miles of Montreal. Great storage elevators will be erected at or near Prescott and 1,000-ton barges will be towed through the present canal system to Montreal. Each incoming ship is known for days ahead, and the exact cargo of grain required can be in waiting for transfer by floating elevators. Ultimately, however, the larger ship will come through to Montreal, as it is quite practicable and within the resources of the country to convert the St. Lawrence River into block-water navigation by the building of eight dams, with duplicate locks; and as an incident thereof, to develop the greatest water powers in the world, aggregating over four million horse-power, eliminate the ice-jams, and make practicable the navigation of the river in winter by the aid of powerful ice-breakers.

It is a duty our Government may well undertake at the earliest possible moment, to secure a hydrographic and topographic survey of the St. Lawrence, so that accurate estimates of cost may be made, and that proper regulations drawn to so regulate proposed power developments owned by private corporations that each may be brought into a component part of the completed whole.

It would be difficult to place a limit on the possibilities on such power development, situated on the greatest transportation route in the world. Cheap and abundant power means so much to a country.

**Trade.**—Our trade has grown by leaps and bounds during the period under review.

Exports				
Year.	To United Kingdom.	To United States.	To other countries.	Total.
1900	96,562,875	52,534,977	14,412,938	163,510,790
1914	215,253,954	163,372,690	52,961,795	431,588,439

Our imports for the same period were:—

1900	44,279,983	102,080,177	26,146,718	172,506,787
1914	131,942,249	395,565,328	90,821,277	618,324,874

A feature which concerns us closely is the growth of manufacturing and the development of mining products:

#### Statistics of Manufacture—1900 to 1910.

	1900.	1910.	Increase, per cent.
Establishments ..	14,650	19,218	31.18
Capital .....	\$446,916,487	\$1,247,583,609	179.15
Employees on			
salaries .....	30,691	44,077	43.61
Salaries .....	\$23,676,146	\$43,779,715	84.91
Employees on			
wages .....	308,482	471,126	52.72
Wages .....	\$89,573,204	\$197,228,701	120.19
Raw and partly			
mfgd. materials.	\$226,527,858	\$601,509,018	125.68
Products .....	\$481,053,375	\$1,165,975,639	142.38

#### Mineral Production.

	1900.	1910.	Increase, per cent.
Mines and works..	1,373	2,222	61.84
Value of buildings and plant .....	\$42,771,803	\$108,506,051	153.68
Employees on			
salaries .....	1,527	2,284	89.86
Salaries .....	\$1,512,821	\$3,317,030	119.26
Employees on			
wages .....	37,065	67,150	81.16
Wages .....	\$16,336,273	\$39,129,941	139.053
Value of products.	\$47,956,862	\$122,004,932	153.40

A marked feature of our trade is the importation of steel products and manufactures of which steel is the important constituent. During the year 1911 we brought in \$85,319,541 worth of such, of which \$11,448,428 worth was on the free list. We also imported fire clay and fire brick to the value of \$994,193, all of which was on the free list. I have no desire to infringe upon the boundary line of politics, but I may be permitted to point out that such a tremendous balance of trade against us is one concerning which thoughtful men may well ask, how is it to be dealt with? I venture to say that by careful readjustment of the tariff quite 50 per cent. of the importations may be profitably dispensed with by manufacture in Canada.

We have been large borrowers in the world's markets, spending money lavishly and, on the whole, wisely. Here and there over-capitalized, ill-considered industrials will be found, but the time has arrived when we must economize—pay our way—write down inflated capital and show the loaning world that Canada is solvent and worthy of the trust and confidence shown us.

I have no doubt of the ultimate result. Our resources of unworked land, our mines, forests and fisheries, will afford homes and opportunities for millions of men. In 1901 our population was 7,206,643, of which 3,925,679 was rural and 3,280,964 was urban. It will be noted that barely 600,000 additional was made to the rural population, whereas the great increase flocked to the cities and towns. This is not satisfactory, and efforts will be needed to bring more people to our land.

The Province of Quebec spent \$4,000,000 on good roads last year.

Mr. H. N. Munro, in a paper recently read before the Junior Institution of Engineers, of Great Britain, said the commercial possibilities of aluminium became evident in 1887, when Hall in America and Héroult in France produced the metal by electrical means. For electrical purposes aluminium was fast becoming common. Overhead transmission lines constructed in aluminium showed a great saving over equivalent copper lines, a saving of as much as 10 to 25 per cent. being effected, depending on the size and nature of the system erected.

A test is being conducted by the mechanical engineering department of Purdue University, Lafayette, Ind., to determine the effect of the impact resulting from flat wheels. These tests cover flat spots of various sizes on wheels carrying definite loads and running at definite speeds. It has been found that an imperfect wheel with a 3-in. flat spot strikes the track with an impact of 104,000 lb. when the car is going 16 miles per hour and is carrying a load of 20,000 lb. It was also found that under similar conditions a flat spot only 1½-in. in length produced a blow of 20,000 lb., and the impact for spots 2-in. long was 25,000 lb. A standard goods car was mounted in the test laboratory and special apparatus including an instrument which photographed the magnitude of the blows, was employed to collect test data.