

might be more practicable if the "most approved modern methods" were known and agreed upon. Does the Engineers' Club feel able to pronounce on this point, or does it wish to leave the matter to the experts in the Toronto city council. Perhaps it is better to wait till the Royal Commission appointed by the British Government to determine this very point has reported. A lasting benefit would be conferred on the profession, not to mention the public, if the Engineers' Club would set this matter at rest.

—Victoria, B.C., is a storm centre from an engineering point of view. We have given some notes, from time to time, on the ups and downs of its professional advisers. There is now on hand an extra fire row over the sewage system, which is planned on the separate system, and into which it has been proposed to turn the storm water.

THE CANALS OF CANADA.*

The canals of Canada is a subject that has interested the Canadian people for more than a century. The greatest of our engineers, both civil and military, have labored in their development, our politicians have found in them the cause for bitterest controversy, and our merchants have looked forward time and again to supremacy in the export trade to Great Britain and Europe after their completion; and yet to-day, the existence of many of them is unknown to most of us, and the aid they have given to the growth of our commerce but little appreciated. Their story may best be told by considering, first their history, then their construction where viewed as examples of the engineer's art, and lastly, their commercial importance. The history of the westward movement of our civilization during the present century, is, in the main, the record of the triumphs of our engineers in developing means of transportation; and the periods of greatest activity in our political life have been followed by large expenditures upon roads, railroads and canals. To-day, confident as we are that owing to the justice of our governmental system and the fertility of our soil, our unoccupied lands present to the migrant farmer attractions unequalled by those of any other government-held land in the world; we are still subsidizing freely every improvement in transportation facilities for the unoccupied districts, in the firm belief that our lands will not be taken up, until they are made readily accessible. It is to this long recognized principle that our canals owe their commencement.

Montreal from the days of Maisonneuve to the days of Alexander McKenzie and his associates, had but one trade—the fur-trade, and that commerce taxed to the full, the transportation facilities of the country. Lachine was the western port of the city, and from it set out the trading expeditions, with their goods laden in either batteaux or canoes, that is in lumbermen's boats or in birch-bark canoes, as we know them on our rivers to-day. At the close of the 18th century they were about 30 feet long, with 6 feet beam, and could carry from three to five tons of cargo; the canoes being used on the Ottawa and Georgian Bay route, as their light weight of about 500 pounds made it possible to carry them across the numerous portages; and the batteaux were best suited to the rocky and dangerous rapids of the St. Lawrence. The profits of the trade must have been very great, for the length of time that was required to complete a transaction was appalling. Alexander Mackenzie, in his book of travels, states that it took over four years to get goods from London to trade them for furs in the Northwest, and to sell those furs in London.

It was to aid this trade that Dallier de Casson, the soldier, explorer and priest, then Superior of the Seminary of St. Sulpice, entered into contract with the engineer, Catalogne, for the construction of a cut across the divide between Lachine and little Lake St. Pierre, from which there was a canoe route to Montreal. This was in the year 1700, and although, owing to Dallier de Casson's death, the work was not completed, the gen-

tlemen of the Seminary never ceased petitioning the King for its construction, until the old regime had passed away. The fur trade, rudely interrupted by the final struggle between France and England, was resuming its activities when the American War of Independence broke out, and after the shock of the Continental armies had broken in vain on the rock of Quebec, the soldier Governor Haldimand saw, that in order to maintain the fortified posts of the Crown in the west, built indeed largely for the benefit of the fur trade, he must have better means of forwarding supplies to them, and for that purpose he gave orders in 1779 for the building of the first St. Lawrence canal. This was built at the Cascades rapids under Capt. Twiss as engineer, and was completed in 1781; the lock being able to pass boats six feet wide, and drawing a foot and a half of water. By 1783 improvements were completed on this scale around all the rapids between Lake St. Louis and Lake St. Francis, and nothing further was done by the Government until after 1800.

But, while the Montreal traders were cheerfully paying toll to the War Department for the use of these locks, two great events of Canadian history had occurred, both in the year 1783. At that date the Northwestern Fur-Trading Company, of Montreal, began the brief, glorious and stormy life that was for awhile the life of Montreal. Its founders were men unsurpassed in our annals for vigor, courage, enterprise and ambition; their memories still linger in our streets, and are writ large upon the map of Canada; for they were the men who pushed our commercial confines to the Arctic and to the Pacific, and who, proving more than a match for John Jacob Astor and his New York associates, saved for us the Northwest. But their passions were as strong as their vigor and enterprise, and fiercely and jealously the great houses composing the company struggled against one another, and fiercely and jealously they made war upon the Hudson's Bay Company and the early Selkirk colonies, until worn out by the long struggle, the companies were at length amalgamated in 1821, and the fur trade passed away from Montreal. But in the legal records of their internal struggles Mr. Douglas Brymner found the particulars of a totally forgotten work; and a few years ago, guided by the information which he published in the Canadian Archives, engineers uncovered at Sault Ste. Marie the foundations of the first lock built by that rapid, a wooden structure, 30 feet long and 8½ feet wide, opened in 1798 by one section of the Northwest Company for the passage of their trade, and probably destroyed during the American war of 1812.

In 1783, also was signed the treaty of Versailles, perhaps the most disgraceful and cowardly action ever committed by Great Britain, when by it she abandoned the Loyalists, who had so staunchly stood for the United Empire, to persecution, confiscation and death at the hands of their enemies; but by that iniquity Canada was the gainer, and from 1784 to 1790 the Loyalists poured into her confines to build up the provinces of Ontario and New Brunswick. They had been among the ablest and most public-spirited of the citizens of the commonwealths from which they came, and from the time that they were fairly settled in Upper Canada, the cry for better access to the sea never ceased. A hundred years ago that cry could mean nothing but water-ways; a fact that is brought home to us with startling effect, when we read the speech of Adam Lymburner, a Canadian delegate sent to England to oppose the passage of the Constitution Act of 1791. That Act separated Upper and Lower Canada, and Lymburner contended that this separation was completely unnecessary as Canada never could extend beyond Hamilton, the Niagara Falls forming an insuperable obstacle.

To accommodate the rapid developing commerce of Upper Canada some improvements were made in the St. Lawrence route between 1800 and 1810, but only on the outbreak of the American War of 1812 was the insufficiency of the canals on the route fully realized by both people and Government. The building of the first Lachine canal was advised by Prevost, the Governor-General in 1815, but it was not until 1821 that the Government of Lower Canada, subsidized by the Imperial Government, undertook this work. It was completed in 1825 with stone locks 100 feet long, 20 feet wide, and 5 feet deep. While it was in progress the fur trade was passing away, and the great Quebec lumber trade was rapidly growing under the liberal fiscal policy of Great Britain towards her American colonies; its booms, dams and chutes were seen on every river; it

*From a paper by Arthur Weir, B.Sc., before the Applied Science students of McGill University.