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THE WELLAND SHIP CANAL

A VAST UNDERTAKING

(By W. Craick.)

So much has been written about the Panama Canal that that gigantic engineering feat has come to be regarded as the eighth wonder of the world. Its chequered history, its appalling cost both in human life and in money, its stupendous construction problems, all have been described in such detail that most people are familiar with their every feature. On all hands it is conceded to be a splendid achievement, reflecting credit on those who have carried it to completion.

Canadian young people should not forget, however, that in their own country there is today being prosecuted a national work which in some respects is of even greater importance than the Panama Canal. While not so large nor so difficult of accomplishment, the building of the new Welland Ship Canal rivals in many particulars the construction of the canal across the Isthmus of Panama. From the engineering standpoint, it is true, it may not be as notable a work; from the commercial standpoint it will be probably be of greater significance.

From our geographical we learn that the two smallest of the Great Lakes, Erie and Ontario, are connected by the Niagara River, and that on the Niagara River are located those tremendous falls over which the water flowing out of Lake Erie pours down hundreds of feet into the rocky gorge that extends to Queenston. The cataract and the tumultuous rapids both above and below the falls present an impassable barrier to navigation and provide the obvious reason for the construction of a canal between the two lakes.

Geographies further inform the inquirer that a canal already exists across the Niagara Peninsula, its termini at Port Colborne on Lake Erie and at Port Dalhousie on Lake Ontario, and that the canal accommodates considerable traffic during the season of navigation. Indeed, those who have visited the Peninsula in Summer will probably have been entertained by seeing the steamers sailing along through the canal and looking from a distance quite as if they were travelling on the surface of the earth itself.

The existence of a canal already, through which several thousand ships sail each year, may make it seem rather curious that the building of another canal should be necessary. To make this quite clear a little lesson in history will be requisite.

Many years ago, when Upper Canada was first settled, people became interested in the problem of how to get around the Falls of Niagara in boats. There were no railways then, and it would mean a great saving in the cost of transportation if they could only take their boats through from Lake Ontario to Lake Erie without having to unload. At last some men did conceive a plan to build a canal, and after several years' work they succeeded in doing so. This canal was very small and imperfect, but it filled existing requirements, and from 1833, when it was completed, until 1841, when the Government took it over, it accommodated traffic very well indeed.

In the meantime the country to the westward was filling up, and on Lakes Huron and Erie ships were being launched that were much too large to get into the little hundred-foot wooden locks on the Welland Canal. The first thing that the Government did when it acquired the canal was to arrange to enlarge

it. This work was begun in 1842 and completed throughout in 1850. The locks were now built of stone, one hundred and fifty by twenty-six and a half feet in size and were double the capacity of the old wooden locks. They were big enough to hold any ships sailing on the lakes at that time.

Twenty years passed, and again the size of the ships on the upper lakes outgrew the capacity of the canal. The Western states were now becoming heavy grain producers and large propellers were being built to carry the grain from Chicago to Buffalo. Practically two-thirds of these ships were too long and drew too much water to make it possible for them to navigate the canal. A second enlargement was decided upon in the year 1872, which meant practically a rebuilding of a large section of the canal along a new route. This is the canal, completed in 1887, with a fourteen-foot waterway throughout, which is now in operation. Its locks measure 27 x 45 feet, giving treble the capacity of the canal taken over by the Government in 1841. It was of a size sufficient to accommodate the largest vessels of the day and was regarded as being ample to meet all needs for years to come.

However, the canal builders of the seventies and eighties did not foresee the tremendous development which was going to take place in Western Canada at the opening of the twentieth century. They did not reckon on the enormous grain production of the prairies, which would flood all possible channels of transportation. They did not realize that within a few years such gigantic freighters would be sailing the upper lakes, laden with wheat from the elevators of Duluth, Port Arthur and Fort William, that their canal would become incapable of handling them.

So once again and for the third time the mandate has gone forth that the Welland Canal must be enlarged. Engineers were sent into the field to study the ground and make plans. It was ascertained at the outset that the route of the existing canal would not serve; that a new route would have to be located. This was finally found some distance to the east of the old canal, and about a year ago the work of construction was commenced. It is now being prosecuted with vigor, and the scene along the line of the new channel is one full of interest and inspiration.

Let us see whether the new Welland Ship Canal can stand comparison in any respect with the famous Panama Canal. So far as length is concerned it cannot, for the latter's fifty miles is double the Welland's twenty-five. The respective widths of the bottoms of the channels are 300 feet and 200 feet, the minimum depths 41 and 25 feet, though the Welland Canal locks are being made to conform with a 30-foot depth throughout. The Panama locks are one thousand feet long and 110 feet wide; those of the Welland eight hundred feet long by 80 feet wide. All these figures show the capacity of the Welland to be approximately two-thirds of that of the Panama Canal. Considering that the one is an inland canal and the other a great interoceanic canal, the position of the former as a very important piece of engineering work is established.

There is much to interest the observer even in the earlier stages of construction. Looking down from the escarpment at Thorold towards Lake Ontario, a busy scene is presented. From this point the route of the

new canal is widely diverted from the old canal. Crossing the latter twice, it strikes almost due north through the valley of the Ten Mile Creek to the shore of the lake. Here a new harbor, called Port Weller, after the name of the chief engineer, is in process of formation. Two sinuous piers are being thrown for a mile and a half from shore in order to make the breakwaters which will enclose the harbor. They are being built of the earth excavated from the cuts, which is brought down by the trainload and dumped in wooden piles.

Incidentally, as illustrating the tremendous scope of the work, it may be said that the contractors have had to build a complete double-track railway from the lake to the foot of the escarpment. Along its trains go thundering back and forth all day long. Here and there spurs branch off and descend into the excavations, where steam shovels are forever tearing at the earth and loading it on to cars. These are hauled off when they are filled and the material conveyed down to piers.

In the neighborhood of Thorold, where four of the seven locks which will rise ships from the level of Lake Ontario to that of Lake Erie are located, it has been found necessary to lift a railway out of the way of the works. The line of Port Colborne branch of the Grand Trunk lay for some distance directly in the path of the canal. To remove it, a new line has been constructed to the westward, a costly piece of work, since a long and deep rock cutting was required.

Other obstacles to progress of a less serious nature must have been swept aside. Fine fruit farms have been uprooted, houses and barns removed, roads diverted and streams turned into new channels. Where lay a peaceful country-side, locomotives and cars, steam shovels and graders, carts and horses are busy burrowing into the ground to make a channel for the canal and reservoirs for the surplus supply of water to fill the locks.

It will take long years to finish the task, in spite of the rapid progress that has already been made. Such a gigantic undertaking as this cannot be finished in a day. Its completion will have an important bearing on navigation of the Great Lakes. Take for instance the question of time. The present canal has twenty-six locks, the passing through which is a slow and tedious process. The new canal will have but seven, of which three will be twin or double locks, permitting one ship to go down while another goes up. By means of a system of valves and culverts in the walls of the locks, it will be possible to fill them in eight minutes. This is quick work and will greatly expedite traffic.

Of even more importance will be the increased capacity. Compare the Soo Canal and its eight hundred foot lock with the present Welland Canal. During the Summer of 1912 there passed through the former seven thousand, eight hundred and fifty-six ships, of a tonnage of 25,832,244 (not including the enormous tonnage through the American canal). Through the latter the same season only 2,905 ships passed, their tonnage being 2,679,500. While it is not to be expected that all the tonnage passing through the Soo Canal will pass through the Welland Ship Canal, yet a very much larger proportion will be carried when the capacity of the Welland is enlarged to accommodate the big boats now using the Soo canals. It stands to reason that it will be more advantageous to send a ship right through to Montreal and possibly to England than to have it unload at some port on the Georgian Bay and thence tranship its cargo by rail. This is a result that may be anticipated when the eight hundred foot locks of the Welland are in operation, and it will work conversely, for ocean liners will then be able to proceed through to the head of the Great Lakes without breaking bulk.

It is a big task, but a necessary one, and commercially it will be of more importance than the Panama Canal, since the commerce of the Great Lakes is far in excess of the probable commerce from Atlantic to Pacific. Let us, then, watch the progress of the work with attention, realizing that it is an undertaking of which all Canadians may well be proud.

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A German staff officer, who has been captured by the French, has been so frank as to state that German military authorities are aware that Germany made a great mistake by not retiring from France after the Battle of the Marne instead of incurring heavy losses in trying to pierce the English line at the Yser canal. This is only corroborative of the statement made in an interview by Lord Kitchener some months ago. He then said words to this effect, "Believe me, Germany is making a great tactical error in lying like a long grey snake across the 'north of France.' That seems obvious. What good does it do Germany to hold the north of France? Holding the north of France will not defeat the French. Holding Belgium will not defeat the allies. To defeat the French she has to rush forward. Simply holding what she has got cannot make victory. On the other hand, had she retreated back to the Meuse just after her defeat on the Marne, she would have been able to hold that line with half a million men less than were required to hold the present line. The losses of her army on that line would not have been half as great, because they would have had such a splendid natural position for defence. Had Germany done this, she would have to have a million more well trained men than she has, and those men could now be used to overwhelm the Russians. Had she done this her victory in Russia might have been complete. The reason she did not do it was, as this German staff officer tells us, and as we had long ago guessed, that the German government was afraid of the effect on the German people of such a retreat, afraid they would be disheartened and call for a stoppage of the war. To keep his people in heart, the Kaiser was set upon a theatrical blow of some kind at England. To get to Calais he waisted his strength persistently on the British lines.

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