

# The Canadian Engineer

*A weekly paper for engineers and engineering-contractors*

## THE NEW WELLAND SHIP CANAL

THE THIRD AND GREATEST WATERWAY TO JOIN LAKES  
ERIE AND ONTARIO—ITS GENERAL DESIGN AND COURSE—  
HISTORICAL NOTES RELATING TO OLD WELLAND CANALS.

**A**MONG the big engineering undertakings started during the present season there are few that excel in size the structure which is to replace the canal which connects Lakes Erie and Ontario. The Welland Canal now in use has, since its construction, been known as the "new" canal, in distinction from the original waterway which is now historically referred to as the "old" canal, the work under contemplation therefore constituting the third. The original and present canals followed a route from Port Colborne across the Niagara peninsula, practically paralleling each other at the northern end, entering Lake Ontario at Port Dalhousie. The original canal was commenced in 1824, and completed in 1833, the line following very closely certain water courses, to facilitate construction, making the length  $27\frac{1}{2}$  miles. This canal contained 27 locks, 24 of which were 150 by  $26\frac{1}{2}$  ft., and the other three, 200, 230 and 270 by 45 ft., respectively. The depth of water on the sills was  $10\frac{1}{4}$  ft., with a total lift of  $326\frac{3}{4}$  ft. The initial construction of these locks gave a depth of 8 ft., the increase of  $10\frac{1}{4}$  ft. being a subsequent change. The present canal was commenced in 1872, and completed in 1887. The route at the northerly end was slightly changed to the east near St. Catharines, the canal coming out into Lake Ontario at the same point as the original one. The locks are 26 in number, 270 by 45 ft., with a depth of 14 ft. over the sills.

The route to be followed by the proposed canal, beginning at the southern terminus, i.e., at Port Colborne, is the same as that of the present canal as far as Thorold, from which point it will deviate to connect with a harbor which will be constructed at the Lake Ontario end, some three miles east of the present Port Dalhousie outlet, this diverging portion being about eight miles in length, and passing in almost a straight line through Merritton to the lake. The section of the existing canal between Thorold and Merritton will, therefore, be abandoned, but it is the intention to use the portion of the present canal between that point and Port Dalhousie as an auxiliary.

The present canal is made up of twenty-five locks each 270 ft. by 45 ft. with some 14 ft. of water over the sills. The total length of this canal is  $26\frac{3}{4}$  miles.

The new canal will have seven locks each of  $42\frac{1}{2}$  ft. lift, 80 ft. width, and sufficiently long to accommodate a vessel of the length of 800 ft. It will be 25 miles from lake to lake and will cope with a difference of level of  $325\frac{1}{2}$  ft. between them. The minimum depth of water

over the miter sills of each lock will be 30 ft. The bottom of the canal will be 200 ft. in width, and although the depth will ultimately reach 30 ft., the present excavation will stop when 25 ft. is reached, further deepening being looked after when occasion arises by dredging out the reaches to the required depth, according to design. The lock walls will be 82 ft. high above the top of the gate sills, and including the necessary foundation work required below this level two of the locks will have walls 100 ft. high. The lock gates will be of the single-leaf type, swinging on a hinge at one side of the lock and resting in a notch cut in the opposite wall, a single leaf thus spanning the whole width of the lock chamber. The gate at the foot of each lock will be 83 ft. high and 88 ft. long, and will weigh about 1,100 tons. The valves and culverts in the walls will be of large dimensions and will permit of the lock being filled in less than eight minutes. This will mean that the time of passage through the canal will be reduced much below that required at present. The time of lockage of the present canal is from 10 to 20 minutes per lock. In the new canal there will be 18 fewer locks, and the saving in locking time will be in the neighborhood of three hours.

### Port Colborne Development.

In Fig. 1 will be noted a proposed new breakwater off Port Colborne, to prevent a disturbance of harbor water, with which the present conditions have to contend, as the present breakwater is insufficient in effect owing to size and location. The new breakwater will consist of an immense rubble mound of stone from the excavation north of Port Colborne, and will terminate in a timber-and-concrete headblock located some 2,000 ft. farther out in the lake than the present breakwater.

The outer harbor at Port Colborne has now a 22-ft. depth of water at ordinary stages of the lake, which is as much as is available at most of the other lake ports and in the channels connecting the lakes at the present time. The deepening of this portion of the harbor may be left for a few years until the connecting channels in the lakes allow deeper navigation. The inner harbor will be excavated to the new depth proposed, and the old locks and regulating weir now in the centre of the village will be entirely removed.

From Port Colborne to Humberstone the rock cut will be deepened and widened on the west side, and just below Humberstone a new cut will be made across the