WELLAND CANAL.

81

Difference in favor of the latter	\$44,000
Add to this the cost of a pair of Guard Gates at Thorold (b)	50,000
Add charging the line of the Welland Bailway (d)	25,000
Add retaining walls for canal, and artificial charnel for Ten Mile	20,000
$\operatorname{Creek}(e)$	84,000
Add the difference of cost between enlarging the old canal above Thorold and making an entierly new canal through the ridge dividing the	
Ten and Twelve Mile Creeks (f)	104.000
Add the capitalization at six per cept. of the annual cost \$4,820 of the	
attendants to the four unnecessary locks (a)	72.000
Add the conitalization at six nor cont of the annual cost of the vancing	12,000
And the capitalization, at six per cent. of the annual cost of the repairs,	
estimated at \$1,200 for the four locks, the four waste weirs, and the	00.0.0
guard gates (A)	20,000
	\$849,000
Deduct from this the purchase and alteration of the mills, diversion of	
of now line (u)	00.000
OI HEW HILE (MJ	30,000
Saving by plan suggested	\$259 000
butting by print suggested	φ=00,000

beside the loss of time, &c., referred to in item (i). The items (d), (e), and (f) can be definitely ascertained by reference to the sections in the canal office, but it is believed that the sums entered for them represent their cost with sufficient accuracy for the present purpose.

It is unnecessary to take into account the cost of forming the canal and basins between the locks, because there would really be little or no difference on either line. By the exercise of the best engineering skill in the location of the locks, and basins on on the suggested line, the quantity of earthwork would be reduced to a minimum, and that minimum would not exceed the quantity called for by the present plans, especially when we consider that as four basins would be saved by the enlargement of all the basins, the banks dividing these basins would be saved. Therefore, in assuming the costs of the excavation to be the same on both lines, I cannot be accused of unduly favouring the changes recommended by the Board of Engineers.

Then, as regards the relative cost of the locks, it is to be observed that the estimate produces the result that might reasonably have been expected. The twenty locksof sixteen feet uniform lift cost nearly as much as the twenty-four locks of twelve and fourteen feet lifts, the difference being about one and a half per cent. in favour of the former. This is mainly owing to the fact, readily understood by practical engineers, that heavier walls are required for greater lifts, so that although it is quite true, as stated in my eighth letter, that the four locks saved would cost upwards of half a million of dollars, yet when the cost of twenty is balanced against twenty-four locks for overcoming the same fall, the result proves the statement of the Board of Engineers to be quite correct, that there is really no material difference in the cost of the two plans.

Thus after a careful and impartial examination of the estimate, it is proved that instead of the suggested changes involving an additional outlay of two millions of dollars as stated by Mr. Page, or nearly *forty per cent*. on the cost of the new line, there would really be a saving of upwards of a quarter of a million, or about *five per cent*., by following the better plan.

The total cost of the new line, as given in the general report of the 29th April, 1872, is \$5,180,000. In the interest of the public it is to be hoped that this estimate, given in bulk sum, will bear investigation better than the one I have just been dealing with.

In summing up, at end of his report of the 12th March, 1878, the Chief Engineer, in the 108th clause, emphatically states that "no advantage would be gained by adopting any of the suggestions of the 'Engineers,' but on the contrary there is good reason to believe that if they were followed a less efficient canal would be constructed, and that, too, at an additional cost of two millions of dollars."

require-

vercome 81 feet.

g. he neceschannel.

d Twelve

rvice for

veirs and

wear and the of four is hardly is can be

as of the

walls **all** for each

he quana better is about hore than

hinery of so as to lots, and

\$123,000

14,400

7,000 1,000

\$145,400 the real

2,952,000

2,908,000