

to the need of replenishing the lower. For full efficiency double locks are necessary, which adds largely to the expense of the line. The locks to be doubled are all in rock-cutting, where masonry is reduced to the minimum, and the expense of double locks in these circumstances is nearly double that of single ones.

In the Niagara River this line requires a dredged channel about 16,700 feet long. This is estimated as in sand and gravel, as the rock-beds are uniform, and no rock appears in the bed of the river for many miles.

One railroad bridge is required on this line not included in Colonel Blunt's estimate. The Rome, Watertown and Ogdensburg Railroad crosses the line at a level little above the water-surface.

The lake harbor estimated for includes a moderate area of sheltered mooring. Should commercial needs require it, a basin can be obtained by dredging in Wilson Harbor.

ROUTE NO. 5.—OLCOTT OR EIGHTEEN-MILE CREEK ROUTE.

Length, 25.28 miles; lifts, 18; estimated cost, \$23,617,900.

"The line of survey begins at the head of Olcott Harbor, on Lake Ontario, 18 miles east from the mouth of the Niagara River, following the channel of Eighteen-Mile Creek (the course of which is nearly south and very direct) for $3\frac{1}{2}$ miles; ascending gradually, reaches in $1\frac{1}{2}$ miles the table-land, over which it passes for $5\frac{3}{4}$ miles nearly south to the foot of the mountain ridge, when it enters another valley or gulf $2\frac{1}{2}$ miles in length, varying in width from 50 to 300 feet on the bottom, which is gradually ascending with steep banks on both sides; this is followed to its head, where the mountain ridge is encountered. From the head of the gulf the line follows a slight depression in the ridge, leading in a tolerably direct course west of south 4 miles to the east end of Beach Ridge; thence by an almost direct line nearly southwest to the Niagara River, opposite the north end of Tonawanda Island, about seven-eighths of a mile north of the mouth of Tonawanda Creek, making the whole distance 25 miles 22.34 chains."