

I assume that the lock at Sault Ste. Marie, Mich., completed in 1881, as the model of locks and their works, and also assume that the canal will be used by vessels either self-propelling or towed by tugs. All slopes are therefore paved.

The sections herewith presented show the form of cutting upon which estimates are based. I have arranged upon both routes for the ascent of the Niagara Terrace by a system of locks 400 feet long and 80 feet wide, and short levels or basins 500 feet long and 100 feet wide. With this system, for draught of 14 feet, the lock can be filled from its own basin and the lock next above without danger from grounding; for draught of 16 feet the lock can be filled from its own basin and the basin next above without danger of grounding in either; for draught of 17 feet, from its own basin and the two above without danger of grounding in any.

Upon route No. 4 this gives fairly efficient service with single locks, but for full efficiency double locks are still needed upon this route. Upon route No. 5, by virtue of a level of 2,100 feet midway of the ascent, efficient service can be had from single locks.

At the lake end of each route is a shallow natural harbor, with harbor improvements on a scale utterly inadequate to the needs of this waterway.

At each I estimate for a channel 200 feet wide to the deep water of the lake, protected by piers of crib-work filled with stone. At each harbor the inner 500 feet of this channel is in water fully protected from storm, being part of the natural harbor.

At each lake-front the bottom of the lake is of a soft red stone, which can be worked by the dredge. A similar formation at Oak Orchard has been removed by dredging to a depth of 10 feet at extreme low water (12 feet at ordinary low water), at a contract price of \$1.10 per cubic yard.

The requirements of bridging are not materially changed since the date of Colonel Blunt's report. The surface width of the canal is unchanged, and I have held, where there is any change, to lower levels than he. In the wide range of estimate open in this matter I have held to his.