

If the lift of the locks were increased, their number of course could be diminished, and this would to some extent lessen the quantity of masonry, but it would largely increase the amount of excavation to be done, and as a whole would considerably augment the cost of the work; besides the risk to the gates and foundations would be greater.

When fixing on the height of the different levels, the question of the lift of the locks was carefully considered in all its different phases, and every effort made to arrive at right conclusions.

All accessible written authorities were consulted, and the arrangement of lockage on most of the canals on this continent, as well as in Europe, was studied. This information, together with my own experience in the construction and practical working of canals, led to decisions on all leading points, which, after a careful review, I feel confident are right.

Along the quickly sloping ground at the base of the mountain, the locks are shewn with lifts of 14 feet, an arrangement best suited to the levels, and other controlling circumstances.

This, it is believed, is the highest that could be judiciously introduced on a line of navigation like this, where the gates are wide, and where it is at the same time of the greatest importance that they should be expeditiously worked, and no unnecessary risk invited.

On the extensive system of boat canals of New York State, where the locks are only 18 feet wide, the perpendicular lifts are all less than 12 feet, except in two or three cases at the river outlets, where in one instance there is a lift of about 15 feet at periods of extreme low water.

On the canals in Great Britain, the lift of locks seldom exceeds 11 feet, but is often considerably less. The lift of the locks on the St. Lawrence Canals is generally from 9 to 10 feet, except at the lower end of the Lachine Canal where the lift is 13 feet.

On the present Welland Canal, where the locks are 26½ feet wide, there are some of them 14 feet lift; the rest are 12½ feet and under, except at Port Robinson and Welland. The locks at the latter two places are 26½ feet wide, and have at present lifts of 17 feet, but when the summit level is lowered to that of Lake Erie they will each have only 9 feet lift.

When submitting a plan for the Caughnawaga Canal, Mr. John B. Jarvis proposed to have locks of about 12½ feet lift, and Mr. Walter Shanly, in his report on the Niagara Lateral Cut, fixes the minimum lift of the locks on that line at 14 feet.

On other projected lines of a similar character in this Province, the locks are generally placed at from 10 to 12-foot lift.

There is no case on record, as far as I know, in which an experienced Engineer, after due consideration, has advised the construction of locks 17 feet lift on a line of navigation of such dimensions as that of the Enlarged Welland Canal, and where the gates require to be so expeditiously worked.

4th. The "Engineers" advised that "means should be provided for filling both through the gates and through the lock walls so as to shorten the time of passing vessels," &c.

In the practical working of canals, the mode of filling and supplying the locks has of course occupied considerable attention, and numerous plans have been tried to effect this in an expeditious and satisfactory manner. These may generally be classed under the following heads:—

1st. By passing the water around the gates, through sluice-ways formed in the masonry of the side walls.

2nd. By building a culvert parallel to the side wall of the lock for the passage of the water, admitting and discharging it through tunnels formed at one or more points, as was done by Sir William Cubitt, many years ago when carrying out the improvements of the Severn Navigation.

3rd. By sluices of various kinds, constructed in the gates themselves.