WELLAND CANAL.

spach, it will be found when the enlarged canal is open that it will take from fifteen to twenty minutes to pass one of the locks—the latter being the safer estimate for this reason. The water being admitted into the chamber only in one direction, that is through the gate, it passes directly under the vessel's bottom, and along her keel to the lower gates, where piling up it lifted her stern and pitches her stern forward towards the upper gates, producing a heavy strain upon her snubbing line. If the strain exceeds the strength of the hawser she plunges into the gates, and there is an accident, with all its attendant damage and delay. To guard against this the sluices must be opened only partially at first until the lock is about half filled. Hence a longer time is required for the filling, as fully admitted in the report.

At Liverpool, where the gates are worked by hydraulic power, I found that notwihstanding their greater width, lifts, and general dimensions, they could be opened and closed in from three to five minutes, while at the entrance lock to the Victoria dock in London, which is eighty feet in width, the ponderous wrought iron gates are opened or closed in one minute by the same means—the whole time required for the passing of a vessel from a tide way depending of course upon the state of the wind and tide. I have seen sufficient, however, to enable me to state, with confidence, that had the suggestions of the Board of Engineers been adopted with such appliances for working the gates and sluices as modern engineering has produced, vessels could be passed through the enlarged locks in about half the time that the Chief Engineer considers necessary for that purpose. As it is my intention to refer to this subject again in my next letter, I now proceed to consider the other objections to

THE LINE THROUGH THOROLD,

to be found in clauses 40, 41, and 42 of the report.

Stated in plain language they are: 1. Damage to private property. 2. Crossing the principal street at an acute angle. 3. Increased curvature. 4. Crowding the traffic of the old and new lines in the first basin at Thorold, and 5. Drawing off the water for two winters. But in the usual exaggerated style adopted in the report one is startled to learn that "Forming a canal of the dimensions contemplated would, in twisting through the village of Thorold, dig the very heart out of the place." All these objections, however, are very weak and can easily be disposed of.

Damage to private property is unavoidable, and must be incurred on any line. It is measured simply by the amount that must be paid for it. It will not be necessary to purchase five mills but only two, and they are not of any great value—the rest can have their machinery changed to suit the new levels. The crossing of the main street can be shifted to the head or foot of the second lock without injury to the traffic of the village but with advantage to the working of the canal. The curvature, without being in anyway inconvenient, is really necessary in order to secure sufficient spaces between the locks and provide ample basins for the navigation. The crowding of the traffic is only a specious argument, and specious arguments can always be met and refuted. In this case, it is to be observed, that on the completion of the enlarged canal it will have a single channel one hundred feet wide at bottom throughout, it will be no wider above than below Thorold, and the track of vessels must be within this space. The volume of traffic both on the old and new lines, must be united either at or above Thorolds and move on in one channel above that village. It matters not where it is united or divided, so long as there is but one channel above and two channels below the point of divergence. But the idea of crowding is altogether imaginary. It cannot happen at Thorold, where the first basin is 1,200 feet long between the locks, and from 200

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