

in other words, would make Burlington and Whitehall sea ports. It is proper to remark, that the interpretation of the letter of instructions may not go to this extent. They run "to open the districts upon that lake [Champlain] to the sea via Quebec, and afford them a shorter and cheaper route for imports of coal, iron, salt fish, oil," &c. These articles can be generally purchased cheaply in Quebec, in consequence of a large amount of shipping entering in ballast, and accordingly they can be profitably purchased in that market. Fifteen years, however, have elapsed since this possibility was suggested, and if great advantages really presented themselves for this branch of trade, to follow the direction indicated, it may be said that even the narrow limit of the present Champlain Canal would have received some benefit from it. We find, however, by the returns published, [the latest for reference being up to the 30th June, 1867,] that of 364,609 tons of freight transported from the St. Lawrence to Lake Champlain, about 4,500 tons only did not consist of lumber in some form or other. It would seem, therefore, that a canal having in view breakage of bulk at Quebec or Montreal, for the supply of the Lake Champlain district, is not called for, because the want is supplied by the Railway connecting with Boston. On the other hand, were the Caughnawaga Canal adapted to sea-going propellers, the question is at once changed, and the argument based on the possible benefit to the western lake districts, applies with some modification to the State of Vermont and eastern New York. It is true that no return freight for Europe, or the Atlantic sea-board of the United States, is to be found in Lake Champlain itself. But the manufactures of Massachusetts and New Hampshire, delivered by railway on Lake Champlain, require transport to Chicago, and at that port the produce of the lakes has to be moved eastward, to the Atlantic sea-board or to some grain consuming country. This view of the theoretical utility such a ship canal would confer, may be said to command a certain recognition, but as to the extent of the trade, there must be difficulty in defining its limit. The remark, however, may be ventured, that its probable extent furnishes rather an incidental, than a main ground of argument of the necessity of the canal.

It now remains more succinctly to enter upon the view already expressed, that it is not possible to enlarge the Whitehall Canal to any extent. Until now the contrary fact has been assumed, and much time would have been saved if in answer to the desire of the Canadian Government, "to find a more desirable route for the great trade which passes between tide water in the Hud-

son River and the Western States," the simple answer had been given, that it could not be found by Whitehall. Mr. J. B. Jarvis, on the contrary, never enters into the consideration, he assumes it to be perfectly feasible. Throughout the report, not in one or two, but in fifty places, he deals with the possibility as a mere matter of expense. One sentence is worthy of preservation. The italics are the writers. The passage appears under the head "Champlain Canal of New York enlarged to a Ship Canal," so there is no mistake on the subject.

"No examination has been made to ascertain the cost of such work. From what I have seen, and from information obtained from intelligent persons who have been well acquainted with it and the country through which it passes, there is believed to be no serious and not much expensive work required for its enlargement, and that six millions of dollars would be sufficient for its completion. To this should be added, for improving the Hudson River for twenty miles below Troy, probably from one to two millions."

One fact is learned from this sentence, that the Hudson River, for the distance of twenty miles below Troy, is exceedingly shallow, and requires very great improvement to be fitted for a deep navigation. It is of no benefit to imitate Mr. J. B. Jarvis' random mode of writing, but it is very certain that a formidable expense in the Hudson River itself lies in the way of any improvement of the water navigation between that river and Lake Champlain. When we turn to this canal* itself, everything is suggestive that it can be but little improved. At present the depth throughout is but four feet; the locks are 110 feet long and 18 feet wide. Some few of them, however, require yet to be brought to these dimensions. It has three sources of supply. The first five miles from the junction with the Erie Canal at West Troy to a point one mile north of Waterford, are supplied from the Mohawk River at Cohoes; the second distance, 25 miles to the crossing of the Hudson River, 2½ miles south of Fort Miller, obtains the supply from the Hudson at Saratoga dam; the remainder of the distance, 36 miles, is fed from Glen's Falls feeder and Wood Creek. From Fort Edward to Fort Ann, a reach of twelve miles, the summit of the canal proper is 81 feet above Lake Champlain. Fort Ann is twelve miles from Whitehall; Fort Edward forty-two miles from the junction with the Erie at West Troy. Accordingly the whole supply is practically from the Hudson at Glen's Falls, brought by a feeder descending, in seven miles, the height of 132 feet. It is perfectly true that a very large tract of country in eastern New

* It was the writer's intention personally to have examined the Hudson at Glen's Falls. It is a matter of regret that, from circumstances, he has been unable to do so.

York, extending over the counties of Essex, Hamilton, Warren, Saratoga, and Fulton, is drained by the Hudson. But the physical geography of this district is suggestive of great variations in the flow of its rivers; and the map promises no mode by which an increased supply can be turned into the canal. As the strength of a whole chain is the power of resistance in its weakest part, so the capacity of a canal is to be determined at the most contracted point of its water supply. We have the Champlain Canal now with four feet of water. In 1860 the Legislature of the State of New York authorised that it should be deepened to five feet, but the work has not yet been carried out. What is essentially needed on the part of Canada is an examination, carefully and systematically made, as to the extent of improvement of which this canal is capable. Mr. J. B. Jarvis accepted the possibility that it could be deepened to 11 feet (pages 16, 4C.) The inference to be gathered from the necessity of using three feeders in a navigation of sixty-six miles is, certainly, that the high level could not supply the water necessary for the present depth of four feet without this additional supply. Certainly it does not seem probable that it would be a wise policy for the navigation of the Hudson, in point of commerce the most considerable in the United States for its distance, to divert one-half of the supply from the most important of its head waters to Lake Champlain. Again, the physical aspect of the country is against the hope that the body of water could be increased. The evidence on which this opinion is grounded, it must be admitted, is sufficiently imperfect. Nevertheless, it throws the *onus probandi* on those who claim that the canal can be enlarged. It is they who must show that there is water sufficient for the purpose, for until that be done, the inference must remain that the present depth of four feet can be increased only in a very slight degree—a conclusion which at once puts all reasoning based on the enlargement to a ship canal out of court.

There is accordingly no ground for anticipating that the Caughnawaga Canal would have any bearing upon the commerce of Canada beyond exercising a moderate influence in the directions which we have pointed out. Accordingly it must be held to be a project, in every way subordinate to the development of the Saint Lawrence navigation; however, it may be considered to be to some extent supplemental to it, it is not to be looked on as a positive requirement, for no special reason exists for its immediate construction. Still, it presents so many favorable aspects, that it may be said that financial circumstances permitting, there are strong reasons why the canal should be regarded as a work hereafter to be executed.