

This highwater level would also render the upper arm navigable to the largest ships, and would in time undoubtedly have the effect of promoting manufacturing enterprises on lands free from the taxes of a large city and yet within reach, by tram or train, of the working classes residing there.

The people and the factories cannot exist together in perfect conditions of health. In every large town the factories are crowding the residences further and further into the suburbs, and Vancouver must now decide whether she will gradually give up her unrivalled and beautiful situation to the demands of commerce or whether she will provide for a vaster commerce and a healthful people, by encouraging the establishment of industries without her gates and yet within reach of her workers.

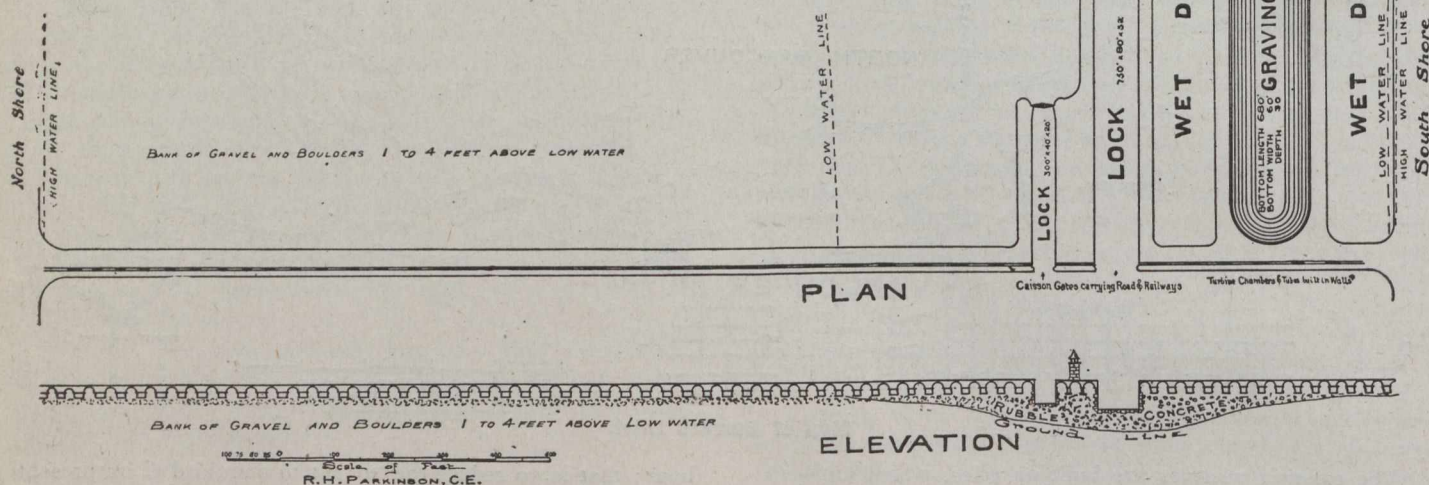
Vancouver rejoices in the mildest winter of any port in Canada. Burrard Inlet is free from ice at all times. The water is clear and free from silt, and the streams flowing into it are mostly of the nature of mountain cataracts, which descend through rocky canyons and carry very little wash with them. The sea-wall and docks suggested would therefore have very little silt to contend with.

The south shore of the Second Narrows is bedrock, which probably extends the greater part of the distance across. If this is the case, then the cost of the proposed works will be far less than the cost of works of the same magnitude built elsewhere, for the expense of dredging will

one-third of the gross bulk of the walls and piers shown on the plan, and this volume could be reduced by filling in the walls with boulders, of which there is a plentiful supply along the north shore.

Roughly the gross volume of rubble and reinforced concrete required for the works shown would be about 400,000 cubic yards, the average cost of which should not exceed \$6 a cubic yard. Therefore, with caissons, tracks, turbines and other equipment the total cost of the proposed works should not greatly exceed two and a half million dollars.

When it is considered that the Esquimalt dry dock (475 feet long, built of masonry) cost three million dollars, one can realize the great advantage which the site of the proposed dry dock possesses, as it is designed to be built at a point where the rock bed of the Inlet lies at just a sufficient depth (35 feet) below high water, which would be the permanent level of the upper inlet, thus requiring only the retaining walls and altars to be built of concrete at a cost less than that of the Port Orchard, California, dry dock (675 feet long), which is built of timber, faced with concrete, at a cost of \$600,000, and is at present the largest dry dock on the Pacific Coast.



Suggested Sea-Wall at Second Narrows, Vancouver Harbor.

not be encountered, except in the gravel bank on the north shore, and this is dry at low water. To find the cost of the proposed works will therefore be largely a calculation of the cost of so many cubic yards of reinforced concrete, to be laid under rather difficult conditions; together with the cost of the necessary caisson gates for the locks and bridges for the railways and highway. The main wall and dock walls shown on the plan are from 30 to 50 feet wide on the surface; these widths are, of course, excessive as far as strength is concerned, and they may be constructed of parallel walls of ten feet in thickness, filled in with boulders or joined at the tops by arches or girders to form the floor of the quay. It would be advisable to build in the walls tubes of over six feet in diameter, which could be used for such purposes as aqueducts and conveyers of electric high-voltage wires. Cross tubes would be provided in the main wall for spillway and also chambers about low-water level for turbines, the water supply for which could be taken in at the foot of the pier ends and thence through tubes laid in the dock walls to the turbine chambers.

The filling and emptying conduits of the docks and dry docks would require to be of large aggregate area, so that when all these voids in the walls are accounted for the volume of concrete used in construction would not exceed

The writer has at present nothing but an Admiralty chart and his own observation (during a three years' residence in Vancouver) of the existing conditions to guide him in this design, and it would be necessary, of course, to make a careful survey of the site of the proposed sea-wall in order to prove the nature of the channel-bed and the exact dimensions of the channel, before a proper design could be prepared or an accurate estimate of the cost determined.

The proposed works might well be located at the First Narrows, were it not for the delay which would be caused to the passenger traffic.

As an investment of capital the proposed works should pay well, since the tram and railway tolls and harbor dues should amount in the course of a few years to enough to pay a good percentage on the investment.

But the competition of the United States ports to the south makes it important that Vancouver Harbor should be made attractive to shipping, and even if the works were toll free and dues free, the enormous impetus they would give to Canadian ocean traffic and to manufacturing enterprises would be a vast gain to the Dominion, not to be measured merely in dollars and cents, but in commerce and population—in enterprise and prosperity.