TABLE showing Variation of Depth in the Bar from 1883 to 1891.

Depths.	Before Works begun.			Since Works in Progress.					
	1883–84.	1884–85.	1885–86.	1886–87	1887–88.	1888–89.	1889–90.	1890–91.	1891.*
8ft. and under 10ft.	41	51	29	54	18				
10ft. „ 12ft.	164	219	218	246	169				
12ft. „ 14ft.	140	91	109	65	144				
14ft. „ 16ft.	20	4	9		25	14	8		
16ft. „ 18ft. ..	1				4	108	61		
18ft. „ 20ft.					4	151	98	55	59
20ft. „ 22ft.					2	88	105	117	82
22ft. „ 24ft.						4	70	126	36
24ft. „ 26ft.				.			22	50	6
26ft. „ 28ft.							1	11	
29ft. and over								6	
Total number of days	366	365	365	365	366	365	365	365	183

* For six months.

Low-water Line.—The line of low-water mark on the sand beach outside the west breakwater advanced seaward during the construction of the breakwater, until at the present time it is 33 chains seaward of the original low-water line. The low-water line outside the east breakwater advanced in a similar manner If the low-water mark is not now stationary it is advancing very slowly, and it is to be hoped that, as in the case of Greymouth, it may soon become stationary—that is to say, that the condition will be reached in which the currents carry round the end of the breakwater just as much sand as they bring up from the southward. As noticed above, the bar keeps its depth, although in very low states of the river the sand drifted round the end of the west breakwater forms a spit protruding towards the head of the east breakwater but the first flood scours this away, and restores the depth lost. The same thing is experienced in Greymouth, where the depth has been permanent for a long time.

Depth in River.—The sea-bar is not now the chief obstacle to navigation, which, however, occurs inside the river, the original depth of which has not been affected by the construction of the breakwaters.

Training-walls.—This difficulty Sir John Coode intended should be rectified by the construction of training-walls of stone, which by confining and directing the currents of both tides and floods, and being assisted by dredging, would deepen and maintain the depth of the river alongside the wharves, and out to the bar The training-wall on the original plan extends for 12,300ft., containing 120,000 tons of stone, and is estimated to cost £43,000, the cost was not included in the original estimate, being left for consideration as the trade of the port grew The trade has grown, and the wall is now required to maintain the deep channel in the position required by the traffic. In the upper part of the wall a difficulty occurs which has been referred to Sir John Coode. The difficulty is that the wall, as shown on plan, shuts out the deep channel of the river, and before the wall can be made a new channel must be cut for the river through a large shingle-spit, which is too hard and compact to be scoured by the current. The quantity to be removed from the shingle-spit to give the river the same amount of waterway shut out by the training-wall would be 200,000 cubic yards, and the cost would be about £10,000. But to dredge and scour the amount required to give the depth shown on Sir John Coode's longitudinal section would require the removal from this spit of about 500,000 cubic yards.

Buller Bridge Piers.—The deepening of the channel to this depth under the Buller Bridge would endanger the piers which, are on piles driven 20ft. into the shingle. They would therefore have to be protected by stone thrown in round them the combined mass of which would take up a large part of the waterway intended to be gained by the deepening. A spit of shingle in Greymouth occurs in a very similar position to this one, which does not seem to interfere with the scouring action of the river on the berthages along the wharves, and, subject to Sir John Coode's approval, I would suggest that the training-wall be carried no further up the river than the Buller Bridge, and be curved so as to include the deep-water channel, and take as little as possible off the shingle-spit. Your Engineer has, in a memorandum to Sir John Coode, pointed out this difficulty, and asked his advice as to altering the position of the upper part of the wall. It is therefore necessary to wait for his answer before taking any further steps.

Scour carried by Wall.—The material of the river-bottom along the face of the staiths and wharf is easily scoured by floods, and the construction of the training-wall will have a powerful effect in increasing the velocity of the current. It is therefore to be expected that deep water will be maintained by natural scour whenever the wall is built. At present, however, the navigable channel is in places neither deep enough nor wide enough, and therefore, while depending on the training-wall to maintain the depth, I would recommend that the only dredging to be carried out be that required to form a channel 250ft. wide at the bottom and 14ft. deep at low-water spring-tides, extending from the upper part of the Government wharf along the face of the wharves and staiths and out to the deep channel at the west breakwater A large part of this is already deep enough, and only requires to be widened, but from opposite the proposed floating-basin to the deep channel near the west breakwater the training-wall, as shown in plan, crosses the fairway of the