stream forms a large fan of shingle where it reaches the valley. During floods the streams cut deep gulches through these fans, carrying the shingle away into the main river.

Some idea may be formed of the quantity which is thus brought into the Waitaki, from the fact that the inclination of its bed is between 30 and 40 feet per mile, while that which the bed of a river of the same size would take if no new shingle were brought into it would not be greater than 3 or 4 feet per mile, for it is a large stream, fully three-quarters of a mile wide when in flood, with a depth of from 10 to 12 feet at its lowest stage of water.

Although it would be impossible to estimate how many tons or cubic yards of shingle the Waitaki bears to the sea, I think the fact that its inclination is ten times greater than it would be if it carried none is sufficient to show that it brings down enough to bury any harbour works which impeded its progress northwards. As above stated, I believe the greater part of the shingle brought down by the rivers south of Timaru is driven northwards by the sea, and passes that roadstead, to be distributed over the beach between the Orari and Ellesmere.

Sir John Coode proposes to make his harbour, which would be of a horse-shoe form, about 900 feet from the beach. The inner limb would be parallel to the prevailing seas—that is, north-west and south-east. It is hoped that by this arrangement the shingle will pass harmlessly along the beach as at present. Sir John anticipates "some little accretion [of shingle] at first in the bight of Caroline Bay," but does not think it would be prejudicial. With great respect for his opinion, I, however, think there is a very great chance of this accretion being sufficient to render the whole work useless. I think, also, it would take place closer to Timaru than the bight of Caroline Bay.

Sir John states that he is informed by Mr. Eliot that gales from the eastward seldom occur, and he does not appear to have been informed that heavy seas from the eastward without wind are by no means uncommon.

Now, an easterly swell would drive the shingle northward, and a large part of the beach would be sheltered by the breakwater from such a swell; the shingle cannot pass still water, and would accumulate between the breakwater and the beach.

With the immense quantity of shingle which I believe to be moving, a few days of easterly swell, if followed by northerly gales, might, I think, cause such an accumulation that a southerly wind following would be unable to clear it away. The accumulation would then increase rapidly, and in a few years the whole work would be buried in shingle.

13th Question.—Are the circumstances in connection with the harbour works at the Cape at all similar to those which exist at Timaru?

Answer.—I have no personal knowledge of the Cape, but I believe the circumstances to be quite different.

14th Question.—Sir J. Coode's proposal is that the work should be done by labour under the superintendence of Government: are you of opinion that such a system is preferable to doing them by contract? If so, state your reasons.

Answer.—I believe work could be carried out very much cheaper by day labour than by contract if the Government would give their executive officers as much power as a contracting firm give their agents, especially the power to get rid of a useless man without giving a reason for doing so. The principal difference between a well and ill managed contract is generally that the subordinate officers in the one look to their immediate superiors for praise or blame; and in the other they trust to side influence for promotion. Under parliamentary government, where all the workmen have votes, there would be great danger of those officers being most successful who made themselves popular with the men by allowing "Government stroke;" but if members of Parliament loyally abstained from interference with the management of the works, and from recommending men for employment, I believe work could be done cheaper by day labour than by contract.

The contract system may be described generally as a system by which the contractor cannot lose and may gain. If the contract is a losing one it is given up, or on one plea or another the losses have to be made good to the contractor. If, however, it is a paying contract, the contractor makes money which he does not share with the Government.

Again, a great many contractors are men of no skill or judgment, who lose money even when the prices are good, simply by bad management. Here again the Government often lose by the blundering of a man who is practically an irremovable servant of their own.

It would not be difficult for the Government to secure the services of the same men who under the contract system actually carry out the work, and these men would work just as well for the Government as for the contractors. The contractors' profits would be saved, and the cost of a double staff of engineers, who under the contract system are necessary.

I have had some experience of carrying out extensive works by day labour, and the company who adopted the system got at least twice as much for their money as a neighbouring company did who adopted the "responsible contractor" system.

15th Question.—In the event of this work being decided upon, would it not be expedient, previous to the commencement of the works, to obtain further professional advice as to the feasibility of the proposed works, reference being had to the peculiar circumstances of Timaru?

Answer.—I consider the chances of failure so great that I think the works should not be begun without consulting some other engineer, and I think some one well acquainted with Timaru should be sent to give information to such engineer as to the peculiarities of the locality. I would even recommend that Sir John Coode be invited to visit Timaru.

I have, &c.,

JOHN CARRUTHERS,

Engineer-in-Chief.

The Hon. the Chairman, Waste Lands Committee.