

But how will the fish thrive over there? I do not know much about the physical conditions over there. If you wish to have my opinion on this head, please send me the necessary materials, and I will look it over.

Mr. L. F. Ayson, 13, Victoria Street, London.

I remain, &c.,

G. M. DANNEVIG.

DEAR SIR,—

The Marine Hatchery, Dunbar, 14th September, 1898.

I am aware that the possibility of introducing the European lobster to New Zealand has been under consideration out there for some time. Although not referred to in your letter of the 31st August, I sincerely hope that the idea has not been abandoned now, when its realisation in connection with the project of introducing sea-fishes generally would only be an additional item of little trouble, but of immense importance.

The lobster-eggs, or berries, being far harder than most sea-fish eggs, their transport in great numbers would not involve much difficulty, and, as their hatching extends over the greater part of the year, no retarding process would be required. If desirable, the adult animals may be taken out as well. That this is possible, and can be carried out on a fairly large scale without great cost, has been illustrated by an experiment that I carried out a few months ago, when lobster was kept under conditions that can be arranged on board ship for sixty days.

If you should like any experiments carried out in regard to packing lobster-eggs, &c., I shall be pleased to be at your disposal.

L. F. Ayson, Esq.

Faithfully yours,

H. C. DANNEVIG.

SCIENTIFIC INVESTIGATIONS BY T. WEMYSS FULTON.

447, Great Western Road, Fishery Board for Scotland, Aberdeen,

29th September, 1898.

DEAR SIR,—

In reply to your inquiry as to the possibility of transporting certain of our food-fishes or their ova to New Zealand, I am of opinion that the difficulties of doing so are not such as to prevent the success of the attempt. It seems to me, from the experiments we have made here in transporting turbot and soles from England, that the chance of success in the case of flat-fishes is considerable, provided the fish are in good condition to begin with, and the arrangements carefully made. In obtaining adult soles and turbot for our hatching at Dunbar we found we could bring them long distances by rail in boxes so made that there was no jar in transit, and with the temperature kept moderately low.

A somewhat similar arrangement aboard one of the steamers could easily be made, and the small quantity of food that might be required *en route* could be kept in the refrigerator. If an experiment of this kind is attempted two points are important—(1) That the fish should be of a certain size; (2) that they should be carefully selected from a stock which has been living for some time in confinement, so that one may be certain they are in good health. Fish caught by the trawl, although they may present no obvious injury, frequently die in the tanks a few days, or it may be weeks, after they are caught. Others may be kept, and have been kept, for years in good condition. These remarks refer to flat-fish. With regard to haddock and cod, I think the difficulties would be greater—especially with the former—but not such as to preclude a trial. Herrings would probably be the most difficult to transport alive, as they more readily succumb to unfavourable conditions.

The difficulty of transporting fertilised eggs, and retarding their development on the way, appears to me to be more formidable than dealing with the fish themselves. In the first place, we do not know how long we can retard the development and hatching. We made certain experiments on the point, and, although we succeeded in keeping the fertilised eggs of cod and haddock for forty days before hatching occurred, I am not satisfied as to all the conditions of the experiment.

At the instance of Mr. G. M. Thomson, of Dunedin, who has taken a great interest in the subject, other experiments were commenced, but they could not be completed owing to the transfer of our marine station from Dunbar to Aberdeen. They will be resumed as soon as we can do so, and the temperature will be regulated automatically, and all precautions taken.

But, even if it is possible to delay the hatching of the eggs for a sufficiently long period, it is questionable if this method is the best. The eggs of all the species you mention, with the exception of the herring, are pelagic and buoyant, and this circumstance would present certain physical difficulties in transit. Then, again, they would require to be at once transferred to the place where the experiment is to be tried.

The best course, in my opinion, is to make an experiment in transporting nearly mature fishes, which would spawn shortly after their arrival. The fertilised spawn could then be collected and dealt with as we do here. You would also by this means, I think, get a much greater quantity of spawn than by transporting the eggs.

If it is decided to make the trial, I think there would be little difficulty in providing you with the fish required.

Believe me, &c.,

T. WEMYSS FULTON,

Scientific Superintendent of the Fisheries Board of Scotland.

LETTER FROM MR. J. C. EWART.

DEAR SIR,—

University, Edinburgh, 28th September, 1898.

I made quite a number of experiments some years ago to find out, if possible, how best to introduce some of our fish to the New Zealand waters. I think it will be best to take young fish, feeding them on the way either with artificial food or with minute organisms caught from day to day by pumping water through a net. The fish could be kept for some time before starting, and they would require to have special enclosures provided against their arrival. It would be useless turning them out at once into the sea. Experiments might first be made on a small scale.

You will, however, doubtless learn more in America than I can tell.

If when you return you pass through Edinburgh I would like to talk matters over.

Yours, &c.,

J. C. EWART.

## PART II.—FRESH-WATER FISHERIES.

### SALMONIDÆ.

Every one throughout the colony must recognise the great value of the work already done by the different acclimatisation societies in establishing trout in our waters, and attempting to deal with the salmon problem. Some years ago the rivers and lakes in this colony contained only a few varieties of indigenous fish of no great value—such as eels, a variety allied to the grayling (Native name, *upokororo*), and some smaller fish of little value. Now these waters are swarming with trout.

Viewed in the light of recent developments, it is apparent that a serious mistake has been committed in liberating the same variety of trout in nearly all our waters. It would undoubtedly have been wiser to have devoted different rivers and lakes to different varieties of fish, such as the rainbow trout, American brook char, Loch Leven variety of trout, and the whitefish.