Some Scientific Aspects of Scottish Fisheries.[1]

AT ever-recurring periods, for at least eight hundred or nine hundred years, appeals have been made to the Legislature concerning the decadence of the fishing industry; yet the harvest of the sea continues century after century, notwithstanding the fears of the fishermen and the distrust or indifference of the public. Without alluding to the earlier Commissions or Committees, the Commission of 1863, including Prof. Huxley, Lord Eversley, and Sir James Caird, first resolutely set itself against the prevailing view of the impoverishment of the sea—solely from the evidence brought before it. Frank Buckland's inquiry, somewhat later, adopted the same view. In 1883 Lord Dalhousie's Commission made a new departure and appointed a scientific zoologist to make investigations on sea and in laboratory. Amongst the results were the institution of statistics and the closure of certain bays for experiments, the results of which after ten years' work have been duly dealt with elsewhere. Now comes the Departmental Committee, which, without much allusion to previous investigations, has carefully and conscientiously treated the subject from evidence *de novo*.

Scientifically, the ocean and its finny inhabitants are either capable of holding their own against man and other predatory forms, or they are not. The Departmental Committee seems to have been impressed with a fear that the latter condition prevails and that intensive fishing and the destruction of the young is slowly but surely leading to disaster. But the same fear has been present from time immemorial, and rests on no solid scientific foundation. We know that from early times vast myriads of the eggs of the food-fishes (as "roe") have been placed on the slabs for sale, their numbers far exceeding any destruction of adult or young caused by man or by other enemies. If the annual drain of such prodigious numbers fails to affect the plenitude of the food-fishes, it is unlikely that any method of fishing devised by man can.

Further, the destruction of ova by the fishes themselves is an important factor. Thus the stomachs of no less than eighty boxes of large haddocks have been found filled with the ova of the herring, whilst the cod is no less greedy. Yet in neither case are the hordes of the herring affected. Indeed, large bays are sometimes carpeted with newly hatched herrings like chopped threads. Again, the young of the sole, a species so often despaired of, has been almost daily destroyed by the shrimpers at the mouth of the Thames, and yet for eight hundred years this has gone on without affecting the safety of the adults. The plaice, now so prominently brought forward for protective legislation, is known to be distributed in its adult state over the whole of the northern North Sea (in reference to Scotland), so that the haven of rest supposed by the Departmental Committee to be in the Moray Firth is of slender consequence for the supply of ova, which are supposed by the Scottish Fishery Board and the Committee to be carried by currents from the Moray Firth southward along the Scottish shores. Unfortunately, these currents lately were found moving in the reverse direction.

The Committee, again, appears to think that the Moray Firth is the locality most frequented by spawning plaice and cod, and the chief source of the supply for the northern North Sea. There are many other spawning areas of both species off the Scottish shores. The statement the Committee gives of the life-history of the haddock is too brief, for whilst both haddock and cod spawn in deep water, the subsequent ways of the fishes are wholly divergent, for the young cod seeks the inshore water when about an inch long, whereas the young haddock keeps to deep water until it ranges from three to five inches in length.

The fertilisation of the eggs of the plaice in the upper layers of the water also needs explanation, and the body of the post-larval plaice is deeper than that of a round fish. The plaice and the haddock (shoals of large examples of which frequent the Moray Firth) are thought by the Committee to be at present in danger, but so long as the multitudes of the tiny young of the plaice appear at the margin of the tide in sandy bays the species is safe. In the same way, so long as the larval and post-larval haddock keeps to deep water, the safety of the species is secured—notwithstanding the regrettable destruction of forms five to seven inches in length by both liners and trawlers. Further, so long as swarms of gadoids (haddocks included) occur north of the North Sea—more than sufficient to supply the whole area of that sea—so long will the haddock be secure. Persistent trawling or seining in a limited area doubtless will diminish the larger forms, but the multitudes of young by-and-by fill the gap. The waste of young fish-life in most methods of fishing is to be deplored, and, if possible, prevented, but it has not hitherto been disastrous.

The Committee makes a strong point of the accumulation of large plaice in the North Sea after the War, but it does not mention that such may have been due to the eager rush of all kinds of vessels to the pursuit, and that opinions were divided on this subject. Further, the notion that, as time passes, trawlers go farther and farther to sea because the home grounds are exhausted, needs modification, since long before trawling was introduced, for example in Australia, it was noticed that the liners followed exactly the same course as years advanced.

The Committee in its anxiety as to the safety of the fisheries states, amongst the adverse circumstances which may affect them, that the eggs of the fishes may not be fertilised, but no unfertilised egg has been met with by the writer in the tow-net; nor do currents and hydrographical changes disturb the ways of Nature, other than at a meeting of surging waters the eggs are sometimes carried to the surface, and thus the ducks are enabled to feed on them. There is no lack of nourishment, for the food of the larvæ and young fishes abounds in the sea at all times. Lastly, the decimation by enemies may be noteworthy, but is found to be negligible. It is concluded that biological data must be attended to before making detailed regulations, an advice given by Lord Dalhousie's Commission in 1885.

Whilst the foregoing criticisms are deemed necessary, it is evident that the Committee has spared no labour in its office, and, though it did not search the sea itself in the *Norna*, its finding is the result of cautious and independent judgment. Nevertheless, the fisheries of our own and other maritime countries—buttressed by all the complex resources of Nature—have stood the test of so many centuries that there are grounds for confidence rather than distrust.

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[1] Report of the Scottish Departmental Committee on Trawling and Policing of Scottish Sea Fisheries. (H.M. Stationery Office, 1924.) 5s. 6d.