

next enemies are the "sea burrs" or Echinidæ, which eat spat; then the "whelk-tingle" or "dog-whelk," a very serious enemy indeed: it bores holes into the young oysters, and destroys large numbers in a very short space of time. Mr. J. Wiseman illustrates this in his evidence before the Parliamentary Committee I have quoted from so largely. He says, "Some two years since I had a fall of spat upon one of my grounds, when my manager reported to me that the dog-whelks had begun to attack those oysters. I sent my staff as soon as I could, within a week; but when they got there they found they had destroyed about £2,000 worth. I then had to remove the whole of the rest of the oyster spawn from the river Crouch, &c." The only way of combatting this enemy is by dredging and throwing it ashore, otherwise it will increase with great rapidity. Then comes the sponge called "clione," which adheres to and rots the shell of the oyster by getting into it, rendering it quite fragile to the touch. This disease Mr. Buckland has christened "clionitis," and describes it as doing a great deal of mischief to oysters. Exposure of the oysters affected with it to the rays of the sun cures this disease, as the sun kills the clione and prevents its growing again. Mr. Banyard speaks of a sort of sponge which he calls a "squasher," generated by the sediment which collects more or less on all oyster-grounds. These squashers grow so very fast that, speaking of his own oyster-grounds, he says, "If those grounds are not worked, they (the squashers) will accumulate so much that we shall not get a shell upon our grounds." Then come shrimps and different varieties of small fish, notably the "goby," a small bull-headed fish, and young mullet, which destroy millions of spat—shrimps are particularly destructive to spat—while crabs and lobsters eat the small oysters. Thus, in each stage of its existence the oyster runs a gauntlet for life. From the first moment of its birth fish and shrimps hunt it; that danger passed, mud and sand escaped, a safe bottom found, the dog-whelk courses round it with the view of boring the soft young shell with its sharp tongue; and crabs and lobsters seize it in their joyous embrace. Should maturity be reached, the oyster has to accept the intrusion of the stomach of the five-fingers into its own, and become the sapless thing above designated a "clock," or be smothered by squashers, choked by sea-weed, or have its shell destroyed by clionites; and even yet there are two dangerous though passive enemies to be encountered—the crow-oyster and the mussel. These may be said to resemble the cuckoo in the sparrow's nest, and, though not actively antagonistic, simply crowd out the oyster. The crow, or saddle-back oyster, has "a round hole at the bottom holding itself on to its attachment by means of a stone pedicle."* Its spat resembles the spat of the ordinary oyster, and takes up its room. "The mussel is one of the greatest hindrances to the development of oyster-beds that we know of. They act in two ways: first of all, they will live in places where the oyster will not; secondly, they send forth their armies of spat, and the armies of young mussels will fall down upon the oyster-beds and spin their webs over them like beautiful silk ropes, by means of which they hold on to rocks and other things. They accumulate mud, and the mud covers over the oysters, and it is a case of mussels *versus* oysters; and the oysters, unless they are protected by the proprietor, generally get the worst of it." All these enemies eluded, the oyster has to face man, his worst foe, with his insatiable greed—a greed which, in its unwise intensity, swallows up the morrow to gratify the thirst of to-day. Overdredging by man will destroy in a day what the oysters' natural enemies could not accomplish in years. Mr. Brazier, in his evidence before the Parliamentary Committee of 1876, states that a Mr. Maple, having discovered an oyster-bed off Shoreham, obtained in one day 17,300 oysters. "The oystermen saw him dredging, and a few days afterwards there were forty smacks at work upon that very bed, from Selsea, Brightlingsea, Southwick, and other places; and Mr. Maple states that in *one single day* they cleared out this entire bed"—a statement which Mr. Brazier had reason to believe was perfectly true. Could the force of rapacity go further?

21. *Stewart Island Oyster Fisheries*.—With the light of the Home experience, as detailed in the foregoing pages, I can with greater assurance advise on the method which ought to be pursued to protect and beneficially utilize the beds already discovered and worked at Stewart Island. The first deep sea oyster-bed, situated off the west head of Port William, lying from 12 to 15 fathoms below the sea surface, on a rocky bottom, was opened up about nine years ago, and was dredged until it became too poor to pay. It has now had a rest of five years, and yet, as I have already mentioned, it has not sufficiently recovered to pay for working. Why this is so, none of the oyster-dredgers can tell me. The real reason I believe is the want of dredging or trawling, not for purposes of denudation, but of cultivation. The oyster-farm on the sea bottom requires as careful attention as the farm on the earth's surface. To obtain a fair return the ground must be kept clean; everything injurious to the existence and proper development of the oyster must be taken away; fresh culch must be added, and proper rest given—*i.e.*, rest from being carried to market for consumption. In England and in France it has been ascertained that it is absolutely necessary constantly to dredge or trawl an oyster-bed, even in the close months, to protect the oyster and its spat from their natural enemies, dirt, sponges, sea-weed, dog-whelks, and particularly five-fingers. An oyster-bed once broken up by the dredge is more easily accessible to the inroads of its enemies, the worst of which, the five-fingers, obtains in such circumstances a peculiar advantage. On the necessity for dredging during the close months to clean the oyster-beds, the evidence taken by the Committee to which I have already referred is almost unanimous. Mr. Banyard, who has been engaged in oyster cultivation and dredging for from twenty to thirty years, states, "My experience has proved that keeping the culch clean is essential for the reception of the spat, and the months of May, June, and July are the very times when the oysters spawn. I am the owner of three oyster-layings, and I have, in the months of June and July, dredged one side of a laying, and have had spat there because I have *worked it*. Upon the other side of the same laying I have *not dredged*, and there I have had no spat. The layings were under precisely the same conditions. This Blackwater River has been very greatly improved by continuous dredging, and it has also been very much extended in the last twenty years. For instance, where there used to be mussels and five-fingers in the Blackwater, there is now a beautiful soil, clean and fit for the reception of spat." Mr. G. Harvey, an oyster merchant of thirty years' experience, speaking about the over-

* Mr. F. Buckland.