

the refuse and offal from dozens of large salmon canneries. This offal, composed of heads, fins, tails, entrails and fragments, which it does not pay to utilize, is dumped into the water near each cannery. At first it sinks, and then it rises to the surface, chiefly on account of the expansion of the gases formed in the swim-bladders and intestines. A prominent New Westminster fisherman, who gave evidence before the British Columbia Fishery Commission, 1892, (printed at Ottawa, 1893), said: 'I think at the mouth of the river its effect is very bad. Down there it floats and lines the banks and gets foul of the nets—heads, guts, etc. It destroys the nets more than the salmon do and makes the water filthy—not fit for use unless cooked.' Many fishermen on the Fraser River hold these views, and claim that it deters the fish from coming in. But it is by no means established that it is detrimental to the incoming schools of fish. The Joint Fisheries Commission, 1896, indeed reported as follows on this question:—'The cannery people everywhere are confident that no harm results from their method of disposing of the offal, unless it be in certain restricted areas where the eddies cause its retention for a time. During the greater part of the canning season the volume of water in the Fraser River is large, its temperature is low and the current strong. The offal in a fresh condition is said to sink at once and to disappear. The inhabitants, generally, along the river oppose the practice on the ground that it is injurious to health, from which standpoint, however, the question is not of international significance. With respect to the open waters of the Sound, we have heard of no complaints regarding this matter, although some of the offal is known to wash ashore in places. No evidence has been obtained which shows that the throwing in of the offal has had a pernicious effect upon the movements or the abundance of the salmon. If such an effect has actually been produced, as may be the case it has not, up to the present time, made itself sufficiently manifest to bring it within the scope of observation. We are led, however, to deprecate the continuance of the practice for local reasons at least, and would urge further experiments looking to the utilization of the offal as an incentive to its retention on land.'

In the cod and mackerel fisheries, as well as in the lobster canning industry, great quantities of offal are as a rule accumulated, which are dumped into the sea close to the places where the fishing or the canning is carried on. So vast was the quantity thrown into the inshore waters along the Labrador coast and the north shore of the Gulf of St. Lawrence that a special prohibition was enacted to prevent the abuse which, it was claimed, was driving the schools of cod away. Along the shore referred to the cod come in very close in immense schools, and are taken to a large extent in fixed traps or pounds. A similar injury was said to have been done to the schools of mackerel off the Atlantic coast of Canada, especially by United States mackerel schooners, which cleaned and split their fish on board and threw over the 'gurry.' The harm done by lobster canneries has no doubt been exaggerated, as the quantity of foul refuse is limited as compared with the 'gurry' from fish curing operations.

Taking up the question of water pollution as produced by agents which are essentially physical or mechanical in their effects, and which do not in any degree, or in a very small degree, act as chemical poisons, or as physiologically harmful, it is doubtful to what precise extent such physical agents, say, suspended particles of sawdust, or gravel, injuriously, affect fishes in the adult condition. It is true a widespread impression prevails that such suspended foreign matters are most harmful. This impression has little accurate or scientific basis, but it has been stated and restated with the utmost confidence. Thus in a report of this department published in 1889, Part II, p. 12, the following emphatic expression of opinion appeared:

The poisonous effects of sawdust, when allowed to pass into rivers and streams, are so manifold and self-evident to the rational or practical observer, that it would appear almost needless, in the present enlightened state of the world, to require any special pleas or arguments to convince even the most sceptical person of its disastrous workings upon all aquatic life, of an animal or vegetable character, found in the tidal, lacustrine or fluvial waters of any country. Wherever mill-dams have been built across streams, and where sawdust, mill rubbish and other deleterious substances have been cast into the water from saw-mills and other manufactories,