

is thrown into the sea or left to decay on the shore, while if treated by the process of D emolon, it would yield more than 150,000 tons of a manure nearly equal in value to the guano of the Peruvian islands, which now furnish annually from 300,000 to 400,000 tons. If to the manure which might be obtained from the cod-fisheries of the Lower Provinces, we add that of many other great fisheries, we are surprised at the immense resources for agriculture now neglected, which may be drawn at a little expense from the sea, and even from the otherwise worthless refuse of another industry. To this may be added vast quantities of other fish, which at certain seasons and on some coasts are so abundant that they are even taken for the express purpose of spreading upon the adjacent lands, and which would greatly extend the resources of this new manufacture. The oil, whose extraction is made an object of economic importance in the fabrication of manure from sardines in France, exists in but very small quantities in the cod, but in the herring it equals 10 per cent. of the recent fish, and in some other species rises to 3.0 and 4.0 per cent,

Mr. Duncan Bruce of Gasp e has lately been endeavoring to introduce the manufacture of fish-manure into Canada; but he has conceived the idea of combining the fish-offal with a large amount of calcined shale, under the impression that the manure thus prepared will have the effect of driving away insects from the plants to which it is applied. He employs a black bituminous shale from Port Daniel, and distilling this at a red heat, passes the disengaged vapours into a vat containing the fish, which by a gentle and continued heat, have been reduced to a pulpy mass. The calcined shale is then ground to powder and mingled with the fish, and the whole dried. Experiments made with this manure appear to have given very satisfactory results, and it is said have had the effect of driving away insects when applied to growing crops, a result which may be due to the small amount of bituminous matter in the products of the distillation of the shale, rather than to the admixture of the calcined residue. Coal-tar is known to be an efficient agent for the destruction of insects, and in a recent number of the journal, *Le Cosmos*, it is stated that simply painting the wood-work of the inside of green-houses with coal-tar has the effect of expelling from them all noxious insects. Mr. Bruce caused several analyses of this shale to be made by Dr. Reid of New York, from which it appears that different specimens contain from 2.0 to 26.0 per cent. of carbonate of lime, besides from 1.4 to 6.7 per cent. of gypsum, 2.0 per cent. of iron pyrites, and from 4.5 to 6.7 per cent. of carbon remaining after distillation. The amount of volatile matter, described by Dr. Reid as consisting of water, naphtha and ammonia, was found by him in two different samples to equal only 3.5 per cent., of which a large proportion is probably water.

I have examined two specimens of manure prepared by Mr. Bruce from the fish commonly called the menhadden (*Alosa menhadden*). No. 1 was made with the Port Daniel shale, as before described; while for No. 2, this was replaced by a mixture of clay and saw-dust, which was distilled like the shale, the volatile products being added to the decomposing fish. The oil which rose to the surface of the liquid mass had been separated from the second preparation, but remained mingled with the first. Both of these