

annual crops from the land without giving anything back. We have seen that the plant cannot create anything, neither can matter grow in the soil; if we wish to retain its fertility, we must replace what we have taken away.

As regards manures of a general nature designed not so much to supply any special want of a soil whose barrenness arises from some such idiosyncrasy, as that to which I have alluded, but to increase the general fertility of the land—long experience has shown that vegetable and animal matters are by far the most useful, and generally applicable; and by them we are enabled to restore to the soil precisely those substances that have been carried off from it by our farm crops: for different species have diverse preferences and capacities in this respect.

Let me urge you therefore to value such materials and not let them run to waste. It is by means of these that your soil may be enriched, your exhausted soil redeemed, and your annual produce increased. When you see a bone lying by the wayside, (and in this part of the world you cannot go far without seeing one), do not pass it by, do not despise it. Pick it up and throw it into your cart, for therein are the elements out of which your art makes a loaf of bread. Think of the care with which every grain of bone dust is gathered up like gold, in England; think of the crops which it realizes; of the ample fortunes which the very gathering of bones there have realized: and think of the turnip fly, which bone dust cheats out of its favorite morsel!

How much of the success of farming and of all other arts and manufactures depends upon the saving of material! upon imitating that beautiful law which chemistry teaches us, that in nature nothing is lost. In Edinburgh we have a distillery of great extent, where economy of heat and material is wonderfully carried out. The "dreg," a waste product, was produced in such quantities that all the cows in Edinburgh could not consume it, and there remained an enormous surplus which had to be discharged into the water of Leith. This nuisance the modern Athenians protested against as an outrage on their sweet smelling city. Something had to be done. Seed cake had been used by farmers, and it occurred to the proprietors that the "dreg," as well as oil refuse, might be pressed into a cake. Machinery was accordingly fitted up, dreg cake was prepared, and in going through the premises a few days before I left Scotland, I found that the proprietors were realizing £60 a week from this waste product, which, although so much despised in Edinburgh, is now sent to the farmers in all parts of Scotland, to be returned in the form of fat cattle and butter and cheese. With all your improvements and assiduity in cultivation, there is still a cankerworm to give you care. Even after you have drained and ploughed, and subsoil ploughed and manured, and sowed good seed, and tended with care, yet will thieves break through and steal, in form of *wheat flies*, which all the Acts of the Legislature, and all the Dicksons in Canada, cannot reform; turnip beetles which, tiny as they are, seem to eat up whole fields of young turnips at a mouthful; and other pests of the insect world, with which you are no doubt all too familiar. No, not too familiar, for their doings are only in part known; if their habits and their history were better known, we should, no doubt, be better able to cope with the evils which they bring.

But there is also in Canada, I am sorry to say, as in other parts of the world, another host in arms interrupting the peaceful tenor of the farmer's way. These are of vegetable origin—the mildews and moulds and blights and rusts and smuts, which you all know by experience, and which are interesting to the scientific observer from their inscrutable ways and the masks they so often put on to elude his prying eye;—at one time adopting one form of development, and anon changing the whole tenor of their life; at one time attacking a living plant, at another time living on decayed matter; the same species in one form spreading a film of mould on the contents of a long cherished pot of preserves, and in another form playing the alchemist in the cupboard, and transforming molasses into the best brown vinegar. And these, and such as these, are they all the enemies with which the farmer has to contend? They are sufficient indeed, but let us remember the weeds that are so abundant in many fields, that reap from the soil so much of its riches, and so frequently smother the growing crop.

One would imagine that in Canada, where so much trouble and labor have been expended in clearing the soil from its indigenous arboreal vegetation, that when once cleared it would be kept clean. But no sooner are the trees hewn down and the soil turned up, than the herbaceous weeds assert their place and power, and often defy the efforts that are made to keep them in check. These efforts must be increased. When you see a broad patch of crowfoot in your field, or a bed of thistles in your pasture, reflect that the ground they occupy is yielding no return, that it might as well not have