

weeds. Refuse from gas-works, nitrate of soda, rape-cake, and chloride of lime, mixed and spread with manures are highly recommended, and the sowing of soda-ash or guano broadcast when planting.

A previous crop of white mustard is claimed to clear the land of them, presumably by starving out, for the roots of the mustard are extremely acrid, and of course occupy the soil to the exclusion of any more nutritive ones. A close grazing by sheep seems beneficial where pastures are badly infested, perhaps because the surface is trodden down too hard for the larvæ to work through, or because the beetles are prevented from laying their eggs, or have them destroyed. The same result is also obtained by compacting the surface by heavy rollers.

There are also means of striking directly at these pests which at the same time are of more general utility, and whose adoption cannot be too strongly urged. Aside from any mere questions of a taste for order, neatness and beauty, the practical wisdom and advantages of keeping land thoroughly worked and cleaned are plain to everyone; it does not pay to leave neglected a single square yard of the farm.

The larvæ of these beetles, in common with hosts of other insects, find a pleasant refuge in the uncultivated patches left about the farm, and under or among stones and other rubbish. Farmers cannot bear this too constantly in mind, and they should strive to have their fields, as well as gardens, free from all unnecessary disfigurements of such kinds. The entomological collector may delight in the rank growth of all manner of shrubs and plants along the fences and ditches of his neighbours, for he generally finds a rich variety of specimens thereon; but what is his gain is usually the owner's and the country's loss.

Leave no such strips along the fence-rows, nor of stubble in the fields. Let all loose boards, stones, logs, brush and rubbish of every kind be removed, and thus, as far as possible, prevent insect foes from harbouring about the fields; there will be plenty of them without furnishing such breeding and hiding places.

Above all, learn to protect all their natural enemies, among the most powerful of which are the birds. It is really disgraceful (and saddening to such as love and value these bright little creatures) to see the merciless way in which they are shot and trapped around this city (Ottawa), and I fear the same indiscriminate "slaughter of the innocents" takes place all over the land. All those that are known to be insectivorous should be vigorously protected and encouraged, even if occasionally they do exhibit a tendency to a vegetarian diet and pilfer a few berries and seeds.

Robins, thrushes, blackbirds, sparrows, etc., may be always seen searching and pecking vigorously among the grass for elaters and other insects, while numerous species are searching for them in all other situations. It has been estimated that an English rookery, of 10,000 rooks, consumes annually about 200 tons of worms and insects. Now, our much-abused crow, a brother of the rook, is just as active and voracious a bird, and feeds its young (according to Fitch) almost solely on elaters and their larvæ. Thousands of these are probably consumed by the young crow before it even leaves the nest to hunt for them itself.

Toads and frogs live also mainly upon insects, and being nocturnal in their habits—as are so many insects—they form the night relay, working to save the crops while the birds are at rest. Turkeys, ducks and other poultry may profitably be allowed to run in grain fields at suitable seasons, while among root crops they can seldom do any harm, and devour immense numbers of all kinds of insects.

In breaking up new land it is well to burn the turf, and the destruction of many insects, in their various stages, is undoubtedly accomplished by the process of burning so generally in use in this country.

When the elaters reach the perfect state, they are entirely harmless beetles (except that they lay the eggs for future broods), and are found upon flowers, grass, stumps, trees, fences, etc., and when they are approached they have a very common habit of dropping from their resting place, so that it is often almost impossible to find them. They walk slowly, but can fly well, and do so both by day and night, seldom, however, making long flights, rather preferring to remain in the vicinity of their former feeding grounds.

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