

trying, and there is no reason for supposing that it should fall, if properly carried out.

Some may ask, how is it, if the Midge was imported into this country from England, that its parasites did not come with it? The Hessian fly is another imported insect, but its parasites have come too—why this difference? Why should not what has happened in one case take place also in another? The reason is, that the natural history of these two insects is very different. The larvæ of the Hessian fly lie dormant in the depression they make in the straw for a considerable time, and are then liable to be carried wherever straw is taken; its parasites live inside the larvæ, and therefore they are just as liable to be carried about also. But in the case of the Wheat Midge, the larvæ lie dormant for months in the dry wheat heads, and may then be carried anywhere, so long as the wheat is unthreshed. The parasites, on the other hand, only attack the larvæ when they are exposed, crawling on the wheat ears, or down the straw to the ground. Dr. Fitch, in his able essay on the Midge, has shown that a large proportion of the larvæ descend into the ground to undergo their transformation, while some remain permanently in the ear. The latter escape the ichneumon's attacks, and are thus imported uninfected by the parasite, the former get largely stung in their passage to the ground, whence there is little probability of their being accidentally removed. It is thought indeed by some that only the larvæ thus stung descend into the ground at all. These ichneumonized larvæ, then, are what we want imported into this country; the difficulties attending the experiment are undoubtedly great, the objects being so very minute, and their capture at the proper period uncertain, yet we do not doubt that it can be successfully performed. Of course it will be necessary to engage skilled entomologists in England, and pay them for their time and trouble, as well as provide for other necessary expenses; but surely the expense will be but trifling when compared with the benefit likely to ensue.

We may mention here, before concluding, that we are now in correspondence on this subject with a friend who is one of the most distinguished entomologists in England, and a high authority on British Diptera (two-winged flies), to which order the Midge belongs. As soon as we hear his views on the subject of the importation of the parasites, we trust to be able to give our readers some definite information on this important matter. If the project can be shown to be readily feasible, we have little doubt that steps will be taken for its speedy consummation.

Entomological Speculations.

To the Editor of THE CANADA FARMER:

SIR,—One of the most remarkable things in nature is, the persistency with which certain insects will affect the same spot, and the same seed, year after year, notwithstanding the circumstance that there can never be any communication between parent and offspring. These facts are more observable in large insects than in small, although there is little doubt that the same rule holds good throughout all nature.

The cause of this peculiarity is a mystery. Thus with the midge:—If you sow a patch of wheat in a garden miles away from any other wheat, and the wheat is from seed originally affected by the midge, notwithstanding that the seed has been cleaned in every possible way, yet the chances are, indeed the almost certainty is, that the wheat plant so raised will be affected by the midge. Now, where does the insect come from? In the ordinary course the midge fly pierces the husk enveloping the grain, and deposits its orange-coloured egg. The egg is really a worm, or if it is not a worm, it hatches into one in a few days, without casting any shell, and becomes active in devouring the plumula of the growing berry of the grain. Having thus made a wound, it keeps it

open, and the whole future substance of that particular grain is devoured by the destroyer. The insect then goes through the usual transformations into a chrysalis, and either remains in the ear of the wheat, and is carried into the barn or stack with it, or it leaves the ear and buries itself in the earth, to come forth as a fly the next spring, and continue its ravages. Where, then, does the midge come from in cleaned wheat, which is dressed, and taken possibly hundreds of miles away, and sown in a place where midge was never heard of before? And yet it does come. It is certain, or at least as certain as anything can be, that none of the chrysalises have been carried. How, then, is the insect perpetuated? Is it possible that the midge lays two kinds of eggs, one which becomes a worm at once, and runs its career, and the other small and invisible, which clings to the growing grain, and remains with it until it finally finds a favourable place for development? Another and more visible instance is found in the large black spiky caterpillar which frequents the various kinds of poplar, particularly that called the Tacamahac, or cotton wood; but it feeds more or less on all the poplar tribe. The butterfly from which the worm arises, lays its eggs on the underside of the leaf of the tree. The worms come forth in due time, and if not stopped, spread all over the tree and destroy the leaves; but if closely watched and removed they do but little injury. Still, though you may be certain that you have destroyed every worm, and although (the tree being deciduous and shedding its leaves) you are quite certain that all the leaves have been removed, and destroyed in the fall of the year, yet the following year, the same branch of the same tree will be again affected; and if you cut off the branch the preceding year before the worms have travelled at all, the nearest branch to the affected one will again be covered with worms in due season, and so will continue for many years, notwithstanding that every pains is taken to remove them before the insect transformations into chrysalis and fly are perfected. Here it would again appear that the fly must lay two kinds of eggs, one for immediate transformation, which is deposited on the leaf, and the other destined to remain for future development in a favourable season, and to keep up the species, and which must be deposited on the bark of the branches. If this is the case, it is a fact not generally known, and one which deserves further research.

Our friends the robins, thrushes, and cat-birds are the great enemy of this poplar worm; chickens will not eat them; but every evening, just before dark, the neighbouring robins, thrushes, and cat-birds make a raid on the trees so affected, and if they are not disturbed and frightened off, soon make a clean sweep of the insects. If the birds, however, are disturbed or frightened, they quit even this their favourite food, and then woe betide your trees for next year; for unless the worms are destroyed they come out the following year in immense numbers.

CUT WORMS.—People make a great fuss about grubs in the garden, eating off the Cabbage and Cauliflower plants, and it is very annoying to have to plant three or four times; but those who complain so bitterly are seldom aware of the habits of the grub. This insect is hatched under ground, and under the surface of the earth is his home; he is the offspring of a beetle, and comes forth in the spring and early summer. People who garden well, are of course very fond of planting their cabbages and cauliflowers in newly-dug ground; and so far as the plants are concerned it is the best way; but digging, although it kills the weeds, does not kill the grub. They come out all the same, whether the ground is clean or weedy. Now, if the cabbage plot has been well dug and cultivated in the spring, by the time the cabbage and cauliflower plants are ready to go out, the ground is covered with small weeds. The neat gardener kills all these, and plants his cabbages. Meantime out comes the grub, and as he has nothing else to eat, he goes straight to the nearest plant, and so from plant to plant, until he finishes the lot, unless he is caught and sacrificed in the meantime by the irate Gardener—and well may he be irate when he gives seventy-five cents a hundred for his cauliflower plants. But what is the poor grub to do? Live and eat he must, so long as he is allowed to exist, and if he has nothing else to eat, he must eat cabbage or cauliflower. We one year tried the plan of leaving the first crop of weeds undisturbed, and only moving a spade-full of earth for each plant. The plants grew just as well among the weeds as they did on the bare ground, and the grubs seemed to prefer the weeds, for the plants were left untouched. The trial was successful, and when the cabbages and

cauliflowers were large enough, the weeds were destroyed, and a good crop obtained; but the trial was too much for our orderly propensities, and we returned to the bare beds and the loss of plants by the grubs. There may, however, be a lesson in this for those who prefer cabbage plants to disorderly beds.

C.

NOTE BY ED. C. F.—We are much obliged to our correspondent for the account he has given us of his experience among insects, and, while we cannot but differ from some of his conclusions, we trust that we shall hear from him again on these and similar subjects.

With regard to the Wheat Midge, we can only account for its appearance in distant places by the supposition that the seed-wheat was brought to the new locality unthreshed, or else imperfectly cleaned; perfectly clean seed, free from any chaff or refuse, could not carry the midge, larva or pupa, nor could it convey the eggs. The eggs are laid by the parent midge-fly, when the wheat is in flower, in the interstice between the two outer chaff-leaves, as we may term them, and in any other crevice in the heads that it can find. The eggs hatch out in less than a week (the eggs, of course, cannot be worms, though worms come from them), and are so minute that they can hardly be noticed by the naked eye, while the shells must be even less discernible. As, then, the eggs are laid in the chaff before the grain is developed, and hatch out in a few days, they cannot be carried about with the mature grain; it is also contrary to nature for one fly to lay two sets of eggs, one to hatch immediately, the other not for months afterwards. The larvæ of the midge live while they are feeding inside the chaff and attached to the kernel; when they have done feeding, some descend to the earth and there complete their transformation, while others stay in the ears. In dry weather the larvæ become quiescent, and continue so for a long time without feeding, but revive again on obtaining moisture. Thus, then, they are most liable to be carried from place to place either in the ear or among the chaff.

The Caterpillar on the Poplar is that of the Common Camberwell Beauty Butterfly (*Vanessa Antiopa*, Linn.), of which we have given a description and figures in vol. III, 1866, page 247. It commonly infests willows as well as the different species of poplar. The reappearance of the caterpillars on the same trees from which others have been completely removed, is no doubt the result of there being more than one brood in the year, and also of the Butterfly possessing the power of hibernating. The last crop of butterflies in the autumn lives over winter, and comes out very early in the spring to lay its eggs. The suitable aspect and condition of a tree, or its branches, which caused its selection in the first instance, is probably the reason why it is chosen by successive broods; this is a circumstance, however, which we have not noticed ourselves.

The Grub that cuts off the Cabbage plants is commonly called a Cutworm; it is the caterpillar of a Moth, not of a Beetle. The plan of leaving weeds for it to attack is a new one to us, and will probably prove useful in many instances; the unsightly appearance they make is of course a drawback, though not to be compared to the loss of the plants.

State Entomologist in Missouri.

We were much pleased at hearing from our friend Mr. C. V. Riley, of Chicago, that he had recently been appointed State Entomologist in Missouri. While we congratulate him on his appointment, we must also congratulate the State upon the choice that has been made, as well as upon the enlightenment and progress shown in the creation of such an office. Mr. Riley was for a long time Editor of the Entomological Department of the *Prairie Farmer*, and did good service in elucidating the natural history of many noxious and useful insects. We have no doubt that he will enter vigorously upon the duties of his new office, and that we shall ere long hear of many useful results of his labours.