

ven, know how to introduce their eggs into them, thus preventing the mischief they would otherwise occasion, and saving mankind from the horrors of famine." It would be foreign to the purposes of a popular little book like the present, to enter into the ontomological details of the formation and habits of these creatures. A general view of their operations will be quite enough. The most common of them is a small fly, like all the rest, of the hymenopterous order. It was originally called *ichneumon tipula*, but now goes by the name of the *platygaster tipula*. A most accurate description, and a drawing of this fly, may be found in the interesting papers of Mr. Curtis, adverted to in a previous part of this volume. The male is black, and the female is of a pitchy colour. Both shine very much; the former is difficult to meet with. Superficial observers, who have noticed the larvæ of the wheat-midge in the ears, have mistaken the ichneumon, which they have observed amongst them, for the parent of these larvæ, and have consequently condemned it as the origin of the very ills it is destined to diminish. This affords another instance of the folly of hasty conclusions, and of the false reasoning relative to the inferences people deduce without accurate investigation, when they merely see two things together. Just in the same way some farmers have concluded that the little ichneumon flies we are now noticing must lay the eggs producing the larvæ of the midge, because they have themselves seen them amongst the corn containing these larvæ. It is time for all observers to arrive at a better state of knowledge, lest we destroy, as authors of mischiefs, the friendly antidotes to their increase. Prejudice and hasty judgment lead to perpetual misconstructions, as to things both moral and natural.

But to return to the ichneumon. This little platygaster may be readily found on the glumes of the wheat-plants, in the months of July and August. It runs rapidly over the ears, and seems to know well which are those occupied by the larvæ of the midge. The author found numbers of them in various wheat fields in August, 1845; and almost invariably, on examining the ears on which they appeared, discovered that they contained the objects of their search. The ichneumon hunts for them with the utmost eagerness, and by the aid of a sharp tail places a single egg in each of their bodies. The sight has been witnessed by the following experiment: a number of larvæ of the wheat-midge were put upon a piece of white paper, pretty near each other, and an ichneumon was dropped into the midst of the group. The energy of her manner, the rapid vibrations of her antennæ, and the whole of her attitudes, were most amusing. On approaching one of the larvæ her agitation quickened to the utmost intensity; she soon bent her body in a slanting direction beneath her breast, applied her tail to the larvæ, and, becoming still as death, sent forth her curious sheath and deposited her egg in the victim, which writhed considerably under the operation. If she came to one that had previously an egg in it, she left it in an instant and sought another: for the platygaster lays but one in each. This however, often repeated, destroys a great many of these little devastators of the grain. The observations of professor Henslow confirm those which have been already made. He says, "When these eggs are hatched, the young maggots which they produce, and which are the caterpillars of the ichneumons, feed upon the fleshy or muscular parts of the caterpillar they are attacking, carefully avoiding the vital parts. At length the caterpillar, they have been thus devouring alive, dies; or, as frequently happens, it changes to the state of a chrysalis before it is destroyed. The ichneumon caterpillars also pass to the chrysalis state, and either remain within the body of the dead caterpillar, or come out before they assume the fly state. Each species of ichneumon is restricted in its attacks to one, or at most to a few particular species of caterpillar; and the females instinctively proportion the number of eggs they deposit in each individual to the relative size of their own offspring, and that of the insect on which they are destined to prey." It is impossible to contemplate these habits of the minute insects thus brought before our notice, without being deeply impressed with the omnipresence of the great Being to whom all things owe their existence. The same hand

that spread the north over the empty space, and suspended the earth upon nothing, and keeps the stars in their courses, regulates the numbers, instincts, and uses of the smallest living things, appearing equally perfect in all:

"What less than wonders from the Wonderful,
What less than miracles from God can flow?"

The two other ichneumons mentioned by Mr. Kirby are supposed to limit the increase of the platygaster tipulæ. One of them is said to oviposit in its eggs, the other in its maggots. There are also many other species, opening a wide and curious field of enquiry for the entomologist. Several very interesting drawings of those alluded to here are given by Mr. Curtis, in the paper previously recommended to the reader's careful perusal. One of these extraordinary flies has an ovipositor, nearly thrice its own length, which it inserts into the parts of the flower containing the eggs in which it designs to lay its own. Indeed the instruments with which nature has furnished all the ichneumons that have been observed, manifest the most remarkable adaptation; and there could scarcely be conceived a more beautiful subject for a separate treatise than that of their forms and habits, whenever they may have been sufficiently investigated. The design of the present remarks is merely to show how carefully there is provided, by the goodness and wisdom of God, a natural antagonism to the disasters that would befall mankind from the unchecked multiplication of our insect enemies. Nor do the ichneumons alone perform this office. There are flies which live upon the midges, carrying them off and devouring them in the same way as hawks and other birds of prey diminish the numbers of the smaller feathered tribes. While his agency is going on in nature, there is left abundance of scope for the exercise of our own ingenuity; and the next question is, how we may effectually call it forth in the way of defence against the little pests now under review?

The author has before stated, that he could not succeed in breeding the midges from the larvæ found in the chaff dust of the barn, and that some of the larvæ have been known to enter the earth. There is, perhaps, reason to believe that it may ultimately be distinctly ascertained that the chrysalis condition is assumed in the earth. If so, those persons who throw this dust carelessly, as is the constant habit, into the farm-yard, help the increase of the fly. The best method of preventing the multiplication of this destructive insect, seems to be that suggested by professor Henslow. He advises the farmers to get sieves made of such a construction that the chaff may be saved, and the dust containing the larvæ pass through. This dust may be destroyed by burning, and with it the larvæ themselves.

The writer has reason to believe that the efficacy of this mode is more than conjectural. In the autumn of 1845, the larvæ of the midge were extremely numerous in the district in which he resides, and several farms suffered considerably. Two intelligent farmers had adopted the precaution of the sieve on large occupations. There were scarcely any midges to be found in their wheat, while in other neighbouring places they were extremely abundant. This simple precaution might have saved many persons, in certain years, a large portion of their crop.

With regard to the Hessian fly, the advice given by Mr. Curtis is manifestly the best possible. It is well worthy the attention of the agriculturists in America. Nothing can be more simple. He merely recommends them to collect and burn the stubble in the fields where they have been found; and the reason given is, that the larvæ at the base of the straw will of course be destroyed. The burnt straw will also form excellent manure for the land; and thus a double advantage will be gained.

The fungi and insects that have been described in the preceding pages form the principal parasites of our wheat-plants. Two more chapters will be devoted to some general remarks on certain matters, evidently connected with these inquiries, and tending, it is trusted, to beget further investigations. It is almost impossible to avoid, in such explanations, that kind of phraseology which, from its technicality, appears at first un-