

inside the substance of the straw, and placed generally a little above the first or second joint from the root. These swellings, or "galls," are clearly shown in the accompanying illustration (fig. 58, a); the black dots indicate the holes through which the insect has finally escaped in its winged state (b). "At first sight, these knotty swellings of the stem are apt to elude observation, because, being almost always situated just above the joint or knot on that stem whence comes the popular name "Jointworms"—they are enwrapped and hidden by the sheath of the blade; but on stripping off the sheath, as is supposed to have been done in the engraving, they become at once conspicuous objects. The mode in which

the Joint-worm produces its destructive effects upon the small grain may be readily explained. Not only is the sap of the plant extracted on its road to the ear, in order to form the abnormal woody enlargement or gall, in which the larvæ are imbedded, each in his own private and peculiar cell, but a very large supply of sap must be wasted in feeding the larvæ themselves. Hence the ear that would otherwise be fully developed becomes more or less blasted and shrivelled; although we are told that, in the case of barley more particularly, the plant tillers out laterally, so as partially to supply the loss of the main crop of ears."—American Entomologist, i. 150.

In Canada the Joint worm fly (fig. 58. b, represents a female, regarded from above, and fig. 59, a, one of the same sex viewed laterally; b, in the latter illustration, is the male insect.)



makes its appearance about the beginning or the middle of June, and after pairing, proceeds-in the case of the female-to deposit its eggs on the young growing plants. In more southern latitudes the flies, as usual appear considerably earlier. Mr. Pettit, of Grimsby, to whom we were indebted at the time for a number of specimens of affected barley containing the insect, gave the following interesting account of the process of ovipositing in the Canada Farmer (Sept. 1867, p. 268):-"About the 8th of June of the present year the perfect insects began to make their way out of the gails. Being desirous of knowing more of their habits, I watched the growing barley, and on the 10th of June found them actively at work ovipositing in the then healthy stalks of the plant. Before commencing operations they walk leisurely up one side of the plant as far as the last leaf, and then down the

other, apparently to make sure that it has not already been oviposited in. Head downward, they then begin by bending the abdomen downward, and placing the tip of the ovipositor on the straw at right angles with the body, when the abdomen resumes its natural position, and the ovipositor is gradually worked into the plant to its full extent. With the aid of a good lens, and by pulling up the plants on which they were at work (which did not appear to disconcert them in the least). I could view the whole operation, which, in some cases, was accomplished in a few minutes, and in others was the work of an hour or two. When a puncture was completed, they usually backed up a little and viewed it for a few seconds, and then apparently satisfied, moved to one side and commenced another." Fig. 60.

In a few days the eggs hatch out, and the worm (fig. 60) commences to feed, snugly enclosed in its cell; when the grain becomes ripe, and the straw consequently hard and dry, the worm is generally full grown, but in this state it for the most part continues unchanged till the following spring,



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