THE GLEANER:

AND NORTHUMBERLAND, KENT, GLOUCESTER AND RESTIGOUCHE

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From the Albany Cultivator.

REMARKS OF THE GRAIN-MOTH.

Usually Termed the Flying Weevil, of the middle and Western States.

L. Tucker.—About six months since, when sending on the amount of my annual subscription to your valuable paper, I remarked, that if you wished it, I would contribute some facts regarding the Flying Weevil. Since that time I have still continued to study the habits of the insect, in order, if possible, to discover some remedy for the evil, as our wheat crops, in this part of the country, during the years 1844 and 1845, had suffered severely. Although the article was written some months since, detailing the then ascertained facts, I delayed sending it for several reasons: On some points regarding the insect I was still uncertain, and desired to make further experiments. I had also written to Mrs Say, requesting to be informed whether Mr Say, while he resided here, had described, the insect. Although I have received no answer yet to this inquiry, I hasten to forward such facts as have come under my observation, (without however any accompanying drawings of the insect, as I had intended,) because a friend has just put a number of the "Prarie Farmer" into my hands, by which I perceive that Dr. Harris, has already received specimens of the insect, of which he has also made drawings, in all its stages, and calls for farther information. My first idea on seeing the paragraph was that the subject being now in such able hands, any communication from me would be useless; but on second consideration, recollecting that, here, we have an opportunity of inspecting the depredations of the living insect on a large scale, I have concluded to send you such a description of the insect as my limited knowledge of Etomology permits me to give; which, if not scientific, will, I trust, be found sufficiently accurate to enable my brother farmers to detect the enemy when it exists in their crops. To this I shall add, on the habits of the insects and the nature of their depredations, such observations as have been collected by enquiries from others, or made personally, concluding with some account of the *usual* remedies for the evil, and a suggestion as to a *new* and if efficacious, easily accessible remedy.

In giving the result of these examinations and experiments, I shall, for the sake of clearnees, even at the risk, nay almost certainty, of being considered tedious, put them as answers to questions, such as I should expect persons, unacquainted with the insect and only imperfectly acquainted with entomology, to propose for the sake of information. I shall also endeavour to distinguish rigidly between ascertained facts and mere conjecture or opinion, however such opinion may be warranted by circumstantial evidence.

1 *What is the insect like? What are its external characteristics?* To the readers of the Cultivator it may perhaps be well to mention first what insects (already descibed throughout the various volumes of that work) it is *not*; and this may afterwards facillitate the reply saying what it *is*.

It is *not* the Wheat-worm or Weevil of the eastern states, spoken of at pages 23 73, and 98 in the first vol. of the second series of the Cultivator. *Nor* is it the Wheat-fly, (*Cecydomia destructor*) of Great Britain, Canada, and other portions of country, described at page 105 of the above volume. It is *not* any one of the enemies of the wheat crop mentioned in the 3d volume of the Cultivator at pages 65, 111, 118, and 129.

It is *not* the Black Weevil (*Curculio granarius* or *Calandra granaria*) described in the 5th vol., page 121, with which most farmers and millers are well acquainted. *Nor* is the Grain-maggot spoken of at page 157 of the same volume.

It is *not* the Grainworm of Western New-York, described in the 6th vol., at page 43.

Nor is the European Grain-moth (*Tinea granella,*) mentioned in the 9th volume of the Cultivator, as having been described by Dr. Harris, in his work on the insects of Massachusetts, injurious to vegetation.

Then what is it? The insect in question having in is perfect state, four scaly or minutely imbricated wings, a spiral tongue, and a hairy body, *is certainly* a Lepidopterous insect. That is to say it belongs according to the Linnæan arrangement, to the

ORDER LEPIDOPTERA,

which contains three genera; the Butterflies, the Hawk-moths, and the Phalænæ, or Moths.

That the ravages here in the wheat are committed by the worm or Larva of Lepidopterous insect no one can doubt, who has seen as I have, the myriads of moths flying about the grain and treshing machine, while threshing out the crop of 1844, and some few in that of 1845; hence the popular term applied to them of *Flying Weevil*, as we never see the common black weevil *flying* about our wheat. It is they only, however, of our wheat enemies which are properly *weevil;* as that term is applied by Entomologists, only to a genus of the Celoptera or hard winged insects, of which the black weevil (*Curculio granarius*) in one species. [Why these black weevils having wings do not fly. I cannot say, but this I can testify, that during seven years, while I had daily opportunity of examining them; and part of which time we were much annoyed by them, in our mill, especially in warm weather, I never yet saw one on the wing, or met with an individual who ever remembered to have seen one of them flying.]

We have an additional proof that these moths are the insects in question. I have several times hatched them out of wheat and corn under large tumblers, and here also frequently found the moth, on dessecting the grains of wheat, just ready to emerge from the pupa case; while in other grains of wheat, I have perceived the moth arrested in its progress, probably by cold weather, half way out of the opening, which is invariably found near the apex of the grain, whenever the insect has completed its metamorphoses, and has left, or is about leaving its dwelling.

Our insect belongs, farther, to the

GENUS PHALÆNA, MOTH;

because its antennæ become gradually smaller from their base to their tip, instead of which those butterflies are largest at the outer extremity, generally ending in a knob; and because its wings are not vertical, as in butterflies. Another proof of its being a moth, is that, when you view a large heap of weevil eaten grain, in a mill, (without disturbing the grain) you usually only discover the insects *in the day time*, on pretty close inspection; while on surveying them *at night* with a candle, you are surrounded by them, showing that, like most moths, they prefer flying by night.

The moth genus is sub-divided into 8 groups, families or sub-genera, among which are the *Noctuæ* or Owlet Moths, and the *Tinæ*, (Destroyers of household stuffs.)

After repeated microscopical observations, believing that I found the tongue of the insect somewhat long, horney and projecting; farther that the thorax seemed crested; the feelers distinct, with the lower joints compressed and the upper naked and cylindrical; and that the wings, when at rest, were deflected, I inclined to place our moth among the *Noctuæ*.

But having latterly, through the kindness of Prof Norwood, of Madison, had an opportunity to consult Dr. Harris's work, I perceive that he thinks that the fly-weevil of Col. Carter, of Virginia, (evidently our flying-weevil,) will prove no other than the destructive Angoumois moth, (one of the *Tineæ*.) This insect ravaged a province of France of that name, situated near the west coast in about latitude 46, many years since; and a description of it, as given by Duhamel, will be found in Dr. Harris's work, at pages 366 and 367.

Now I am aware how difficult it is for one like myself, not versed in entomology, to decide whether the minute tongue of an insect is projecting and horny; or prominent and membranaceous, (these constituting in the Ency. Brit., article Entomology, the grand characteristic differences between the *Noctuæ* and *Tineæ*) with other such intricate details. And therefore, although I am aided by a tolerable microscope, one lens of which magnifies the surface of objects, by my estimate, if correct, about 4000 times; still as Dr. Harris now has the insect to examine for himself, I shall not venture an opinion, with regard to the species, expect to say that as far as my knowledge extends, his description of *Anacampses cerealella*, (Angoumois Moth,) comes very close to that of our moth. In some particulars, perhaps unimportant, however, the description does not, I think quite apply.

I shall neverteless submit, with all due humility, as the result of my investigations on the insect in question, in its various stage, the following detailed

SPECIFIC CHARACTERS.

The Egg.—The speck found on weevil-eaten wheat, on the upper margin of the heart, (*corculum*, or oral spot near the base of the grain, containing the future germ, surrounded by a soft and somewhat waxy material) although just visible to the naked eye, presents, under the microscope, the appearance of from 50 to 100 minute, irregularly-ovoid grains (somewhat resembling rice,) apparently of albuminous matter enveloped in a thin pellicle or membrane. From this speck being almost always exactly at the lower orifice of the cavity commenced by the worm, and from its otherwise resembling the eggs of insects, I have always felt confident that this is the egg or eggs, although I cannot detect the living embryo for want, I suppose, of a more powerful lens. At first I supposed the whole only one eegg, as it seemed but little larger in proportion to our moth than the egg of the common silkworm moth does to its parent. But, from the fact that these grains can be separated under the microscope, by the point of a very fine needle, I believe the speck will prove to be a *cluster* of eggs. Even after the worm has commenced its operations, this speck still presents the same external appearance. The membrane seems only to burst below, and allow the escape of the worm or worms as circumstances may require, and still retains its membranous covering, which is not affected by water, as nearly as I can ascertain, unless it be boiling, or nearly so. Why there should be so many eggs in reserve, I cannot say; but sometimes I have found a cluster deposited on nearly every grain which one ear of wheat contains.

The Larva is naked, of a dirty white or yellowish color; feet 16 in number. (The first pair of prop-legs is however so minute that it is very difficult to decide, without some possibility of error. There may, therefore, only be fourteen feet.) From one specimen, taken out of corn, when examining its mouth with a needle, I found I could draw a very minute thread. Of this spinning power I could not at first perceive that they made any use; but on close inspection, I observed that the worm just before changing into a crysalis, seems to shove all its excrementitious deposit to one side and downwards in the old cavity, and then weaves a thin, white web-like partition, neither vertically nor horizontally, but rather obliquely through the channel, so as to seperate the deposit from the chrysalis; the latter being always found with its head towards, and not far from the opening at which the future moth emerges.

Under the microscope, the lava has very much such an appearance as the grub of cockchafer, (or Maybug,) so often found in our gardens, presents to the naked eye.

The *Pupa* is brown, (becoming darker as it approaches its final transformation,) smaller at each end than in the middle, and not enveloped in any covering.

The Moth or Perfect Insect.—Measuring from the head to the extremity of the wings, the moth is usually three-twelfths of an inch long, or in specimens taken out of corn, four-twelfths of an inch long, and one-tenth across. The antenæ, when highly magnified, appear somewhat moniliform, [resembling a necklace,] setaceous, [tapering from the base to the extremity,] and sometimes nearly as long as the body without the wings. The head is usually furnished with two *palpi*, (feelers) bent back; second joint naked and cylindrical. (Some specimens certainly have no palpi, but whether such are uniformly of one sex or the other I cannot decide. I have found palpi on both sexes.) Tongue spiral, longer than the head. The wings extend frequently some distance, at least one-tenth of an inch beyond the abdomen, particularly in the male, whose abdomen is considerably smaller than that of the female. The *upper* wings are of a color which I think generally speaking would be called gray; but probably entomologists might call it cinerous or ash-coloured; where the wings approach the thorax, however, they have more of a bluish tinge, and towards the tips a yellowish tinge; the whole upper surface exhibits a brilliant lustre, resembling satin. The *lower* wings are darker, inclining to brown, with a broad fringe. When at rest, the wings are somewhat deflected, that is, sloping like the roof of a house. The female is furnished with an ovi-positor, which seems capable of being thrust out a considerable distance. Viewed from above or beneath, this egg sheath appears as thin as the edge of a knife blade, but when seen from either side, it presents a considerable width, and has on one side an opening, through which, I presume, the eggs are forced out, with the accompanying viscid matter, to attach them firmly to the grain.

This description will, no doubt, appear to many of your readers very dry, and the result very small after so much labor. But I can assure my brother farmers that, to me, the investigation has been full of interest; and I can safely add my testimony, in confirmation of the recommendations which many have given, of the use of the microscope. It is an instrument calculated to aid us materially in some portions of our agricultural investigations, [particularly among the animal and vegetable enemies of our crops;] and withal, admirably adapted [when we are contemplating the minute and, but for these lenses, to us invisible world] to excite our admiration for Nature's works and her immutable laws.

II. *Where is the insect found?*

I. In what kinds of grain?

As far as I have been able to observe for myself, or ascertain from others in this neighbourhood, it never attacks rye; a neighbour informs me he has found it in oats; and I have found it abundantly in wheat, barley, and Indian corn. [The insect found in corn does not differ in any essential, that I can discover, from that found in wheat; it is usually somewhat larger than the specimens from wheat, but this may be owing to the greater amount of nourishment which the grain has afforded, a grain of corn being so much larger than a grain of wheat.]

2. In what portion of the grain is it found.?

The egg is found, as already remarked, on the outside of the wheat, and most generally on the upper margin of the heart, somewhat above the point from which the plume, or infant stem ascends. This being the softest and most easily perforated portion of the grain, the embryo grub, after burs ting the under portion of the egg, seems to find no difficulty in entering the grain. Sometimes, however, I have found the egg in the groove of the wheat but the grub seems to find its way round to the heart, before it commences its attacks. As the larva increases in size, it eats itself a channel lengthwise of the grain, devouring nearly all the farina, until it reaches the upper