

INJURIOUS INSECTS OF 1881.

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THE long, cold, steady winter of 1880-81 was favorable to the hibernation of insects, and consequently they were quite destructive during the past year. The chinch-bug, the Colorado potato beetle, and the army worm were among the most abundant. As they have been so often discussed, we omit their description in this article.

The white grub of the meadow, the larva of the June bug (*Lachnosterna fusca*, Frohl.) seems to be attracting considerable attention at present, and many remedies are proposed. A great deal of the trouble arises from the fact that the grubs are three years completing their growth, and the only time a remedy could be applied successfully is when the insect arrives at maturity. Then the farmers, not being troubled with the grubs, forget for a time about them. The first two summers of their larval existence they are quite small and only comparatively destructive; but during the third summer the roots of the grass in some places are so destroyed that the sod may be rolled up like a piece of carpet. Dr. Weed, who has given this insect considerable attention for the past ten or twelve years, affirms, as his opinion, that it is local in its habitat, it being destructive in one part of his farm for a season, and the next year destructive in another portion not a mile distant; so that every three years the work of the grubs in these spots is decidedly noticeable. The most active enemies of the grub are the blackbirds, robins, meadow-larks, and other birds.

When maturity is reached, they appear as brown beetles (known as June bugs) flying heavily and awkwardly. In this state bats are their enemies. They are attracted by a light, and a lighted lantern suspended over a pail of water has been used to trap the beetles. We have seen a statement that as high as 962 have been captured in this manner in one evening.

Another method recommended is to shake the beetles from the fruit trees in the morning when they are torpid, catching on cloth, and destroying them. It is said they prefer cherry trees as a resting place in the day time. Every female beetle lays from one to two hundred eggs, depositing them in the ground.

During the first part of June, 1880, the June bug was so unusually plentiful at Muscatine that the air at twilight for several days was literally alive with the beetles. Consequently it might be predicted that the farmers in this immediate vicinity, during the summer of 1882, may be somewhat disturbed by the white grub and beetles emerging in 1883.

The Maple worm (*Dryocampa rubicunda*) or Rosy Dryocampa, seems to have been very destructive to the soft maple in parts of the southwest portion of the State. In Mt. Ayr, Ringgold county, it has, we are informed, completely defoliated the maples used as shade trees, being confined to the town. It is a longitudinal striped worm of two shades of green. A pale yellowish-green, alternating with seven darker stripes, the middle stripe being the darkest. On the second segment are two large black spines pointing forward, and each of the remaining segments has six short black spines, which become quite prominent on the tenth and eleventh segments, counting backward from the head. Its length, when full grown, is about one and one-half or one and three-fourths inches. It enters the ground several inches to form the chrysalis, which is deep brown, ending in a double-pointed long spine, and the abdominal segments are each armed with a row of small points. It is double brooded, that is two broods a year, and remains over winter in the chrysalis state, issuing as a perfect moth the following spring. The moth expands one and three-fourths to two and one-fourth inches. The fore wings are rose-colored, crossed obliquely with a broad yellow band, and occasionally a little yellow will be found on the outer margin. The hind wings are pale yellow, with a short rose band. The body is yellow. Antennæ short, and like a broad feather in the males.

It has several insect enemies, which usually keep it in

check, but for the past three years it has obtained the ascendancy in the southwest. We collected a few specimens in Muscatine, although it did little or no damage.

During the past season, at Mt. Ayr, the first brood of larvæ had completed their destructive life and pupated by the middle of July. By the 23d of August the second brood of larvæ had almost reached maturity, about half of them being full grown, while the tree trunks, fences, and sidewalks were green with them as they left the tree to enter the ground.

The Boll worm (*Helothis armigera*, Hubn.) or corn worm, as it is called in the northern States, was somewhat destructive during the last year, especially in the late sweet-corn, feeding on the silk and soft kernels. It is a striped green worm, about an inch and a half long, varying in color, one author says, "from pale green to light brown." This is the identical boll worm of the South, which destroys so much cotton. When the worm is full grown it descends into the ground and transforms into a chrysalis, where it remains two or three weeks, and comes forth a perfect moth. We have not seen the moth, but Walsh describes it as "also quite variable in depth of shading, but the more common color of its fore wings is pale clay yellow, with a faint greenish tint. They are marked and variegated with pale olive and reddish tint; a dark spot near the middle of each fore wing being very conspicuous. The hind wings are paler than the fore wings, and invariably have along the outer margin a dark brown band, interrupted about the middle by a large pale spot." It is double brooded, and besides living on corn it eats corn tassels, green and ripe tomatoes, green peas, young pumpkins, and the bolls of the cotton plant. There is no very satisfactory remedy given, although hand picking is recommended, but owing to the habits of the larvæ, is difficult of execution. On June 26th we observed a small black slug (*Selandria cerasi*) feeding on the parenchyma or green portion of the leaves of the Early Richmond cherry, giving them somewhat the appearance of "skeletonized leaves." It is about half an inch in length, and has twenty legs. It

gradually tapers backward, ending in a blunt point. At first appearance, it resembles the small garden snail or slug found in damp places. It looks black and shiny, but on removing the slime with which it is covered, it proves to be transparent, with a slightly yellowish cast, and some of the internal anatomy and pulsations of the heart can be distinctly seen.

This slug causes a great deal of damage to pear and cherry trees, by forcing the trees during the heat of summer to throw out the new leaves at the ends of the branches and twigs that should not be matured until the following spring, thereby exhausting the trees and destroying the prospect of fruit. This insect is more prevalent in the eastern States and the fruit district of Michigan than with us. In 1797 it is claimed they were so abundant in Massachusetts "that small trees were covered with them and the foliage entirely destroyed. Even the air passing through the trees became charged with a disagreeable and sickening odor given out by these slimy creatures." Harris gives an interesting account of how Prof. Peck wrote an article entitled a "Natural History of the Slug Worm," which was printed in Boston in 1799, by the order of the Massachusetts Agricultural Society, for which he received the society's premium of fifty dollars and a gold medal.

The perfect insect of this slug is a black, shiny saw-fly, belonging to the sub-order Hymenoptera, the same to which bees and wasps belong. The first two pairs of legs are mostly clay-yellow, with some black, but in the hind pair of legs the black predominates. The wings are transparent. The body is about a fifth of an inch in length. The fly appears from the first to the middle of May, pierces the skin of a cherry or pear leaf, and lays one egg in each incision. Fourteen days after the egg hatches. The young slug is twenty days coming to its full growth, when it either falls from the tree or crawls to the ground, burrows from one to three inches beneath the surface, and forms an earthen cocoon in which it transforms into pupa. After a time it breaks open its earthen cell, emerging as a saw-fly. It is double-brooded, those of the second brood entering the

ground in September or October and emerging again the following spring. Some authorities claim that a portion of the fall brood do not finish their transformations the following year, but remain in the ground until the second spring, so that if by any accident all of the slugs of one year should be destroyed there would yet be enough in the earth to continue the species.

One of the natural enemies is a very small ichneumon fly which stings the eggs of the saw-fly depositing an egg of its own that hatches in a small maggot preying upon the saw-fly's eggs.

Another natural enemy is a small blue-black and orange larva of some lady-bird, probably the larva of the convergent lady-bird (*Hippodamia convergens*, Gu.) It is highly amusing to watch this larva tormenting the slugs. Birds destroy a great many, and mice perform the same kindly office while the slugs are in the pupa state.

It is found that ashes or quicklime, sprinkled on the trees with a sieve fastened to a long pole, is the most effective remedy known. Dust or sand is often recommended in place of ashes or lime. This, however, has proved rather beneficial to the slugs than otherwise, as it sticks to them, stiffening up their skins and making it easier for them to molt. Lime, on the contrary, will burn through to the skin and kill them. Fresh ashes, when moistened by the slime of the slugs, will have the same effect, though not to so great a degree.

A severe storm is undoubtedly of good sometimes. On the 26th of June, the day we first observed these slugs on our Early Richmonds, a severe storm arose at four P. M.—so severe that that 1.66 inches of water fell in less than an hour. After the storm, not a slug was to be found on the trees, and for the remainder of the season, though we observed carefully, we saw no more traces of the slugs.

Plowing around the trees in the early spring, would undoubtedly be advantageous, as it would destroy the pupæ. Loosening the earth around rose-bushes we know to be a practical check to the rose slug.

Cabbage Worms.—These might well be taken as a separate

and distinct subject upon which to write. For the two years previous to 1881, the cabbage in our locality had been subject to the ravages of but one, the imported cabbage worm (*Pieris rapæ*). In 1881, however, three distinct species of worms, and the cabbage aphid, all combined for its destruction. We visited Dr. Weed in his noted cabbage garden, near Muscatine, on August 29th, and found him superintending a corps of boy hands, picking the worms from his cabbage. He had arrived, however, at the conclusion, after killing 9020 of the butterflies in 1880, that the only way of successfully combating the worms, is by sprinkling, though he has not yet found any decoction which is wholly infallible. A few large leaves, plucked from the cabbage, were truly an entomological curiosity, for they contained the larvæ and pupæ of the European or imported cabbage worm (*Pieris rapæ*); the southern cabbage worm (*Pieris protodice*); the larvæ of the nine-spotted lady-bird (*Coccinella nine-notata*) and the larvæ and cocoons of what we thought to be the Cabbage Pionæ (*Pionæ remosalis*, Green). It is not often we find five distinct species on one leaf. The pale green worm and pupa, and the white butterfly of the imported cabbage worm (*P. rapæ*) have been so often described, we will not stop to re-describe them. On May 2d, 1881, it made its first appearance, a full month later than the previous year. There were two broods of the worms, and they finally disappeared the first of September. The southern cabbage butterfly (*Pieris protodice*), after an entire absence of two years, suddenly made its appearance in great numbers about June 19th, and on June 22d they were so very plentiful, that, figuratively speaking, you literally crushed them as you walked along the country roads. This brood of butterflies disappeared in about a week or ten days, and by the middle of August we were informed that another new worm was at work on the cabbages. On examination, it proved to be the larva of *P. protodice*. It is about the size of the larva *Pieris rapæ* one and one-half inches long. It is marked with four conspicuous longitudinal yellow stripes, alternating with bluish-green stripes, somewhat broader than the yellow, and with transverse rows of

black dots of various sizes. The ventral or under side, is pale green, shading into blue at the sides. It is thinly covered with minute, stiff, black hairs. When ready to pupatate it either leaves the plant or chooses the most sheltered spot on the cabbage, and spins a small, white, silken mat on the leaf, into which it fastens the anal or clasping legs. It also spins a silken chord around the body, fastened to the leaf at each end designed as a support to the pupa. Then it shortens, throwing off the larval skin, becoming a soft, pale green pupa, which hardens somewhat, and changes to a bluish-gray with black spots. In a short time the butterfly emerges, resembling *P. rapæ*, except it is marked with more black.

The other cabbage worm we have never observed previous to last year, and can find no description in any of the standard entomological works within our resources. The most approximate is the description of *Pionæ remosalis* given by Prof. Thomas in his fourth entomological report of Illinois. It corresponds with *Pionæ remosalis* in length and general shape, but in coloration it differs. *Pionæ remosalis* perforates the leaves with elongate oval holes, while our worm simply eats parenchyma from the upper surface in elongate oval patches. The specimens described by Thomas pupatated in the breeding cages on the surface of the dirt, forming loose cocoons and covering them with sand. Our specimens pupatated on the leaf in loose white cocoons. It is possible this may be *Pionæ remosalis*, but we have not yet given it sufficient study positively to determine.

Remedies.—A number of given artificial remedies were discussed in a former article before this society. A few, however, have come within our notice during the past year, which seem to merit special mention. Prof. J. H. Comstock, formerly the entomologist of the department of Agricultural College, recommends sprinkling the plants with hot water. Use a thermometer. "Water heated to 140 degrees Fahr. will not injure the plant, and will destroy the worms very effectually. It should be applied by a watering-pot, so that the plant may be thoroughly drenched in all the infected parts." Tobacco water has been suggested. Prepared by

soaking the refuse tobacco stems in water for a few days and sprinkling the plants with the decoction. The stems may be obtained at any cigar factory, where they are thrown away as worthless. As a general rule, tobacco is destructive to nearly all the forms of insect life.

A friend of ours saved his cabbage by using salt and water in the proportion of one gallon of salt to one barrel of water. Two applications being sufficient to remove not only the worms, but also all the aphids. The first application had some red pepper, steeped in water, mixed with it. This may have had some beneficial effect.

With cabbage retailing at twenty-five cents per head, as at present, it pays to experiment with and take care of the cabbage.

The subject of entomology is entirely too much neglected. Taking the people as a whole, they have very little accurate knowledge of insect transformations, their modes of subsistence, duration, or periodical times of appearance. A farmer knows the chinch-bug is bad one year, and not another; why, he cannot tell. If he knew the habits, life history, and effect of the weather on this insect, he would more probably know why it is plentiful one year and scarce another. He would learn also how to arrange his crops to the best advantage. This is not only the case with one "bug," but all of our injurious insects will fall into one class in this respect. And when our farmers think of and observe these small foes and friends of ours, then will a portion of the many millions of dollars claimed by Walsh and Thomas to be annually lost in the State of Illinois (and Iowa surely loses an equal amount) be partially saved.

"But how will this be brought about? How can we remedy the present state of affairs? are the questions asked by every practical man. Our answer would be: Educate the rising generation of farmers. Have entomology taught in the public schools. Make it one of the common studies by statute enactment. Require teachers to place it in advance of, or at least equal to, grammar.

It would be of vastly more financial benefit, and is very

much easier to comprehend. It is practical, and its illustrations are visible everywhere. We know by observation in teaching, that children of eleven and twelve years old and upward will take very kindly to entomology. Now another problem arises, "What text-book shall be used?" This is a hard question to answer, we are free to admit. We do not know of any book published at present that quite reaches our ideal of a text-book for common schools.

Most of the books are too hard for beginners, and are not arranged in chapters suitable for lessons. But should this great State of Iowa, with her 11,444 public schools, say through her Legislature, that after the first day of January, 1884, entomology should become one of the branches studied in our public schools, then the book agents would be prepared to supply the demand with a full line of suitable books, for in the education of the masses lies the prosperity of our nation.

CHARACTER OF KEOKUK.

KEOKUK, December 25, 1864.

REV. SAMUEL STORRS HOWE—*My Dear Sir:*—As you inquire only about Keokuk, I shall not speak of others, as I infer you are posted in regard to them.

The meaning of the name "Keokuk," is Watchful Fox. He was not prince or chief when a child, *i. e.*, he was not an hereditary chief, like Wa-pel-lo, Ap-pa-noose, and others.

At the termination of what is called the Black Hawk war, the United States Government, unjustly, as I have ever contended, made Keokuk the head chief of the nation.

Keokuk, previous to this, was the orator of the nation, and he was indeed an orator—the Daniel Webster of his nation. And that great statesman remarked, after listening to a speech by Keokuk in Washington, that he (Keokuk) was the finest orator he ever heard speak.

I think I never heard a more impressive speaker than he. His address was commanding, his carriage exceedingly dignified and graceful.

But his name is significant—he was a wily, a Watchful,

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