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uncommon of late. One specimen in the Academy's collection was taken on Nicolle Island, within the city limits. With this species I close my report, filled with gratification at the results attained, and enthusiasm for the future. If spared, with the accession of earnest assistance, I hope to do better still in the future. I am satisfied that a considerable number is yet to be added to be added to our catalogue of species, but not without close gleaning in some portions of the field already well worked.

NOTES ON ENTOMOLOGY.

BY R. J. MENDENHALL.

CODDLING MOTH,² OR APPLE-WORM—*Carpocapsa pomonella*, Linn. Wherever the apple is grown, or to whatever distant region it is transported, there also appears its destroyer, the apple-worm. This omnipresent pest is a native of Europe, and was probably introduced into this country in fruit brought from there. It began to make its presence known in the orchards of the Eastern States, about the beginning of the present century, whence it has gradually spread westward until even the orchards of the Pacific States no longer enjoy immunity from its ravages. The moth, the parent of the apple-worm, is seldom identified by even the most experienced orchardists, owing to its nocturnal habits, and to the fact that it is not attracted to the light of lamps, or fires, like the majority of nocturnal insects. It is a very pretty insect, expanding about three-fourths of an inch. The forewings are crossed by alternate wavy lines of silvery gray and dark brown, and each has, on the inner hind angle, a large brown spot, with streaks of bright bronze or gold. The hind wings are silvery gray, darkest towards the outer margin. In common with other *Tortricida*, it rests with the wings folded, roof-like, over the body.

This insect hibernates in the larva state; and the moths appear in the spring, about the time that the apple trees are in bloom, and begin depositing their eggs in the calyx-end as soon as the fruit is

set. Seldom more than one or two eggs are placed upon the same apple, some marvelous instinct warning the insect against ovipositing upon fruit already occupied.

As the fruit grows, so also does the worm within, slowly at first, more rapidly later; and, in all, requiring a period of between thirty and forty days to attain its full size. The appearance of the apple-worm is familiar to every one. When young, it is of a translucent whitish color, with a black head and collar. As it approaches maturity, the color of the body changes to a dull pink, sparsely clothed with short hairs, while the head and shield are of a shaded brown.

If the infested fruit does not fall to the ground by the time the worm is fully grown, the latter makes its exit, and descends the tree in search of a place of concealment in which to spin its cocoon. The latter is pure white within, but is disguised outwardly by particles of bark, leaves, or whatever substance it is attached to.

The most effective means of reducing the numbers of this insect is to take advantage of its habit of concealing itself before changing to pupa, and furnish it a hiding place in which it may be entrapped and killed. The best traps are cloths in the forks of the tree, or hay bands, or folded bandages of coarse paper, around the trunk. The latter has proved superior to anything else for collecting the worms, which delight to hide between the various folds. The traps should be examined once in ten days, during the months of July and August, and the larvæ and pupæ destroyed. In more southerly latitudes, this insect produces two broods in a season, but with us it is, in all probability, single brooded.

THE PLUM CURCULIO—*Conotrachelus nenuphar*, Herbst. This is the pre-eminent enemy of stone-fruits in this country, and many varieties of pip-fruits are also placed under contribution for its sustenance. With us, it is especially destructive to Cherries and Plums. It is a small, dark brown, rough-looking beetle, with a black, shiny hump on each of the wing-covers, just back of the middle, at the base of which, on the posterior side, is a whitish spot. The head is prolonged in front, into a stout, slightly curved beak, terminating in a pair of sharp jaws. The elbowed antennæ are attached a little way above the jaws. When disturbed, this beetle, like others of its tribe, invariably "plays possum," gathering the beak and legs close

to the body, and falling to the ground, where it remains for a long time, motionless, while its close resemblance to a dried bud, or a bit of bark serves to conceal it.

This *Curculio* hibernates in its perfect state, and attacks fruit as soon as the latter is sufficiently grown to furnish the requisite amount of food for its young. In placing its eggs, the insect first makes a deep puncture, with its beak, and then turning about, forces an egg into the hole, afterwards cutting, with its jaws, above the puncture, the peculiar crescent-shaped slit, which has caused the insect to be so commonly designated as the "Little Turk."

The larva is a fat, legless grub, of a yellowish-white color, with a bright brown head, and strong jaws, of a darker shade of the same color. When full grown, about three or four weeks from the date of hatching, the larva leaves the fruit (which, except in the case of some varieties of cherries, drops to the ground about this time,) and immediately burrows into the earth, where it changes to pupa and from which it emerges, as a beetle, in about two weeks. The beetles are longer lived than most mature insects; those which hibernated continuing to eat and to lay eggs, through nearly the entire season. As winter approaches the old ones die, and the summer brood seek the protection of fence corners and timber, where they conceal themselves under bark, fallen leaves and other rubbish, and lie dormant until spring re-awakens them to activity.

The remedies consist in trapping, and in jarring them from the trees, upon sheets stretched over some sort of frame. The first method is most efficient during the spring months, and is done by placing chips and pieces of bark on the ground around the trunk of the tree, beneath which the beetles will readily hide, especially if the weather be chilly. Later in the season, the jarring process should be resorted to, morning and evening, and the *Curculios* thus taken destroyed by drowning or burning.

THE SPOTTED SQUASH OR CUCUMBER BEETLE—*Diabrotica 12 punctata*, Fabr. Among the other insects which attack growing Melons, Squashes and Cucumbers, is the one just named. This is a small, soft-shelled beetle, with the elytra (wing covers) of a pale yellowish green color, and ornamented with twelve conspicuous roundish black spots, and having the head also black.

Like its congener, the Striped Cucumber-beetle, (*D. vittata*, Fabr.) it often swarms upon plants of the Gourd family, often causing irreparable injury by gnawing into and burrowing in the vines and young fruit. Persistent driving of the beetles from the plants, or keeping the latter well sprinkled with wood ashes, or with a mixture of Paris-green and flour, are the only means of defence that have yet been suggested.

THE APPLE-TWIG BORER—*Bostrichus bicaudatus*, Say. Is a cylindrical brown beetle, about half an inch in length. The large, round, rough thorax, which is terminated in front by two little toothed horns, is easily mistaken by the uninitiated for the head, which is small and comparatively inconspicuous. The wing-covers are roughened with punctures, and, in the male, are furnished at the tips with a pair of hornlike projections, while in the female they have only a slight keel-like ridge. Both males and females bore into the wood of the past season's growth, for the sake of food and protection, and not for breeding purposes; their larvæ having never yet been found in twigs of the apple or pear.

The history of this insect, in its immature stages, has not yet been discovered, but it is thought highly probable that it breeds under the bark of some species of oak. The beetles usually enter by a bud, late in summer, and gnaw their way, for a distance of an inch, or two inches, into the twig, in which they shelter in a dormant state, during the following winter. The infested twigs die, and often break off, in the spring. The nursery is the place where the injuries of this insect are most felt, and where the most care should be taken to prune off, and burn the twigs, with the beetles that harbor in them.

THE FALL WEB-WORM—*Hyphantria textor*, Harris. During the late summer and the fall months, our shade and fruit trees are subject to the ravages of a webbing caterpillar, which is often erroneously thought to be the Tent Caterpillar. It is, however, a much smaller and lighter colored larva, and while both the apple and forest tree Tent Caterpillars appear in the spring, or early summer, the tents of the species under consideration are not manifest until past mid-summer.

These insects pass the winter in the pupa state, and the moths do not issue until late in the spring. The eggs are laid in a cluster on a leaf, and the young, as soon as hatched, commence spinning together the "community tent," gradually enlarging it, to take in additional leaves and twigs, until, often, large branches are entirely included within the unsightly web. When full grown, the worms are a little over an inch in length, of a pale greenish-gray color, with a dusky stripe along the back, and a yellow one on each side. They are covered with long whitish hairs, which arise from minute black and yellow warts. When mature, they desert their nests and change to pupæ, within a frail cocoon, among the grass and fallen leaves, on the ground. The moth is satiny-white, with a slight yellowish shade.

As this insect breeds upon a great variety of wild trees and shrubs, as well as upon many cultivated species, its extermination is practically impossible. But in our orchards and pleasure grounds it may be kept in check by perseveringly gathering and burning the nests, with their inhabitants, wherever found, being careful that none of the remarkably active worms escape.

THE BRONZE CUT-WORM. We have become tolerably well accustomed to the depredations of the White Grub, in our grass-lands and lawns, as well as in our corn fields and strawberry beds.

Last summer a *new* enemy, almost an equal, in destructive propensities, to the White Grub, and feeding, like the latter, on the roots of grass and clover, came to my notice. This is the larva of a moth, (*Nepelodes violens*, Gneu.) and is a large cut-worm of a bronze-brown color, with a paler stripe, faintly outlined on the back, and one more distinct on each side. It feeds beneath the surface of the sod, causing the latter to turn yellow in spots, and to die out. It reaches its full size about the first of August, and the moths emerge in about ten days, or two weeks, thereafter. It is one of the most elegant of the *Noctuidæ*, the fore-wings being of a purple brown color, with a metallic gleam, and with the markings peculiar to their family, in darker shades of the same color. The body and hind wings are of a glossy, grayish-brown.

Its habits of concealment make it a difficult foe to contend with,

and one chief dependence must be upon the birds, which seem to detect its presence readily, and which seldom fail to extricate it from the sod, by a few vigorous pecks.

NOTES OF A REMARKABLE STORM.

BY GEO. B. WRIGHT.

(A Paper read March 7, 1876.)

The 18th day of July, 1867, will long be remembered by those persons who were, at the time, in the region comprising the counties of Pope, Douglas and the western part of Stearns, in this State.

I was, at the time, engaged upon the government land surveys in the western part of Pope county. The storm did not extend eastward as far as Minneapolis, and the only effect here was a sudden flood in the river, by which booms were destroyed, and about fifty million feet of logs were carried over the falls. The flood came mostly from the Sauk River. As I have never seen any printed account of the storm, which stands, I believe, in the amount of rainfall, without a parallel in temperate climates, I take this opportunity to call your attention to it. I shall confine myself mainly to the incidents which came under my personal observation, of the storm and its effects. We had been for several days surveying along the Chippewa river, a tributary to the Minnesota. This was in T. 124, R. 40, about 15 miles S. W. of Glenwood, county seat of Pope county. The Chippewa there is a creek from 12 to 20 feet wide, and varying with the rapidity of its current, from 1 to 3 feet