Entomology.

The Hessian Fly.

We were not quite sure that our spring wheat had been injured by the Hessian Fly until we took some of it to our respected friends the Entomologists, Messrs. Reed and Saunders, of this city. After careful examination they pronounced the injury to be caused by this fly. We are much astonished at its reappearance amongst us so extensively, without having noticed it last season. As far as we have travelled or heard from in Canada, the spring wheat is much damaged this year by this pest. It is also injuring the fall wheat, but what effect it will have on next year's crop we are as yet unable to say. We wish to draw forth information regarding it, and therefore offer a prize.—The following is taken from "Harris' Insects Injurious to Vegetation."

The scientific name of the Hessian fly is *Cecidomyia destructor*. It received its common name from a supposition that it was brought to this country in some straw by the Hessian troops under the command of Sir William Howe, in the war of the Revolution. It was first observed in the year 1776, in the neighborhood of Sir William Howe's debarkation on Staten Island, and at Flatbush, on the west end of Long Island.

Description of the Fly.

The head, antennæ and thorax are black. The hind body is tawny, more or less widely marked with black on each ring, and clothed with fine grayish hairs. The egg-tube of the female is rose-colored. The wings are blackish, except at the base, where they are tawny, and very narrow; they are fringed with short hairs, and are rounded at the tip. The legs are pale red or brownish, and the feet are black. The body measures about one-tenth of an inch in length, and the wings expand about one-quarter of an inch or more. After death the hind body contracts and becomes almost entirely black.

Laying their Eggs.

Soon after the wheat comes up in autumn, the female fly lays her eggs in the small creases of the young leaves. Twenty or thirty very minute eggs, of a pale red color, are laid upon a single leaf. Again in the spring, the latter part of April, or early in May, the eggs laid in autumn, having passed through their regular transformations, produce a second brood of flies, prepared to lay a second lot of eggs upon the more advanced wheat.

The Work of the Maggots.

If the weather be warm, in four or five days after the eggs are laid in autumn, they are hatched into small maggots of a pale red color, which crawl down the leaf, working their way between it and the main stock, passing downward till they come to a joint just below the surface of the ground, with the head towards the root of the plant.—Here they remain, neither eating nor penetrating the stalk, till transformed into flies in the spring. They suck the sap from the stalk which they surround, causing it to wither and die. The second crop of maggots, in June, do not entirely destroy the plant, but cause it to crinkle down before the grain is full grown.

In the Pupa State.

They usually come to their full size in five or six weeks, and then measure about three-twentieths of an inch in length. The skin now gradually hardens, becomes brownish, and soon changes to a bright chestuut color, resembling a flax seed. This hard skin or shell serves as a protection to the grub within, during the rigors of winter. After a while the insect cleaves from its shell, and remains within entirely detached. The pupa thus detached, surrounds itself with a pupa skin which adheres to it until it emerges from the outer shell or puparium in the spring, soon after which it disengages itself from the skin, and appears a perfect fly, prepared to lay another brood of eggs. A large proportion of the maggots of the second brood remain in the stubble of the field, in the flax seed state after the grain has been removed, and passing through their transformations more rapidly than in winter, are ready early in October to attack the new crop. Some Entomologists are confident that the fly also lays eggs in the grains of wheat, and that they hatch soon after the germination of the seed, crawl upwards, and then fix themselves around the stalk. If so, they have more than one way of propagating themselves, and become consequently still more difficult to overcome.

Preventives.

Probably the best preventive now known is the one already mentioned, viz: sowing so late in autumn that the weather will be too cold for the fly to deposit her eggs after the wheat shall have become far enough advanced to admit of it. It has been pretty well established by experience that this will greatly reduce their numbers, and limit their ravages. Another preventive is to suspend the sowing of wheat for a number of years.—*Rural Home.*

We copy the following notes on this pest from "H. Y. Hind's Prize Essay on Insects and Diseases Injurious to Wheat Crops," a copy of which has been kindly sent us by Mr. A. Julyan.

Methods for Arresting the Progress of the Hessian Fly.

1. *A Fertile Soil.*—We regard this as a primary and indispensable measure and one which must accompany others in order to their full success.

2. *Late Sowing.*—We regard it as one of the most efficient, as it certainly is the most facile of any that can be resorted to. It is universally admitted that it is the earliest sowed fields which are always the most infested. Objections—winter killing, rust and wheat midge. Remedies to these—draining, protecting with litter or cow dung. Time of sowing—about the last week in September, seed being properly prepared for reasons given elsewhere. Depth of sowing—2-2½ inches. Depth of plowing—6 to 8 inches or more. In parts of Ohio late sowing is found to be a very excellent artifice, the varieties sown being the "Soule and white-blue stem;" these have nearly driven the Illinois, Mediterranean, Redchaff, Bald, &c., out of cultivation.

3. *Grazing.*—This measure is alluded to as worthy of attention; we cannot, therefore, but regard this as a most judicious and important measure if seasonably resorted to.

4. *The Roller.*—No doubt this measure is a judicious one. It shakes off the eggs and crushes the young worms; the condition of the ground must be particularly attended to before this remedial measure is employed.

5. *Mowing.*—A valuable proposal for exterminating the second or spring brood from a wheat field.

6. *Fly-Proof Wheats*—or such as have a strong, stiff stem.

7. *Steeps for the Seed.*—Much lies within the compass of human instrumentality to accelerate the growth of vegetation by means of this kind. It is probable that a great advantage in many respects will be found to flow from a judicious adoptiou of this artifice. Not only is growth accelerated, but the steep may be made to possess great fertilizing qualities; and steeps are constantly employed as a preventive to smut.

Mr. Pell, of Penam, N. Y., prepared his seed wheat by soaking in brine, scalding with hot water containing common salt, mixing with pearl ashes, and when distributed nicely over a barn floor by sifting a composition containing charcoal dust, guano, sulphate of ammonia, and various other mineral ingredients over it. It was sown at the rate of two and a half bushels to the acre; at the expiration of fifteen days the wheat was so far above ground as to be pronounced by a neighbor far in advance of his which had been sown in the usual way on the first of September, nearly four days earlier. The crop weighed 65 lbs. per bushel, and was eminently rich in gluten, containing 18 per cent. The yield per acre was about 70 bushels.

In steeping or pickling wheat in strong chamber ley, a practice both common and beneficial, the use of lime for drying should by all means be avoided. Gypsum should be employed instead; but of all substances, finely powdered charcoal, as a most efficacious absorbent of the ammonia of the urine, is to be recommended.

8. *Oats as a Decoy.*—The oats being ploughed in after the deposition of the egg—*if* the fly will deposit its eggs upon oats.—This remedy is equivalent to late sowing.

9. *Wheat as a Decoy.*—If two or three acres across the middle of a large field be sowed with wheat about the middle of August, all the flies in the vicinity will be attracted to this point, and there retained, so that it will be safe in ordinary seasons to sow the remainder about the middle of September. Plough the early sowed wheat under, and bury the unhatched eggs and maggots. In years when clouds of Hessian flies migrate, it is evident that this remedy would be of little avail, if the season were at all late. The measure should receive a fair trial from some intelligent wheat grower, in a district suffering under this pest.

10. *Sprinkling Salt, Ashes or Caustic Lime over the Plants.*—This top dressing serves as a manure and nothing more. It will strengthen the plant and accelerate the period of its maturity.

11. *Burning and Ploughing up the Wheat Stubble.*—Dr. Fitch says:—

"We commenced our account of this remedy, impressed with the belief that it was the best that had ever been proposed; we close it, persuaded that it is the very worst."

By burning the stubble you burn the parasites of the fly, which, as has been shown, destroy nine-tenths of each generation.

We cannot give assent to the very sweeping denunciation of this remedial measure contained in the foregoing sentence. It is quite clear that before the parasites accumulate so as to overcome the Hessian fly, the artifice is worthy of adoption. With the exception of certain seasons, the ravages of the fly are local, and may therefore be arrested by this artifice. It has received so many favorable notices from different quarters that it is certainly worthy of trial.

In 1851, Mr. John Delafield, in a general view and agricultural survey of the County of Seneca, N. Y., taken under the direction of the New York State Agricultural Society, tells us that the Hessian fly has ceased to be a formidable enemy there, probably for two reasons:—

"First, the period of sowing the seed grain has been retarded until a period too late to offer a nidus to the fly; and second, the soil is better prepared by due fertility, to give the plant vigour to resist the influence of the larvæ."

The remedial measures which have been enumerated either imply the presence of the Hessian fly in destructive abundance, or contemplate invasions from neighboring districts. They may be thus briefly summed up for winter wheat:—

1st. Have your soil in good heart and order.

2nd. Drain as much as is consistent with true economy in Canada, and plough deep.

3rd. Sow late an approved flinty stemmed variety, and an early ripener.

4th. Prepare the seed for rapid germination and growth by steeping, and afterwards drying in some special manure.

The recommendation "Sow Late," to avoid the Hessian fly, appears to be diametrically opposed to the advice given to avoid the ravages of the wheat midge, and that dreadful scourge rust. It is to meet the case of a simultaneous presence or appearance of both Hessian fly and wheat midge, that late sowing, with a forcing preparation of the seed, is recommended and practised. If acting with special reference to an individual insect, one would sow late to avoid the Hessian fly, or early to avoid the wheat midge; but it is very manifest that under ordinary methods of culture, if both insects prevail (and they may now always be expected) during the same year, or if they succeed one another, the crops must suffer from the attacks of one of them. Therefore it is better to be ready for both contingencies, sowing late on well prepared land to avoid the Hessian fly, and anticipating the arrival of the midge by stimulating your crops to attain, before winter sets in, the same development of parts which they would have acquired by being a fortnight longer in the soil, taking care at the same time to select a good variety of seed, flinty stemmed, and an early ripener, and one which is not acclimated.

With respect to spring wheat, it has been urged that the election of varieties which can be sown so late as to escape the May attack of the Hessian fly, the June and July attack of the midge and rust will cover all contingencies. Can this be accomplished? Have we such a variety of wheat as will satisfy these conditions?

A meadow irrigated by running water is said to be double the value of one irrigated by flooding; a flooded one double the value of a rich loam not irrigated.

Garden and Farm.

HINTS FOR AUGUST.

Not much of importance to do this month, but busy hands and watchful eyes in the garden will always find plenty. Those having flowering annuals and biennials will find some ripening their seeds this month, and any particular fine flower you'd wish to save can easily be done by picking off the head or pod, as the case may be, into paper bags and stowing away in a dry place. Thus it is how a great many of the novelties are discovered and sold at such fancy prices, and how the varieties are always improved. Petunias, asters, zinnias and lots of others are now ripening their seeds.

Dahlia growers will be particular to thin out the growth of the plants and pinch off old flower buds. An occasional watering of liquid manure and good mulching will greatly improve the size of the blooms and color. Biennials, such as Sweet Williams, Chinese Pinks, &c., should have the old flower stalks cut off, seed saved, and an inch or two of soil put in the centre of the plants, so that the side shoots may grow and flower next year. Keep stirring the soil and kill the weeds—flowers and weeds don't harmonize.

In the vegetable line the onions will want pulling and drying. Save the seed, if any, and pick out some of the largest bulbs to plant next year for seed. Assort your onions for market—use the small ones in the family. Earth up your celery, clean out old lettuce and radish beds, and sow crops for fall use.

Now is the time to propagate any choice fruit by small working on small stocks. If you don't know how to breed get P. Barry's Fruit Gardener or Purdy's Fruit Instructor. Save your raspberries by simply bending this year's growth and bury the tip an inch or two in the ground; fine plants may be lifted in October or later.

Sucker fruit trees—examine orchard for insects laying eggs. Now is a good time to prune anything less than an inch. Trees being full of foliage, inexperienced horticulturists can easily see where they require thinning. An hour spent now is worth a day in the spring.

J. McP. R.

CO-OPERATION AMONG FARMERS.

In a late number of the report from the Agricultural Bureau, the following truisms are presented:—

The word "combination" seems to have acquired a wicked significance in view of some farmers. Let them use instead "co-operation" if they prefer it; but they must remember that there is no human being entirely independent of all others. Without association there would be neither churches nor schools, government nor social institutions. In other industries a large portion of the work done and profits made are through associated effort. There may be association for duty as well as for deviltry. There is no reason why comparative isolation should lead to positive hermitage. A great enlargement of American dairying has come from association; the monthly gatherings for sales of farm animals have saved immense sums from the clutches of middle men; the inauguration of market fairs should be general; association for importing or buying animals of the best blood should be more numerous; there should be a farmer's library in every township in the land.

ELEMENTS OF A HOME.

I never saw a garment too fine for man or maid; there was never a chair too good for a cobbler, or cooper, or king to sit in; never a house too fine to shelter the human head.—These elements about us, the gorgeous sky, the imperial sun, are not too good for the human race. Elegance fits man. But do we not value these tools of housekeeping a little more than they are worth, and sometimes mortgage a home for the mahogany we would bring into it?—*Theo. Parker.*

It needs no argument to show that the man who desires to cultivate the land intelligently needs all the aid which science can give, and indeed science stops far short of his needs; he cannot succeed unless his plans harmonize with the laws of light, heat, growth and moisture, although he may be ignorant that such laws exist.