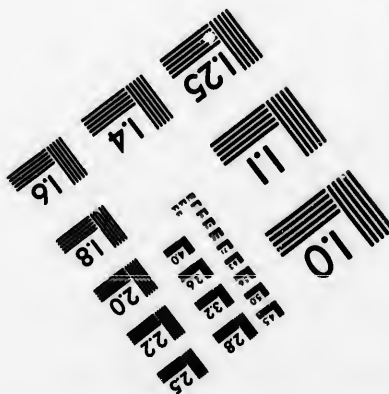
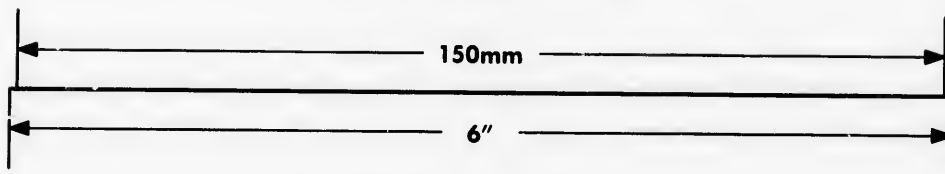
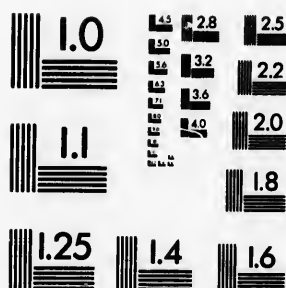
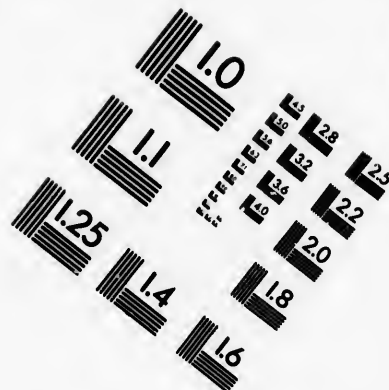
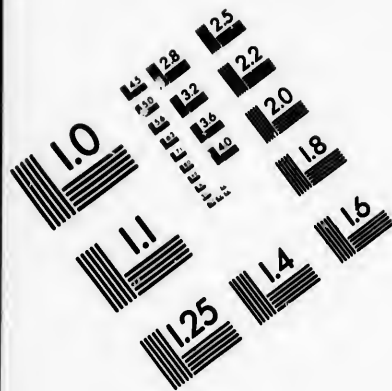


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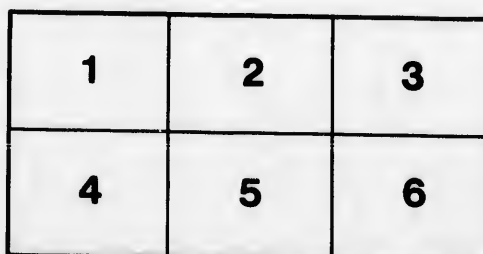
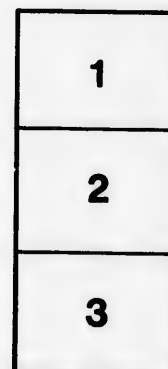
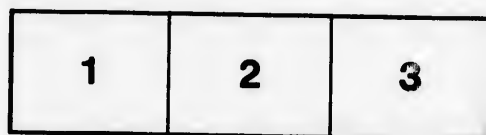
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ONTARIO DEPARTMENT OF AGRICULTURE.

INSTRUCTIONS IN SPRAYING.

SOLUTIONS RECOMMENDED.

I. BORDEAUX MIXTURE.

Copper sulphate	4 pounds.
Lime (fresh)	4 "
Water	40 gallons.

Suspend the copper sulphate in four gallons of hot water. This may be done by putting it in a bag of coarse material, and hanging it so as to be covered by the water. Slake the lime in the same quantity of hot water.

Do not at once mix the two solutions thus made, but proceed as follows:—Put one of the solutions in the barrel, add a few pails of water, then add the other solution and bring it all up to 40 gallons. Use only fresh Bordeaux mixture, or what is not over two days old. The copper sulphate and lime solutions should not be used until required for use. Strain the solutions.

Only the best fresh-slaked stone lime should be used. If the lime is good the above amount is likely to be sufficient. It is an easy matter to know how much lime is required by using what is termed the ferro-cyanide of potassium test. This substance can be got at any druggist's, and very little is required. Take a small bottle (2 oz.) and get it filled with a saturated solution of this compound. If there is not plenty of lime in your mixture, a drop of the test added to it turns brown. Add more lime and stir. As soon as the test fails to color in coming in contact with your mixture, it indicates there is sufficient lime present to neutralize the effects of the copper sulphate. Use wooden vessels in preparing the Bordeaux mixture.

2. AMMONIACAL COPPER CARBONATE SOLUTION ("Oupram").

Copper carbonate.....	1 ounce.
Strong ammonia sufficient to dissolve the copper carbonate.	
Water	10 gallons.

* This solution is not much used, and is recommended only in cases where the fruit is so far advanced that it would be disfigured by using the Bordeaux mixture.

3. PARIS GREEN MIXTURE.

Paris green	1 pound.
Water	200 gallons.
Lime	16 lbs. freshly slaked.

Use 200 gallons water in a mixture for apple trees, 250 for plum trees, and 300 for peach trees.

4. HELLEBORE.

White hellebore (fresh).....	1 ounce.
Water	3 gallons.

5. PYRETHRUM.

Pyrethrum powder (fresh).....	1 ounce.
Water	4 gallons.

6. WHALE-OIL SOAP SOLUTION.

Dissolve 1 lb. James Good's caustic potash whale-oil soap No. 3 in 7 gallons of hot water.

7. KEROSENE EMULSION.

Hard soap	$\frac{1}{2}$ pound, or soft soap	1 quart.
Boiling water (soft)		1 gallon.
Coal oil		2 gallons

After dissolving the soap in the water, add the coal oil and stir well for 5 to 10 minutes. When properly mixed, it will adhere to glass without oiliness. A syringe or pump will aid much in this work. In using, dilute with from 9 to 15 parts of water. Kerosene emulsion may be prepared with sour milk (1 gallon), and coal oil (2 gallons), no soap being required. This will not keep long.

8. TOBACCO DECOCTION.

Refuse tobacco	2 pounds.
Water	5 gallons.

Boil the mixture for 30 minutes or more, until a dark brown tea-colored solution is obtained. Keep it covered until cool. It may then be used undiluted for spraying infested plants.

NOTES.

1. When there is danger of disfiguring fruit with the Bordeaux mixture use the ammoniacal copper carbonate solution.

2. Experience in spraying during the past three years indicates that it is best to use the combined insecticide and fungicide, commencing as soon as the buds begin to swell, again when the leaves appear, and continue it at intervals of 10 to 15 days, until the trees have been sprayed 3 to 5 times, which will depend upon the weather. In the case of a rainy season, it may be necessary to spray at least five times, while if dry, and the mixtures have been allowed to remain on the foliage, then three or four times may be sufficient.

In no case spray while the trees are in bloom, but immediately after. It is contrary to law, and punishable by a fine of from \$1 to \$5.

3. The combined insecticide and fungicide, containing Paris grain and Bordeaux mixture, is to be used for insects that chew and injurious fungi, but kerosene emulsion alone for those insects that suck the juices of plants, such as aphids, thrips, red spider, clover mite, oyster-shell bark-louse, San Jose scale, etc.

4. A stock solution for the preparation of Bordeaux mixture may be prepared as follows: Dissolve 25 pounds of copper sulphate in 25 gallons of water. One gallon of this contains one pound of the copper sulphate. In another barrel slake 25 pounds of good lime, and add 12½ gallons of water. One gallon of this contains two pounds of lime. To make the mixture, take four gallons of the copper sulphate solution and two of the lime. If there is any doubt about there not being sufficient lime, try the test already referred to under Bordeaux mixture. Now fill up the amount to 40 gallons with water. Add four ounces of Paris green.

5. Prepare the mixtures well, apply them at the proper time, and be as thorough as possible in the work. Three-fourths of the so-called spraying done is not spraying at all. The trees are only drenched. When spraying is properly done, the mixture is broken up like a mist and settles on every part of the plant. A great deal more of the mixture will remain on the plant when applied in this way, and there is also a saving of material, as every drop which falls to the ground is lost.

6. No mixture should be left in the pump or barrel, and, after using, clean water should be pumped so as to clean the outfit. This is important, as some of the mixtures act chemically on the metal of the pump.

7. Use a Y and two nozzles. The work can be done just as well and much more expeditiously.

8. To keep Bordeaux mixture off horses and harness use coarse linen or other cover.

9. As most of the spraying mixtures are poisonous, care should be taken in working with them. They should not be used when there is any wound or abrasion of the skin exposed, and care should be taken not to allow the spray to settle on the hands or face, or to be inhaled. Arsenites taken into the system by absorption or inhalation produce symptoms of poisoning. In mild cases they resemble the symptoms produced by poisoning; in severe cases, headaches, nausea, eruptions, boils and ulcers are said to result. The danger from arsenites, which are soluble in water, such as London purple, are much greater than from Paris green, which contains very little water-soluble arsenic. There is more danger of poisoning by absorption when perspiring freely. However, by taking proper precaution, there need be little fear. A leather washer about four inches in diameter should be fitted just below the nozzle, which will prevent the drip from reaching the hands. As far as possible keep to windward of the nozzle. When much work is to be done, rubber gloves should be worn. The face and exposed parts should be washed immediately after spraying.

10. The cost of spraying with Bordeaux mixture is not very great. Copper sulphate of the best quality (which is the only kind which should be used) can be had at from $4\frac{1}{2}$ c. to 5 c. per lb. by the barrel, and Paris green at from 15 c. to 20 c. per lb. The cost for material to properly spray an average apple tree for the entire season should not exceed from 4 c. to 5 c.

TREATMENT.

1. APPLE.

Treatment for destroying *codling moth*, *bud moth*, *tent caterpillar*, *canker worm*, *apple spot*, *leaf blight*, *pistol case-bearer* and *powdery mildew*.

First spraying: Bordeaux mixture and Paris green (4 oz. to the barrel of the mixture) when the buds are swelling.

Second spraying: Bordeaux mixture and Paris green before the blossoms open.

Third spraying: Bordeaux mixture and Paris green when the blossoms have fallen.

Fourth and fifth spraying: Bordeaux mixture and Paris green at intervals of ten to fifteen days, if necessary.

No definite date can be named after which it would be safe to cease spraying for apple scab. The orchard should be watched after the third or fourth application, and the treatment again applied if scab appears on the fruit or leaves.

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Many apple growers who sprayed in 1897 until the end of June, and neglected to watch their orchards afterward, lost heavily. The scab appeared very late in the season last year, and all the experimental orchards were given an extra application in the early part of July, which largely accounts for the splendid results obtained.

We cannot always control the codling moths by spraying, especially in the northern section of Ontario where they continue to propagate long after the regular spraying season is over.

To insure a clean crop of apples, if the codling moth is bad in your orchard, in addition to spraying, use bandages around the trees. Make them from four to six inches wide, three or four inches thick, of any kind of cloth. Old bags, sacks, carpets, coarse material of any kind will do. Bands of straw and tow have been used with some success. The first week in June, bind one around each tree three or four feet from the ground; secure it either with cord or small nails; take it off every fifteen days and dip in hot water, or put it through an ordinary clothes wringer, which may be attached to a wheelbarrow and taken from tree to tree. Have sufficient pressure to crush all insects.

After a careful inspection in 1898 of badly infested trees, on which bandages were used, no cocoons were found except in the bandages, and in crevices of the bark under the bandages. It will take very careful inspection to find all of them, as they are carefully concealed and very much resemble the bark. All coarse, loose bark should be scraped from the trees in the early spring, as many other enemies of the apple tree harbor there also.

The first brood of moths appear about the time apple trees bloom, and begin depositing eggs as soon as the apples have formed on any part of the apple or on the leaves or stem. Each moth lays from 80 to 100 eggs. The egg laying period lasts from 8 to 12 days. The eggs hatch in from six to eight days. The larva at once makes its way into the apple, where it remains from three to four weeks, when it leaves the apple and locates in some suitable place to pass the transformation stage, which is usually under or in the crevices of the coarse bark of the tree from whence it came, but sometimes on fences, buildings, or rubbish, wherever it can find shelter. In one day it constructs a cocoon in which it enters its third or pupa stage. From this it emerges in from two to three weeks a natural moth prepared to repeat its life-history. The latter broods remain in the cocoons in the larval stage until the following spring.

2. PEAR.

Leaf blight, scab, and codling moth, the same treatment as for the apple.

3. PLUM.

Curculio, brown rot and leaf blight.

First spraying: Bordeaux mixture and Paris green before the flower buds open.

Second spraying : Bordeaux mixture and Paris green as soon as the petals have fallen.

Third spraying : Bordeaux mixture and Paris green in seven to ten days after.

Fourth spraying : Bordeaux mixture in ten to fifteen days after.

4. PEACH.

Brown fruit rot, leaf blight, plum curculio and peach curl (Exoascus sp.)

Spray at first as in case of plum, but after growth begins make Bordeaux mixture only of half strength.

Fourth spraying : Ammoniacal copper carbonate, if any danger of disfiguring the fruit with Bordeaux mixture.

In spraying peach trees for curl leaf or peach rot Bordeaux mixture full strength may be used while the tree is dormant. After growth begins use it only half strength.

5. CHERRY.

Aphis, shag, brown rot and leaf blight.

First spraying : Bordeaux mixture and Paris green as the buds are breaking ; if aphis appears use kerosene emulsion alone or whale-oil soap.

Second spraying : Bordeaux mixture and Paris green as soon as the blossoms fall.

Third spraying : Bordeaux mixture and Paris green ten to fifteen days after.

6. GRAPES.

Mildew, black rot, flea beetle, and leaf-eating insects.

First spraying : Bordeaux mixture and Paris green when leaves are one inch in diameter.

Second spraying : Bordeaux mixture and Paris green when flowers have fallen.

Third and fourth sprayings : Bordeaux mixture at intervals of ten to fifteen days.

Paris green alone when the beetle is attacking the buds in the spring, or when the larva is attacking the leaves in summer.

7. RASPBERRY.

Anthraxnose, leaf blight and saw-fly larva.

First spraying : Bordeaux mixture and Paris green just before growth begins.

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Third spraying : Bordeaux mixture when the fruit is gathered.

8. CURRANT AND GOOSEBERRY.

Worms and mildew.

First spraying : Potassium sulphide, Bordeaux mixture and Paris green as soon as the leaves expand.

Second spraying : The same ten to fifteen days later.

For worms alone, hellebore or Paris green will be effective.

9. TOMATO.

Rot and blight

Spray with Bordeaux mixture, as soon as rot or blight appears, for three times, if necessary, at intervals of ten to fifteen days.

10. POTATO.

Blight and beetles.

First spraying : Paris green as soon as the beetles appear (one pound to 100 gallons of water).

Second spraying : Bordeaux mixture and Paris green when plants are six inches high.

Third and fourth sprayings : Bordeaux mixture at intervals of ten to fifteen days, if necessary.

Spraying with Bordeaux mixture will prevent the blighting of the plants and the rotting of the tubers.

11. CABBAGE.

Pyrethrum applied in solution (one ounce to four gallons of water) or dusted on (one part pyrethrum to seven parts flour) for the cabbage worm.

12. STRAWBERRY.

The rust or leaf-blight.

Bordeaux mixture, when it can be applied without disfiguring the fruit, will control this disease. Apply at intervals of two or three weeks on new beds after they begin to make runners.

INJURIOUS INSECTS.

The following are some of the most common injurious insects that are troublesome in the garden and orchard. To destroy these, spraying as directed will be effective. To destroy insects use only an insecticide, but if treating for a fungoid pest at the same time use a combined fungicide and insecticide.

1. TENT CATERpillars.—*Clisiocampa Americana* and *C. Sylvatica*.



Tent Caterpillar: a and b, caterpillars; c, egg cluster; d, cocoon.



Tent Caterpillar Moth.

These insects weave large webs in the branches of the apple tree and do much damage feeding upon the foliage of the trees. They also attack the plum and cherry. The eggs—200 to 300—are laid in rings upon the twigs of the trees and can be readily seen, so that many of them might be easily destroyed during the winter. The caterpillars grow rapidly. *Americana* has a white strip down the back, and *Sylvatica* a series of white spots, and thus they are readily distinguished from each other. Both develop into brown moths. The accompanying cut represents the different stages of the insects, *C. Americana*.

Remedy.—1. Collect the egg cluster in winter. 2. Crush the "tents" when full of caterpillars. 3. Apply Paris green with lime or with Bordeaux mixture.

The young caterpillars mature in the fall and remain dormant in the egg cells during winter, whence they emerge during the first warm days of Spring. They have been discovered on the buds as early as the fifteenth of April waiting for the young leaves to appear. If the tree is sprayed with Paris green mixture at this period their destruction is almost certain.

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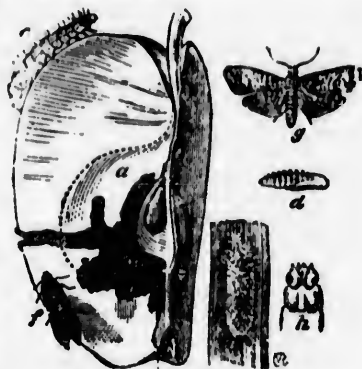
2. CODLING MOTH.—*Carpocapsa pomonella*.

The eggs of this tiny moth are laid on the leaves and stems and sometimes on the skin of the young apple. As soon as hatched the larva burrows into the apple, where it feeds until fully developed. Affected apples fall to the ground, and often contain the worm in them. The cocoons are frequently under the bark and in other sheltered spots.

The moth appears about the time the trees are in bloom, and is one of the worst pests that attacks the apple.

When the blossoms have just fallen the calyx leaves are widely opened. It is claimed by some of the best authorities that this is our best chance to deal an effective blow at the first brood of larvae of codling moth, which usually enter the apple at this point. The trees should be thoroughly sprayed within a week after the blossoms have fallen that a quantity of poison may rest in the calyx cup and be protected by the leaves which close up rapidly and retain it for the first meal of the larva. If this spraying is followed by rain it will be necessary to repeat the application.

Remedy.—1. Feed the fallen apples which may contain larva. 2. Spray with Bordeaux mixture and Paris green, as directed for the treatment of the apple



Codling Moth : a, burrow ; b, entrance hole
d, pupa ; c, larva ; f, moth.

3. CANKER WORMS.—*Anisopteryx vernata* and *A. pometaria*.

The spring canker worm was very common in 1896. Both worms are much alike, about an inch long, of a darkish brown color, slender, and move with a hoop-like motion, hence, sometimes called "measuring worms." They can drop from a tree by a silken thread.

A. vernata, the moths, appear in spring ; the female is wingless, the male is ash-colored and has wings. *A. pometaria* is much the same, but the moths appear in the fall. The wingless females in



Canker Worm (f) and eggs (a, b, c.)
both species crawl up the trunks to lay their eggs upon the twigs.

These insects attack the plum, cherry and apple. The accompanying cuts illustrate *A. vernata*.

Remedy—The females may be trapped by putting a band of some adhesive material around the tree.



Canker Moths : a, male ; b, female.

2. Paris green is an effective remedy, as directed in the treatment of the apple, if used in time. If the worms are full grown and numerous, use six ounces of Paris green instead of four.

3. Tree collars.

4. OYSTER-SHELL BARK-LOUSE.—*Mytilaspis pomorum*.

This insect appears in the form of minute brown scale upon the bark of the apple tree, and being much the same color is difficult to distinguish. The eggs are beneath the scales. They hatch about the end of May or the beginning of June. The young lice are almost invisible; they seek the ends of the young twigs, where they become fixed, and continue to suck the juice from the twigs. Soon a scale forms over them. All scales the shape of an oyster-shell are females, and their eggs are laid under the scale. The scale of the male is more oblong and is rarely seen.



Oyster-Shell Bark-Louse.

Remedy.—1. In winter, or early spring, scrape off the rough bark from the trunk and large limbs, and rub in with a scrubbing brush the following solution: One quart soft soap, or one-quarter pound hard, in two quarts boiling water; take seven parts of this and add one part of carbolic acid; then, when the young lice are moving (May or June), spray with kerosene emulsion diluted with ten parts water, or whale-oil solution.

5. PEAR TREE SLUG.—*Eriocampa cerasi*.

This insect may be found attacking the pear, plum and cherry.



Pear tree slug, various sizes.

The eggs are laid about June. The larva is about one-half inch in length and is thicker towards the head, of a somewhat greenish-black color and slimy. It has many legs. The pupa stage is spent in the ground and lasts two weeks. The imago is a small, four-winged black fly. The slug feeds on the upper surface of the leaf. It was quite common during 1896.

Remedy.—Spraying with Bordeaux mixture and Paris green, hellebore or pyrethrum, in the common proportions. There is a second brood about the middle of July which is quite as destructive as the first brood. Spray with mixture of Bordeaux and Paris green first week in June and middle of July.

6. PLUM CURCULIO.—*Conotrachelus nenuphar*.

There is no insect better known than this little beetle. The egg is deposited in the plum, where it hatches. The affected fruit soon falls to the ground, and

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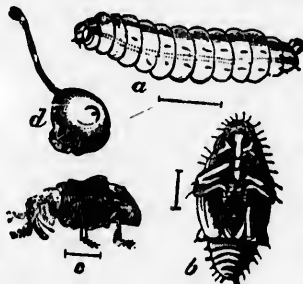


the larvæ leave the plums, pass into the ground, where they remain for about six weeks. The imago is a small grayish beetle, one-fifth of an inch long, with a black hump on the middle of each wing case. It has a curved snout and a stout body. The beetles hide themselves during the winter in sheltered spots, and appear in the spring about the time the trees are in bloom. This insect is also found upon the cherry, peach, and even apple. The curculio works on the fruit for about eighteen days only.

Remedy.—1. Jarring the trees morning and evening. At this time many beetles will drop and may be collected upon a sheet placed below.

2. Gather and destroy the affected plums as they fall.

3. Spray with Bordeaux mixture and Paris green as directed for the treatment of the plum. Spray once before the trees bloom, again as soon as the petals fall, and repeat about a week after.



Plum Curculio: a, grub; b and c, beetle; d, egg laying on plum.

7. TO PROTECT THE PEACH TREE FROM THE BORER.

Take equal parts of hardwood ashes and fresh lime, add water until it has the consistency of paint; to this add one ounce of crude carbolic acid to each four gallons of mixture. Apply with a brush to the trees from the limbs down to where the roots join the trunk. It is necessary to clear the ground away a little to make a perfect job. Apply from 1st to 15th of June.

8. CURRANT WORM.—*Nematus ribesii*.



Currant Worms and the Saw Flies to which they change.

This insect is very troublesome upon currant and gooseberry bushes. It lays its eggs early in the spring, on the under side of the leaves, in rows along the veins. These hatch in about ten days, and the young worms appear. The larva, when full grown, is about three-quarters of an inch in length, of a greenish color, with dark spots, and has many legs. It spins a brown cocoon, of paper-like texture, which is found sometimes on the ground among the dried leaves, or on the bush, attached to the stems or leaves. This represents the pupa condition.

The imago appears in about two weeks after the pupa stage has been entered. The male is much smaller than the female, the body black, with some yellow spots above, while in the female the body is mostly yellow. Both have four membranous wings. A second brood is of common occurrence.

Remedies.—1. Hellebore, one ounce in three gallons of water. It may also be applied as a dry powder, mixing it with three or four parts of flour.

2. Paris green for the first brood, but care must be taken not to continue this if the fruit is likely to be affected.

9. GRAPE-VINE BEETLE.—*Haltica chalybea*.

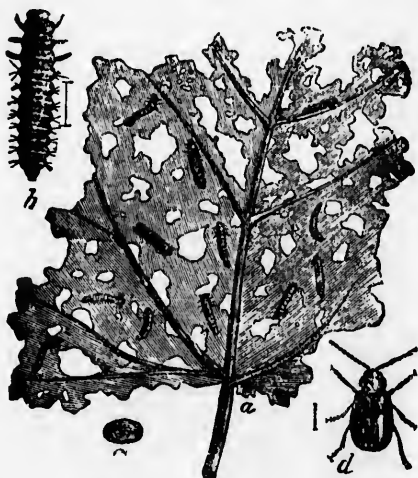
The eggs are deposited on the under side of the leaves. The larva is about one-third of an inch long, brownish, with several black dots on the body. The pupa condition is passed in the ground, and continues for about three weeks.

The imago is a small, polished beetle, about one-fifth of an inch long. It passes the winter in sheltered spots, under leaves, or around the roots, and is very destructive in the spring to the young buds, and afterwards, in the larval condition, to the leaves.

Remedies.—1. Paris green, three ounces to fifty gallons of water, or combined with Bordeaux mixture as directed under treatment of the grape.

2. Dust pyrethrum powder upon the vines attacked.

3. Jarring the vines in the morning and collecting the beetles.



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Flat-Headed
Borer, *Chrysobothris*
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10. ROUND-HEADED BORER.—*Saperda candida*.

The *eggs* are deposited about June, near the base of the trunk of the apple tree. The *larva* eats its way through the outer bark to the inner, and takes about three years to develop. It works in the sapwood, where it forms flat, shallow cavities, filled with sawdust-like castings. These are often seen on the bark and indicate where the "borer" is at work. As it reaches maturity, it cuts a passage upwards into the solid wood, and then curves towards the bark.



Round-headed Apple Tree Borer, *Saperda candida* : a, larva ; b, pupa ; c, beetle.

In this channel it enters the *pupa* stage about spring. When fully developed, it is an inch long, with a round head that distinguishes it from the flat-headed borer, which also affects the apple tree.

The *imago* is a slender beetle, one inch long, with two broad, whitish stripes on the wing covers, and long jointed antennae. It appears about June.

11. FLAT-HEADED BORER.—*Chrysobothris femorata*.

This insect also attacks the trunk of the apple tree, but lays its *eggs* higher up the tree than the preceding one. The *larva* is a pale yellow, an inch long, and has a well-marked flat head, much wider than the body. It is sometimes found even in the limbs, and is not so long in developing as the round-headed borer. It cuts flat channels in the sapwood, and sometimes girdles the tree. Castings and discolored bark indicate its presence. It finally bores into the solid wood, and becomes a *pupa* for about two weeks, and then emerges as an *imago* about half an inch long, somewhat flat, and of a greenish black color, with three raised lines on each wing-cover. The legs and under side of the body present a coppery lustre.



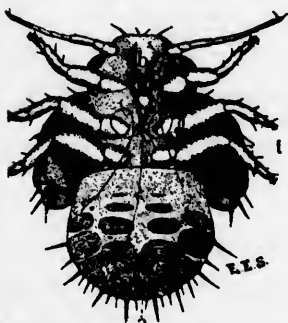
Flat-Headed Apple Tree Borer, *Chrysobothris femorata* Fabr : a, larva ; b, beetle.

Remedies.—1. Examine the trees in autumn, and where the sawdust-like castings indicate the presence of the "borer," a stiff wire may be pushed in and the larva killed, or sometimes the larva can be cut out with a knife.

2. About the beginning of June, apply the following mixture to the trunk of the tree: One pound of hard soap, or one quart soft in two gallons of water; heat to boiling, and add one pint crude carbolic acid; make a second application in three weeks. This can be well done by using an old scrubbing-brush to rub it in.

12. THE PEAR TREE PSYLLA.—*Psylla pyricola*.

The immature insect.—These curious, minute, oval, immature forms are called nymphs. The newly-hatched ones are yellow in color, with crimson eyes, and can scarcely be seen with the unaided eye. During their growth they gradually acquire the black markings shown in the figure, and become tinged with red. A very conspicuous feature in the full-grown nymph is the large black wing-pads on each side of the body.



Full-grown nymph of the pear psylla, ventral view, greatly enlarged. resembles a bird's beak.

Remedy.—Our experiments in 1892, showed that the nymphs in all cages were quickly killed by kerosene emulsion.* Others who have tested it thoroughly report success.

Usually most of the damage is done in this State by the first brood of nymphs before June 15th. It is therefore very important that the insect should be checked early in the season. We now advise using the emulsion diluted with about fifteen parts of water, instead of with twenty-five, as it is more effective against the nymphs, and it will also kill the adult insects. As the nymphs begin to hatch just as the leaves are expanding, then is the time to begin spraying; about May 15th is usually the time in this State. Where they are numerous, a second or third spraying will be necessary. *The emulsion must be applied liberally and thoroughly*; it will not injure the tree in the least. It is much more difficult to fight the insect later in the summer, when the tree is in full foliage and many of the nymphs are covered with honey-dew. Watch for their appearance on the unfolding leaves in the spring and act promptly. Spray two or three times in a week if necessary; make every effort to prevent the development of a second brood.



Psylla pyricola, the adult insect, much enlarged.

(*From Cornell University Agricultural Experimental Station Bulletin No. 108.)

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The adults.—In Bulletin 44 we suggested that a thorough washing of the trunks and larger branches of the trees in winter with kerosene emulsion (at least five per cent. kerosene), or a strong soap solution, would destroy many of the adults in hibernation in the crevices of the bark. It is reported that a whale oil soap solution has been thus used very effectively in New Jersey. We believe it is a practical method, and should be practised in infested orchards.

13. BUD MOTH.—*Tmetocera ocellana*.

This insect is found attacking both leaf and flower buds upon the apple, and sometimes proves very injurious. The half-grown *larva* winters over, and appears



Apple Tree Bud Moth, *Tmetocera ocellana*: a, moth; b, larva; c, pupa.

in spring as a small brown caterpillar, just about the time the buds begin to open, and feeds upon them. It measures about half an inch when full grown. By rolling up one side of a leaf, and securely fastening it with silken threads, it forms a tube in which it enters the *pupa* stage, having lined the little chamber with a closely woven layer of silk. This condition lasts ten days. The *imago* is a small moth, resembling the codling moth in size and form. It is of an ash-gray color. The front wings have a whitish-gray band across the middle; the hind wings are a dusty brown. The expanded wings measure half an inch across. It also attacks pear, plum, cherry, quince and peach trees, and blackberry buds.

Remedy.—Paris green added to Bordeaux mixture as directed for the treatment of the apple.

14. THE GRAPE-LEAF HOPPER OR THRIP.—*Erythroneura vitis*.

This small insect, about an eighth of an inch long, of a white color, marked by three dark bands, is sometimes troublesome on grape vines. It feeds upon the juices of the plant, and is usually upon the underside of the leaf, where it is difficult to reach in spraying.

Remedy—1. Remove fallen foliage at the close of the season, so that the insects cannot find shelter during the winter.

2. Spray with kerosene emulsion diluted with ten parts water, or with whale-oil soap solution, on the under side of the leaves in the cooler part of the day.

15. RED SPIDER.—*Tetranychus telarius*.

The red spider is a very small insect—a true mite—and in some places is very destructive. It sucks the juices of the plants attacked, and causes the color of the leaf to change from green to a grayish white. It flourishes in a dry

atmosphere and in sunny places; shade and moisture are not favorable to its development.

Remedy.—Spray with clear water, and keep the atmosphere about the plants moist.

2. Spraying with kerosene emulsion should also be followed by good results.

16. PLANT LICE.—*Aphids*.

Aphides are a numerous class of insects which infest many plants and trees. They injure the leaves by sucking the sap. The green aphid, *Aphis mali*, is especially injurious to the apple tree. The eggs are deposited in the autumn in cracks of the bark of the twigs and around the buds. When deposited they are a greenish color, but grow gradually darker until they are a shining black.

They hatch in the spring just as the buds are swelling, and the tiny lice locate themselves upon the buds and upon the underside of the young leaves, which soon curl over them, making it difficult to treat them. They multiply with great rapidity and cause considerable damage to the foliage and young shoots.

Remedy.—Spray with kerosene emulsion, whale-oil soap solution or a tobacco decoction, as soon as the lice hatch, being careful to touch everyone of them, as these substances kill only by contact.

17. THE CLOVER MITE.—*Bryobia pratensis*, Gorman.

During the winter there may be seen upon the branches, around the crotches, and sometimes covering the trunks of trees, masses of rather large, round, reddish eggs. These are the eggs of the clover mite, and are very numerous in some Ontario orchards this year. The mites hatch about the month of May. Their presence on the leaves of fruit trees causes them to assume an unhealthy yellow appearance.

In Colorado and other western mountain states it is reported as one of the principal enemies of deciduous fruit trees, such as apple, pear, peach, plum, cherry, etc.

Remedy.—The eggs may be destroyed by spraying the trees in winter with kerosene emulsion diluted with five parts water. When they have hatched use any of the remedies given for plant lice.

INJURIOUS FUNGI.

The following are among the most injurious fungi that affect the products of the garden and orchard. They can be readily controlled by the proper application of Bordeaux mixture, as directed.

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The usual life-history of a parasitic fungus is, that it arises from a spore which is microscopic; this germinates and gives rise to thread-like structures which penetrate the plant upon which the fungus grows and derives its nourishment. Upon these structures in time spores are produced, as new sources from which the fungus may develop and continue to be injurious to the vitality of the plants attacked.

1. APPLE SPOT OR SCAB.—*Fusicladium dendriticum*

This fungus attacks the leaves and fruit of the apple, causing the "spots" on the fruit. The vegetative portion of the fungus is chiefly around the edge of the spots where the spores are produced in great numbers.

2. LEAF SPOT.—*Entomosporium maculatum*.

This disease attacks the pear, causing the leaves to show reddish spots with small pimples in the centre. When the fruit is attacked it cracks and appears stunted.

3. BROWN ROT — *Monilia fructigena*.

Attacks plums, cherries and peaches. The fruit affected becomes brownish at first, then shrivels and appears dried. In this condition it is termed "mummified" and is often seen upon the trees in that form. All "mummified" fruit should be gathered and burned, as they contain spores that will perpetuate the disease.

4. ANTHRACNOSE.—*Glaeosporium venetum*.

This fungus appears on the canes of raspberries as small round or oval patches, with a purple border, and sometimes upon the leaves as small yellowish spots with dark border. The affected canes should be cut out and destroyed by burning.

5. LEAF-BLIGHT, OR SUNBURN.—*Sphaerella fragariae*.

This disease produces very conspicuous spots on the upper surface of the leaves of the strawberry. The spots are reddish at first, then the centre becomes somewhat grayish. Destroy by plowing up plants after first crop or prevent and check by Bordeaux spraying.

6. POWDERY MILDEW.—*Sphaerotheca mors uvae*.

This mildew is the well-known blight on the gooseberry. It thrives in a warm, dry atmosphere, and sometimes is very destructive. At first the berries are covered with a grayish substance, and later assume a brown color. Early spraying with Bordeaux mixture will prevent.

7. POTATO-BLIGHT.—*Phytophthora infestans*.

This fungus attacks the potato, commencing with the leaves and finally affecting the tubers.

8. BLACK-KNOT.—*Plowrightia morbosa*.

This fungus attacks plum and cherry trees. The name black-knot describes it perfectly.

REMEDY. Cut out and burn every knot as soon as found, removing the branch two or three inches below the affected part. Make a thorough search for the knot after the leaves drop in the fall. Spray the trees with Bordeaux mixture to prevent new spores from becoming established.

9. MILDEW OF THE PEACH.

It is a fungus of the tips of shoots and young leaves. Syringe with soap-suds. Some mix lime water with the soap-suds and afterwards dust with sulphur. Good pruning and good growth are generally sufficient to prevent.

10. YELLOWS.

"Yellows" in peaches is a contagious disease, fatal to affected trees, and there is no known remedy but to dig out and burn root and branch.

11. LITTLE PEACHES.

A NEW DISEASE OF PEACH TREES.

A new disease of the peach, known as "little peaches," has done a great deal of damage in Michigan, and is reported from peach orchards on the Niagara River, in New York State, and some other points. The peach ceases to grow when it is about the size of a plum. The tree gradually loses vitality and dies. It is considered contagious and quite as bad as the "yellows." Remedy: Dig out and burn as soon as discovered.

THE APPLE CANCKER.—STORY OF A DANGEROUS DISEASE.

The Disease Found.—At last year's meeting of the Western New York Horticultural Society, the committee on botany and plant diseases reported the prevalence of apple canker in the orchards in western New York, and a note on the subject from M. B. Waite, Washington, D. C., was read. Last spring a request was received at the Geneva Experimental Station from Chapin Brothers,

East Bloomingdale, N. Y., stating that the trees were not only about wholesale for the past few years. Two next. Tall, wet, suffered less exposure free from evaporation far taken, trees ago. It has died.

What ous sections localities. of instances States, on of the limit black and c more prevalent exempt from though thriving.

Its Life. disease were bark, and v in the culture in test tubes bark and w made with l around the e inserted. F of the season four inches i the dead are experiments that produce twigs were black-rot fun found to be of the disease been found o although the

East Bloomfield, N. Y., that the dying of trees in their orchards be investigated. The visit revealed the fact that, of 80 acres of once fine orchard, belonging to one of the brothers, 30 had been taken out, and one-half the remainder were not worth a shilling. Of the 45 acres originally in the the other orchard only about ten acres are left that are of any value. It is evident that this wholesale destruction is largely due to the canker. The disease has been noticed for the past six or eight years, but it has increased rapidly in the past three or four years. Twenty-Ounce is most susceptible, Baldwin, Wagener, Greening and King next. Talman Sweet seems practically free; trees on low land and on ground at all wet, suffer worst. Trees in outside rows are freer from canker than those in less exposed situations. The orchard is 40 years old, but the trees that are free from disease are thrifty and in their prime. The orchard has been cultivated far more intelligently than the average orchard. No crops have been taken, trees have been pruned regularly, and the orchard was thinned 15 years ago. It has been sprayed from the first with insecticides, but not with fungicides.

What it is.—Inquiries concerning the disease have been received from various sections of the State, and its prevalence is reported in widely separated localities. It seems to be common in most parts of the State, and in a number of instances is doing serious damage. It is also prevalent in the southern States, on the Pacific coast, in Michigan and Indiana. The swollen appearance of the limbs, the rough, blackened bark, and in many instances bare wood, black and decaying, are characteristics of this disease. The cankers are much more prevalent on mature than on young trees, the latter being evidently exempt from the attack. Old age and neglect seems to favor the disease, though thrifty trees may be ruined by its attacks.

Its Life History.—Investigations of the nature and life history of the disease were at once begun. A series of cultures were made from the diseased bark, and various forms of fungi were obtained. Two forms constantly appeared in the cultures, and led to their being separated and being grown in a pure state in test tubes. One form proved to be a toadstool that is very common on dead bark and wood in the orchard, and the other was unknown. Inoculations were made with both forms, and in a few days there was an area of discolored bark around the place of inoculation in each case where the unknown fungus had been inserted. Further inoculations were followed by the same results. By the close of the season, several of the seedlings were nearly girdled with wounds three or four inches in length, while on the trees, a portion of the wood was laid bare and the dead areas of bark, characteristic of the disease, were produced. Further experiments seemed to prove that the apple canker is caused by the same fungus that produces the black rot of the apple, pear and quince. Some blighted apple twigs were examined, and it was afterward found that mature spores of the black-rot fungus were abundant on them. Some pear trees, also, which were found to be in a dying condition, were attacked by the same fungus. The spread of the disease was from the top downward. Fruit of the same fungus has, also, been found on twigs of some quince trees that grew by the side of the pear trees, although the injury was slight. The canker has also been found on a quince

tree in the Experiment Station orchards, the appearance and effect being much the same as on the apple trees. The disease was also found to be abundant and doing serious damage in the large orchard of Maxwell Brothers, near Geneva. A series of experiments was undertaken to prove that this fungus occurring on these different species of trees is the same and identical with the common black rot of the fruit.

What can be done?—Strong evidence seems to be produced that a well-known fruit disease will also attack and do serious damage to the trees themselves. Black rot of the fruit of apple, pear and quince can be held in check with Bordeaux mixture, and there is no reason to think that this standard fungicide will fail in this case. Orchards that have been well sprayed with Bordeaux mixture for several years past, are much freer from the disease than those not sprayed with fungicides. The disease seems to prefer mature trees, and it lives best in the rough bark, till it gains an entrance to the cambium. By removing or preventing the formation of this bark by spraying the limbs with Bordeaux mixture, one favorite breeding place of this and possibly other plant diseases is removed. By keeping the limbs protected with Bordeaux mixture, all spores that chance to fall on them will be destroyed. Canker spots once formed cannot be cured, but such limbs should be removed wherever practicable. The rational way to combat apple canker is to spray the limbs with Bordeaux mixture as a preventive. This may be done when the trees are sprayed for apple scab, and an earlier spraying, when the growth first starts, would do no harm.

Geneva Experiment Station.

W. PADDOCK.

[Paper presented to the Western N. Y. State Fruit Growers' Association, Jan. 25, 1899.]

SPRAYING OF PEACH TREES FOR THE PROTECTION OF THE BUDS AND FOR CURLLED LEAF.



Showing difference in time of blossoming of whitened and unwhitened buds. (After Whitten).

there is vitality enough in the buds to blossom but not to set the fruit, thus

Probably no other fruit grown in Ontario so often disappoints the well-grounded expectations of the orchardist as does the peach. The location may be favorable and the soil well adapted and perfectly drained; the wood may be well ripened and go into winter with abundant promise of a bountiful crop for the next season; but when the enterprising grower, endeavoring to ascertain the prospects for a crop, goes to the trees in January, February or March he often finds, on cutting open the buds, that the heart is black and dead. Not infrequently all the buds are affected in this way and the crop is a total failure. Sometimes

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cruelly disappointing the hopeful grower. This is due to the freezing of the buds after they have been stimulated into growth by a few bright warm days. Every peach grower knows that when in good condition peach buds will stand a temperature considerably below zero; while buds which have been exposed to warm weather will be killed by a much higher temperature. Many experiments have been made to overcome this difficulty, but have been abandoned as ineffectual, or too expensive for commercial orchards. Mulching the ground under the trees, after it was frozen, so as to keep the roots dormant was tried and abandoned, when it was known that the buds would swell and even grow under certain conditions, while the roots were frozen and dormant.

The building of sheds, baling and laying down of the trees were all successful, but of no use to the grower from a commercial point of view.

The temperature seldom rises high enough in the shade, during the winter, to stimulate the growth of the buds. The problem thus was, how effectively and cheaply could the buds be protected from the direct rays of the sun?

With this problem yet unsolved, we heard that a series of experiments were being conducted at the Agricultural Experimental Station at Columbia, Missouri, in which the trees were whitened with a lime wash.

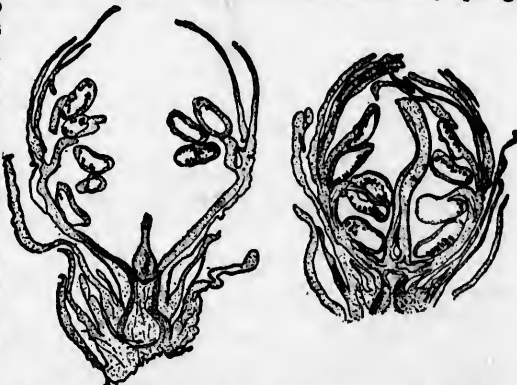
The theory was that whitening the trees would prevent them absorbing heat on bright sunny days, and that they would remain dormant during the winter and blossom later, thus also being less exposed to frosts in the early spring.

A test was made to ascertain the amount of heat absorbed by different colored objects of the same texture.

It was found that on dull days, or when shaded, no difference existed, but when exposed to the sunlight a marked difference appeared. Frequently a difference of 10 deg. or 15 deg. was indicated, and when the sun was very bright there was 21 deg. difference between the white and purple thermometers.

The theory looked all right, and we decided to put it to the test. We selected 100 young and vigorous trees of the following varieties: Stephen's Rareripec,

Wheatland, Smock, Centennial, Early Rivers and two seedlings, and gave them a good whitening, going over them twice, late in December, again in



Sections of unwhitened (a) and whitened (b) buds of Heath Cling Peach, taken March 20th, 1896, showing that the unwhitened bud had swollen and grown considerably and had an imperfect pistil, while the whitened bud was nearly dormant, and had a perfect pistil.—Whitten, Mo. Exp. Station, Bull. 38.

February and a third time in March. The material used was fresh stone lime, slacked with hot water and used as thick as it would work through a Bordeaux nozzle. One-fifth milk was added to each barrel to make it adhere to the tree. The trees were completely coated and some of the wash remained on them all summer.

The trees thus treated were later in blooming than those untreated; but it was impossible to judge of the benefit as all the trees came through in splendid condition, and we had a fair crop, considering the very heavy crop of the previous year. However, we shall try again this winter, and our programme is as follows: In the latter part of December we will spray with the following solution: 40 gallons of water and skim milk or buttermilk, (about one fifth being milk if possible), copper sulphate 4 lbs., salt 5 lbs., and enough lime to bring the whole to a thick mixture as will work readily in the pump. As soon as this is dry we will follow with the same mixture only omitting the copper sulphate. We will spray also early in February and early in March, using the solution without the copper sulphate. We expect that this will be all that is required, but should the coat of whitewash at any time become thin we would make an application at once.

There was a considerable amount of curl leaf on the trees in 1897, and for fear of a recurrence of the disease in 1898 we decided to treat them with Bordeaux mixture.

In April we sprayed the whole orchard excepting one side of each of three rows, and gave a second application in May. The mixture used in both cases was of standard strength and each barrel was tested with the ferrocyanide of potash test.

The application made in April while the trees were dormant caused no injury, but in May, after growth had started, it injured the twigs badly on the narrow leaved varieties, the Longhursts dropping almost all their foliage and fruit. The fallen foliage appeared perfect, the trouble being apparently with the twigs, which afterward shrivelled and died. No damage was done to broad leaved varieties.

Otherwise than the damage referred to the work was satisfactory, as the orchard was only very slightly affected, while the sides of the three rows which were not sprayed were badly diseased.

On the trees which were whitened throughout the winter in addition to the Bordeaux sprayings, scarcely a curled leaf could be found. The orchard was visited by a number of prominent fruit growers from Grimsby, Winona and other points who expressed themselves as pleased with the results.

To avoid a repetition of the damage to the foliage this year we will use only 2 lbs of copper sulphate to 40 gallons of water when we spray in April and May.

Fruitland.

W. M. ORR.

(Reprinted from the *Canadian Horticulturist*.)

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Fig.

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Fig.

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SOME BENEFICIAL INSECTS.

Some insects may be classed among the friends of the fruit-grower and farmer. They feed upon some of the injurious forms of insect life—chiefly in the



Fig. 1.



Fig. 2.



Fig. 3.



Fig. 4.



larval stage—and in this way they help to lessen their ravages. Among these beneficial insects are:

COLEOPTERA (Beetles).

LADY-BIRDS.—Convex, nearly hemispherical, generally red or yellow, and spotted. They feed upon small insects and the eggs of larger species, and are



Fig. 5.



Fig. 6.



Fig. 7.



Fig. 8.

valuable for keeping plant lice in check, some of the varieties attacking the aphids feeding upon the leaves of the apple trees. Among the most beneficial are: Nine-spotted Lady-bird (Fig. 1), Fifteen-spotted Lady-bird (Fig. 2), Ten-



Fig. 9.

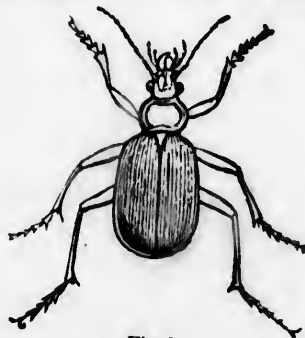


Fig. 10.



Fig. 11.

spotted Lady-bird (Fig. 3), Two-spotted Lady-bird (Fig. 4), Convergent Lady-bird (Fig. 5), Comely Lady-bird (Fig. 6), Plain Lady-bird (Fig. 7). Fig. 8 represents the larval condition of the Nine-spotted Lady-bird.

GROUND BEETLES.—These are found living on the surface of the ground, hiding in the ground under stones or rubbish, or running through the grass. They are valuable helpers to the orchardist, as some of them feed upon the larvae of injurious insects, such as the pear midge, curculio, etc. Those beetles known as the Calosoma are caterpillar hunters, sometimes even climbing trees in search of their food. Two valuable species are *C. calidum*, or the Red-spotted, Glowing or Fiery Hunter, which may be easily recognized by the rows of reddish or copper colored pits on the wing covers (Fig. 9), and *C. scrutator*, or Beautiful Bodied Searcher (Fig. 10). The latter has green or violet wing covers, and the rest of the body is marked with violet, blue, gold, green and copper.

MURKY GROUND BEETLES known as *Harpalus* (Fig. 11), and *Pterostichus* are also beneficial to the agriculturist. The former is of a pitchy black color.

TIGER BEETLES (Figs. 12 and 13) are more valuable to the farmer than to the orchardist, and several species of these are quite common.



Fig. 12.



Fig. 13.

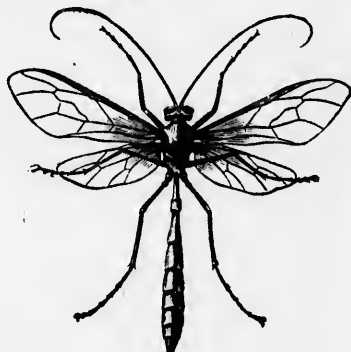


Fig. 14.

HYMENOPTERA (*Bees, Wasps, etc.*)

ICHNEUMON FLIES.—These are our most common parasites of injurious insects, chiefly among the butterflies and moths. The various species vary much in size, some being several inches in length and others of minute form. (See Figs. 14 and 15). The most common are *Thalessa*, with a very long tail, parasitic on pigeon tremex, and *Ophion*, with yellow body, generally compressed, living on the polyphemus moth and yellow-necked caterpillar.



Fig. 15.

BRACONIDS.—Sometimes also called Ichneumon flies. *Microgaster* lays eggs in the bodies of sphinx larvae. The larvae develop there, and just before the caterpillar perishes they leave it and spin their white, oblong, silken cocoons on its back. These egg-like bodies, should not be disturbed, as adult *Microgasters* will soon emerge.

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Aphidius infests plant lice, but it is too small to be readily seen.

Macrocentrus (Delicate Lace String) is parasitic on codling moth, etc. (Fig. 16.)

CHALCIDS or CHALCIS FLIES.—Small and parasitic. One species infests the cabbage butterfly, and others many troublesome larvæ.

VESPIDÆ or WASPS.—These may be placed among the beneficial insects, as they subsist chiefly upon injurious forms.

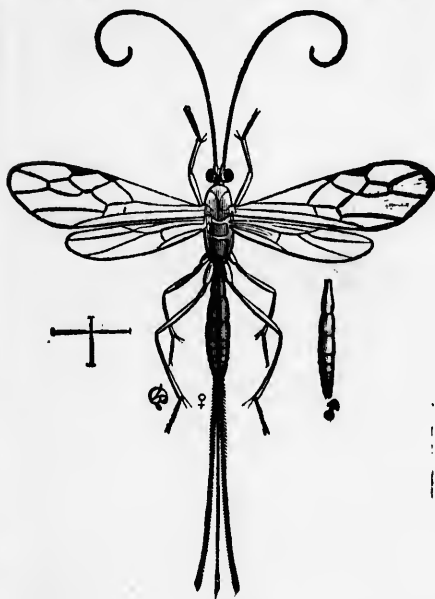


Fig. 16.



Fig. 17.



Fig. 18.

DIPTERA (*Flies—Two-winged*).

TACHINIDS.—The Tachina flies are larger than house flies. (Figs. 17 and 18.) As valuable as the Ichneumon for parasitizing caterpillars, grasshoppers, etc. Eggs are laid on the surface of caterpillars, and the larvæ bore inside. Cut worms are especially attacked by them. Many Tachina fly larvæ prey upon saw-fly larvæ. *Eristalis* preys upon aphids. *Pranachus*, with a long tapering abdomen, feeds upon clover midges.

SYRPHIDS.—The *Syrphus* flies are very valuable, as their larvæ feed upon plant lice. (Fig. 19.) Some live under ground and live upon apple root-lice.

SOLDIER BUGS.—These are predacious on other insects. Head small, eyes prominent, beak short. Easily recognized. (Fig. 20.)



Fig. 19.



Fig. 20.



Fig. 21.

HEMIPTERA (*Bugs*).

STINK BUGS or **SPINED SOLDIER BUGS** feed on larvæ of the potato beetle.

NEUROPTERA (*Four-Winged*).

The larvæ of lace wings are often found feeding on currant worms and aphids. (Fig. 21.)

DRAGON FLIES are also classed among the beneficial insects.

AN ACT

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AN ACT FOR THE BETTER PREVENTION OF CERTAIN DISEASES AFFECTING FRUIT TREES.

Chap. 280, R. S. O. 1897.

1. This Act may be cited as *The Yellows and Black Knot Act*, 1897.

2. It shall be the duty of every occupant of land, or if the land be unoccupied it shall be the duty of the owner :

(1) To cut out and burn all black knot found on plum or cherry trees on his land so often each year as it appears on such trees ; and

(2) To cut down and burn any peach, nectarine or other trees on his land infected with the disease known as the yellows, and to destroy all the fruit of trees so infected.

3.—(1) The council of any county, city, town, township, or incorporated village, may, and upon a petition of fifteen or more rate-payers, shall by by-law, appoint at least one inspector to enforce the provisions of this Act in the municipality, and fix the amount of remuneration, fees or charges he is to receive for the performance of his duties, and in case a vacancy shall occur in the office of inspector, it shall be the duty of the council to fill the same forthwith ; and the council (in any municipality where peaches are grown) shall also by by-law appoint three or more persons resident in the municipality, who shall constitute a board of fruit tree inspection, to which appeals shall lie from the order or decision of the said inspector.

(2) The council may pass a by-law dividing the municipality into such sections or divisions as may be necessary for the carrying out of this Act, and may appoint inspectors for such divisions whose duties and powers shall in all respects be the same as that of the township inspector.

(3) Where an inspector is appointed by a county council, his duties shall be to aid the local inspectors in enforcing the provisions of this Act, and where no local inspector is appointed by a municipality the inspector appointed by the county council shall have all the powers of a local inspector within such municipality.

4. If written complaint be made to the inspector that yellows or black knot exists within the municipality, in any locality described in such complaint, with reasonable certainty, he shall proceed to examine the fruit trees in such locality, and if satisfied of the presence of either disease he shall immediately give notice in writing to the owner or occupant of the land whereon the affected trees are

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growing, requiring him within ten days from the receipt of the notice to deal with such trees in the manner provided by section 3 of this Act.

Inspector to ascertain and report as to existence of diseases.

5—(1) It shall be the duty of every inspector appointed under this Act, by personal inspection, to ascertain from time to time whether either of the diseases mentioned in this Act exists in the municipality, and to report thereon at least once a year to the municipal council, and wherever he is satisfied of the presence of either disease he shall proceed in the same manner as in case of a complaint made under section 4 of this Act.

**Report to
Minister of
Agriculture.**

(2) A copy of the annual report of the inspector shall be forwarded by the clerk of the municipality to the Minister of Agriculture.

Appeal to board of fruit tree inspec- tion.

6.—(1) An owner or occupant to whom notice regarding yellows has been given by the inspector, under section 5 of this Act, may appeal therefrom, within the ten days limited therein, to the board of fruit tree inspection of the municipality.

**Notice of
appeal.**

(2) The owner or occupant so appealing, shall, within the said ten days, give notice in writing to the inspector that he requires an examination of the trees, in respect of which complaint is made, by the board of the fruit tree inspection, and shall name the day and hour at which the examination will take place.

**Notice to
board to
attend and
examine trees.**

(3) The person appealing shall also within the said ten days give notice in writing to three members of the said board that he requires the attendance of the members notified at the time and place named for the examination of the said fruit trees, and the date so fixed shall be not less than three days after the service of notice on the inspector and on the last member of the board so served.

**Examination
by board.**

(4) At the day and hour named in the notice of appeal, the members notified shall attend and examine the trees in question and determine whether or not the notice given by the inspector to the owner or occupant, under section 5 of this Act, was rightly given, and the decision of the said board or of a majority of the members present shall be final.

Decision by board.

(5) The decision of the board shall be in writing, signed by the members agreeing thereto, and a duplicate thereof shall be given to the person appealing and to the inspector, and pending such decision all proceedings against the owner or occupant appealing shall be stayed, and if the said board decides that the notice given by the inspector was wrongly given and was unnecessary no further proceedings shall be taken thereon.

(6) Each member of the board shall be paid for every examination he or she decides that the municipality and the amount of the board, found liable,

7.—(1) Any person who shall cut or remove any trees by the inspector shall remain on place until the trees are cut and shall upon completion of the work pay a fine of not more than \$25.

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(3) Every person required by section 10 to perform the duties imposed on him is liable to a fine

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(6) Each member of the said board shall be entitled to receive \$2 Fees of board. for every examination made by him under this section, and the same shall be paid by the owner or occupant appealing if the board decides that the notice of the inspector was rightly given, or by the municipality if the board decides that such notice was wrongly given, and the amount of said fees shall be stated in the written decision of the board, and shall be a debt due to the board from the party so found liable, recoverable in any division court having jurisdiction.

7.—(1) Any owner or occupant of land who, after notice given by the inspector, as provided by section 4, suffers any black knot to remain on plum or cherry trees, or keeps any peach, nectarine or other trees infected with yellows or the fruit of trees so infected, shall upon conviction, be liable to a fine of not less than \$5 and not more than \$20 for every such offence. Penalties.

(2) Any person who knowingly offers for sale or shipment, or sells or ships the fruit of trees infected with yellows, shall, upon conviction, be liable to a fine of not less than \$5 nor more than \$20.

(3) Every inspector who, after receiving the written complaint required by section 4, of this Act, refuses or neglects to discharge the duties imposed on him by this Act, shall, upon conviction, be liable to a fine of not less than \$10 nor more than \$20.]

8.—Every offence against the provisions of this Act shall be punished, and the penalty imposed for each offence shall be recovered and levied, on summary conviction, before any justice of the peace; and one-half of every fine imposed shall be paid to the inspector or other person laying the information, and one-half to the treasurer of the municipality in which the offence is committed, for the use of the municipality. Application of penalties.

9.—The council of every municipality shall require its inspector or inspectors to faithfully discharge all their duties under this Act. Council to require inspectors to perform their duties.

ACT FOR THE PROTECTION OF INSECTIVOROUS AND OTHER BIRDS.

CHAP. 289, R. S. O. 1897.

HER MAJESTY, by and with the advice and consent of the Legislative Assembly of the Province of Ontario, enacts as follows:—

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fected.

Cage birds
and poultry.

Birds that
may be killed.

Trapping and
selling forbid-
den.

Nest, young
or eggs not to
be taken.

1. Nothing in this Act contained shall be held to affect *The Ontario Game Protection Act*, or to apply to any imported cage birds or other domesticated bird or birds generally known as cage birds or to any bird or birds generally known as poultry.

2.—(1) Except as in section 6 of this Act provided, it shall not be lawful to shoot, destroy, wound, catch, net, snare, poison, drug, or otherwise kill or injure, or to attempt to shoot, destroy, wound, catch, net, snare, poison, drug or otherwise kill or injure any wild native birds other than hawks, crows, blackbirds and English sparrows, and the birds especially mentioned in *The Ontario Game Protection Act*.

(2) Any person may, during the fruit season, for the purpose of protecting his fruit from the attacks of such birds, shoot or destroy, on his own premises, the bird known as the robin without being liable to any penalty under this Act.

3. Except as in section 6 of this Act provided, it shall not be lawful to take, capture, expose for sale or have in possession any bird whatsoever, save the kinds hereinbefore or hereinafter excepted, or to set wholly or in part any net, trap, spring, snare, cage, or other machine or engine, by which any bird whatsoever, save and except hawks, crows, blackbirds, and English sparrows, might be killed and captured; and any net, trap, spring, snare, cage or other machine or engine, set either wholly or in part for the purpose of either capturing or killing any bird or birds save and except hawks, crows, blackbirds and English sparrows, may be destroyed by any person without such person incurring any liability therefor.

4. Save as in section 6 of this Act provided, it shall not be lawful to take, injure, destroy, or have in possession any nest, young, or egg of any kind whatsoever, except of hawks, crows, blackbirds, and English sparrows.

5. Any person who carries the same and carry the same confiscated, and market clerk confiscate, and

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5. Any person may seize, on view, any bird unlawfully possessed, and carry the same before any justice of the peace, to be by him confiscated, and if alive, to be liberated; and it shall be the duty of all market clerks and policemen or constables on the spot to seize and confiscate, and if alive, to liberate such birds. Power to seize birds unlawfully possessed.

6. The chief game warden for the time being under *The Ontario Game Protection Act*, may on receiving from any ornithologist, or student of ornithology, or biologist, or student of biology, an application and recommendation according to the forms A and B in the schedule hereto, grant to such an applicant a permit in the form C etc. in said schedule, empowering the holder to collect, and to purchase, or exchange all birds or eggs, otherwise protected by this Act, at any time or season he may require the same for the purposes of study, without the liability to penalties imposed by this Act. Permit may be granted by chief game warden to ornithologists, etc.

7. The permits granted under the last preceding section shall continue in force until the end of the calendar year in which they are issued, and may be renewed at the option of the chief game warden for the time being under *The Ontario Game Protection Act*. Duration of permit.

8.—(1) The violation of any provision of this Act shall subject the offender to the payment of not less than one dollar and not more than twenty dollars with costs, on summary conviction, on information or complaint before one or more justices of the peace. Penalties.

(2) The whole of the fine shall be paid to the prosecutor unless the convicting justice has reason to believe that the prosecution is in collusion with and for the purpose of benefitting the accused, in which case the said justice may order the disposal of the fine as in ordinary cases. Application of fines.

(3) In default of payment of the fine and costs, the offender shall be imprisoned in the nearest common gaol for a period of not less than two and not more than twenty days, at the discretion of the justice.

9. No conviction under this Act shall be quashed for any defect in the form thereof, or for any omission or informality in any summons or other proceedings under this Act so long as no substantial injustice results therefrom. Conviction not invalid for want of form.

AN ACT FOR THE FURTHER PROTECTION OF BEES.

Chap. 282, R. S. O. 1897.

Use of poison
in spraying
fruit trees in
bloom pro-
hibited.

1. No person in spraying or sprinkling fruit trees, during the period within which trees are in full bloom, shall use or cause to be used any mixture containing Paris green or any other poisonous substance *injurious to bees*.

Penalties.

2. Any person contravening the provisions of this Act, shall, on summary conviction thereof before a justice of the peace, be subject to a penalty of not less than \$1 or more than \$5, with or without costs of prosecution, and in case of a fine or a fine and costs being awarded, and of the same not being upon conviction forthwith paid, the justice may commit the offender to the common gaol, there to be imprisoned for any term not exceeding thirty days unless the fine and costs are sooner paid.

DO NOT SPRAY TREES WHEN IN FULL BLOOM.

1. It is not the right time to spray.
2. It may destroy insects that are then fertilizing the blossoms.
3. It is destructive to bees.
4. It is forbidden by law.

