Autumn Orchard Work

Washington, D. C., Dec. 4.—In the management of the orchard, especially the apple and pear orchard, there is a period in the autumn after the fruit is gathered, and perhaps after other crops have been safely harvested, that is most convenient for doing some of the careful work in the control of certain diseases and pests. The control of peach borers and insect pests and fall spraying for San Jose scale have been discussed in a previous article. There are certain fungous and bacterial diseases, particularly pear blight and apple canker, which are best worked upon at this time. These diseases are principally controlled by the eradication methods rather than by spraying. With both these diseases it is not only a matter of convenience but it is a fortunate thing that some of the most important work of the season can be best accomplished at the time when it is most convenient. The mild autumn days before the snow flies or disagreeable, rainy, or cold weather comes gives the very best opportunity for careful work and close inspection.

PEAR BLIGHT.

Pear blight is a bacterial disease which works mostly in the fleshy, growing, tender parts of the tree, including the blossom clusters, young twigs, and the bark of larger branches, and even on the sody, collar, and root system of the tree. Under certain conditions the bacteria spread into the wood to a considerable extent. The disease attacks the pear, apple, quince and other related fruits of the pome family. While the leaves are attacked to some extent, particularly the leaf stems and midribs of the younger leaves, the main killing of the foliage results from the death of the twigs and branches on which the leaves are located. The dead branches and other parts give no evidence to the naked eye of the cause of their death and thus resemble somewhat limbs killed by fire; hence the name fire blight, particularly with blight on the apple, is often applied.

HOW THE TREE IS INFECTED.

The germs get into the tree in several ways. First and most important is the blossom blight. Flies and other insects carry the germs from the gummy exudate on the hold-over blight to the opening blossoms and infect the nectaries of the flower. Bees and other insects carry the germs from blossom to blossom and tree to tree and even to adjacent orchards and spread the disease rapidly during the blooming period. During the present season pear blight has been particularly bad, especially the blossom blight on both pears and apples. The outbreak of 1915 stands out as one of the worst in history, particularly on acconnt of the unusual amount of blossom blight on the apple.

Next in importance after the blossom blight, and in some cases the most serious phase of the disease, is the infection of the tender tips of growing twigs. Thousands of these young twigs may be killed on a single large apple or pear tree. The blight may extend from the infections on the blossoms or from twigs down on to the larger branches, thence to the body of the tree. The branches, bodies, and more particularly the collar and even the root system of the tree, may be infected directly by the germs. The infection may come from a fruit spur, water sprout, or even a sprout from the root, or the germs may be introduced by punctures by insects, birds, implements, or other means, directly into the fleshy bark, or even may enter, in certain cases, through growth cracks. Ordinarily the cuticle of the tree protects it from the entrance of the germs, otherwise there would be much more destruction of trees than actually occurs.

Each infection, no matter where it occurs, should be looked upon as an individual case of pear blight. The diseases resulting from the various modes of attack for convenience are given various names, such as blossom blight, twig blight, body blight, collar blight, and root blight. The lower down on the tree, as a rule, the more dangerous is the blight. The tree may have a thousand or more twigs and blossoms killed in the top and not be seriously or permanently injured, while a single case of body blight or collar blight may result in its death. Each infection is to be looked upon as a definite, limited, diseased area. The part attacked is usually destroyed, though the disease may occur in the outer fleshy bark of the limbs and branches without always penetrating to the cambium. When the cambium or vital layer between the wood and bark is killed, death of that particular area, of course, results.

SECONDARY CONTROL MEASURES.

For various reasons spraying has not been practically successful in controlling the disease. The eradication method, or actually cutting out the diseased area, is the principal way of controlling pear blight. Other methods, such as withholding stable manure and nitrogenous fertilizers, moderate cultivation or withholding it completely, seeding the orchard down to grass or clover, or sowing rank growing clover crops after the blight appears in the spring, such as cowpeas and sorghum in the middle states, oats, millet, or similar crops in the northern states, all help in a secondary way in reducing the severity of the blight. In the irrigated orchards the use of the minimum amount of irrigation water is also advisable.

DIRECT ERADICATION.

The main method of controlling pear blight, however, consists in cutting out the diseased tissues wherever found and disinfecting the wound and the instruments to avoid spreading the disease. In the great majority of cases, fortunately the blight comes to a definite standstill in the bark, after killing a certain distance, and stops. The germs die out in the dead bark, a crack or crevice forms between the live and dead bark, and the case ends itself naturally and heals out. In many cases, however, the disease, while dying out in the older parts, keeps on spreading on the margin, the germs renewing themselves by multiplication and infecting new areas of fresh bark. When they manage to live through the dry, hot summer weather and keep alive until autumn, when the leaves drop from the trees, they almost invariably live over winter, and though greatly checked by the cold weather of the winter, are not killed or apparently even injured by the cold. Such cases become hold-over blight, and by this means the supply of germs is kept over in the orchard for the next season. The hold-over blight cases may extend considerably and result in further damage to the tree by the extension of that particular area, but their worst feature comes from the fact that they supply the gummy exudate and the virus for new infections on the blossoms the following spring. When warm weather comes in the spring and root pressure fills the tree with sap the hold-over cases start off vigorously and exude the gummy matter, especially in moist weather literally teeming with the pear-blight bacilli. Insects, mainly flies carry this to the opening blossoms.

Cutting out pear blight, therefore has a double purpose, first of stopping the blight and cleaning up the tree, and second of preventing the hold over. Much good work on blight can be done in the summer time, but the final cleanup should occur in the fall. Summer cutting beginning as soon as the blossom blight shows plainly and continuing until the fruit is about half grown, is helpful. The best time to do it is in periods of dry sunny weather. On young trees it is often very important, particularly on young pear and apple trees, to head off the blight by cutting well below it as soon as it shows up in the spring and summer.

EXAMINE BARK THOROUGHLY.

In all blight cutting, either summer or autumn, it is important to examine thoroughly by cutting the bark around the lower edge of the infection to determine the lowest point at which any change of color, even a water-soaked or transparent condition, can be detected with the eye. Young or active blight on the lower margin is readily distinguished by its moist, gummy or sticky character and either water-soaked or usually reddish discoloration of the bark. This is in rather marked contrast with the dry dead bark where the germs have died out. Having found the lowest margin of the disease, if it is on a limb, the knife, pruning shears, or saw is used, cutting well below the infection. If the disease has stopped and the dead, dry bark is sharply defined in contrast with the live portion, the cut may be made quite close below the margin, or it may be made where any convenient branch emerges or where the limb leaves the main branch or the trunk. If the freshly blighted area is short and the blend is rather abrupt between the dead and live portion, the cut may be also made rather close to the diseased area as required by the nature of the branch. Six inches may be sufficient in such cases but the cut should always be made out to sound bark and wood. If the saw is used it is always desirable afterward to trim the edges of the bark and the surfaces of the saw cut or the wood with a sharp knife to see if the whole surface is normal. If a water-soaked appearance is found even on the surface of the wood, this indicates that the germs have penetrated the woody vessels and a lower cut is necessary, repeating the same process.

A large-bladed pocket knife, a scraper, and a three-fourths inch carpenter's gouge, kept well sharpened are useful in cutting out the bark on these areas. The same principles of looking for watersoaked areas in the wood should be applied here, and the gouge, or perhaps the chisel, used to remove all suspicious wood and bark. The edges of the bark should be trimmed smoothly and neatly, so that they can be readily disinfected and healing of the wound can properly take place.

USE DISINFECTANTS.

In all cases of blight cutting described above, a disinfectant should be carried constantly by the worker and each pruning wound or scar should be thoroughly wiped and saturated with this disinfetant and the tools wiped and cleaned with disinfectant before going to the next case. Disinfection of the tools before they are used again on any other part of the tree is necessary to insure success, as infected tools may carry blight from diseased to healthy parts. Various disinfectants may be used. One of the most convenient is a water solution of corrosive sublimate (1-1,000). Tablets can be purchased at the drug store which will make this strength by adding one tablet to a pint of water. The solution should be kept in a bottle with a cork and the operator should carry a sponge or roll of soft cotton cloth for saturating with the distinfectant and for wiping the wounds and implements. The most convenient way is to have a small kit or a basket and carry all the tools, including the bottle of disinfectant, in this kit. The sponge or swab of cotton cloth can be tied to a stout string about arm's length and fastened to a buttonhole or the operator's clothing.

Caution—Corrosive sublimate is a deadly poison. The tablets and the bottle of disinfectant should be so labeled plainly and should be kept away from children and other persons, and the bottle of solution, when not in use, being very inexpensive, should be emptied.

Corrosive sublimate is a powerful germicide, but does not penetrate deeply. It does not kill the cut edges likewise a good germicide. These solutions should always be kept in glass bottles or otherwise chemically clean containers. They should never be put in tin cans or metal containers of any sort, since the solutions are decomposed and rendered inert by metals. The water used should be reasonably clean and the sponge or swab should be kept clean by occasional washing.

HINTS FOR EFFECTIVE WORK.

Begin operations at the base of the tree and work upward, otherwise a lot of time and careful work may be wasted on the upper part of a branch which it is later found necessary to remove, or body blight or even collar blight found later on the tree may cause it to be condemned. In some cases there is a limit to the amount of work which the grower is willing to do to save a tree. The blight should be removed even if it necessitates condemning the tree and rooting it out. A tree partly injured by collar blight may be cleaned up and saved. This often requires digging the dirt away and working partly underground. It is necessary, however, to follow the margin of the disease, even if it carries you into the ground, just as if you were tracing the boundaries of an island. It is usually best to condemn a tree girdled by collar blight. It is possible, however, after doing thorough work of eradication with a rather mild case of collar blight, to bridge graft and thus save the tree by the same process used in bridge grafting a tree girdled by mice or other animals.

Collar blight can best be detected in the autumn, just before the pear or apple trees shed their leaves. This and similar injuries to the collar of a tree will cause the leaves to yellow and assume bronze or autumn colors and even drop, while those on the normal, healthy trees are still green. Other troubles, such as injuries by mice, frost collar girdle, and fungus root rot cause similar symptoms, but these symptoms should lead to an inspection of the collar.

To inspect the collar of a tree or any doubtful point on the body or on large limbs, dig out with a carpenter's gouge or a sharp knife a small piece of the outer bark, exposing an area of the fleshy bark the size of one's thumb nail. The cut should not be made through to the cambium and will do no injury if the bark is all right at that point. Always do this with a disinfectant in hand and promptly disinfect the cut, otherwise you may inoculate the blight or at least give an opportunity for inoculation. Keep the knife or gouge continually disinfected during this inspection.

Do not be deceived by the normal rough-bark formation, which consists of the outer layers of bark which have died naturally. Fruit trees, like other trees, keep their bark smooth while young and vigorous. As they get older the outer layers begin to die, being replaced by vigorous young bark underneath. This process starts mainly at the base of the tree and works upward, the oldest bark dying first. It also

(Continued on page seven.)