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FIRE BLIGHT

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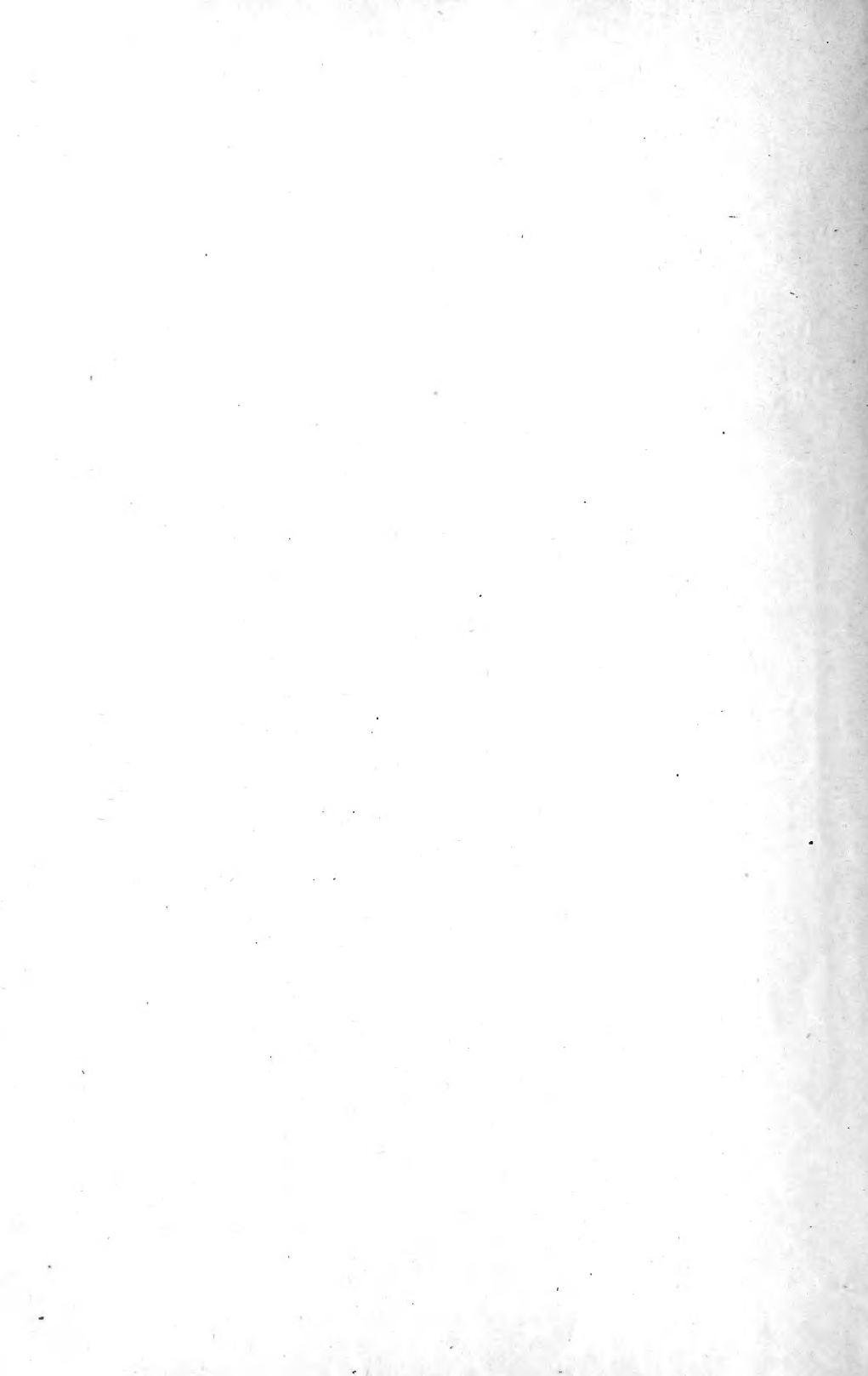
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INTRODUCTION

The disease affecting apple and pear trees known as Fire Blight has been discussed in this Society for 35 years according to the Annual Reports.

During this time about every member in regular attendance at the meetings has had a turn at "blight," but it still remains to vex the orchardists of the state, professional as well as amateur. That the disease is still prevalent is shown by the numerous inquiries received at this office. In order to reply conveniently to these questions it was thought best to issue a pamphlet giving a brief history and description of the disease as well as approved remedies. In looking over the literature on the subject a press bulletin by Prof. Henderson of the Idaho Experiment Station seemed to afford the desired information presented clearly and concisely and it is hereby reproduced by courtesy of Director H. T. French of the Idaho Station.

F. CRANFIELD, Editor.



UNIVERSITY OF IDAHO
AGRICULTURAL EXPERIMENT STATION
MOSCOW, IDAHO;

L. F. HENDERSON, Botanist

FIRE BLIGHT

A Bacterial Disease of the Pear and the Apple.

Spring is now upon us,—the time when the careful horticulturist must be preparing to combat those many ills incident to fruit culture, whether of an insect or of a fungous nature. Of all these probably the Fire Blight is the worst and most to be dreaded.

The name "Fire Blight" is the proper one to use; it should not be called "Pear Blight" for two reasons. In the first place it is liable to be confused with the Pear-leaf Blight, a disease which attacks the leaf of the pear, and incidentally injures the fruit. In the next place this disease is not limited to the pear; it is fast becoming too common on the apple as well, in our state. Nay, in many states it attacks all of the pomaceous fruits, such as pear, apple, quince, crab and hawthorn.

HISTORICAL.

Though this trouble has been known as working havoc in orchards for a century or more, it is only in comparatively recent times that its true nature has been well understood. For a long period of years the discussions of this trouble were of such a theoretic nature that many horticultural societies forbade its being brought up in their meetings, unless someone had something of absolute knowledge to offer about it. Various causes were ascribed for its presence, such as "sour sap," "atmospheric conditions," "soil conditions," and "effects of various fungi." In 1878, however, Professor Burrill of Illinois discovered the true cause and announced his discovery to the world. This was found to be a bacterial disease, due to the presence of myriads of little germs in the inner bark and cambium. The germ was called by Prof. Burrill *Micrococcus amylovorus* from the eagerness with which it seizes upon and devours the starch in these

tissues. From the subsequent studies of Arthur at the Geneva Station in New York, and of Waite in the U. S. Department of Agriculture, we know how this germ or bacterium lives, reproduces itself and is carried from tree to tree.

APPEARANCE OF BLIGHT.

Luckily the disease is a very conspicuous one, which renders its presence in an orchard the more inexcusable when well known. It affects, twigs, leaves, young fruit, and even the branches or trunks. From the experiments of Waite it has been found that it cannot attack the plant through the **uninjured** bark or leaf. It can, however, gain entrance through any injured place on trunk, limb or even leaf. Its most common points of entrance are natural ones. These are the young growing tips of the branch, the stigma of the flower, or the glands which secrete nectar. Therefore the "flower-blight," the "twig-blight" and the "branch or trunk blight" are all forms of this disease.

In the first, the young twig, especially if it be growing rapidly, turns black in both leaf and stem, and wherever the leaves are blighted they remain black and dead **through the ensuing winter**. This black, piratical flag is the surest evidence of its presence.

In the "flower-blight" a whole bunch of flowers, or frequently **every** bunch on the tree will be affected, and dying back to the beginning of the spur, hold the blackened flowers and young fruit also through the entire year. This is the most common form on the apple.

Frequently an entire limb or even the trunk will be affected for only a short distance, while the top will still be entirely free from the disease, and this can only be understood when we speak of how the disease is spread.

More frequently upon the pear several limbs and even the whole trunk will be affected, and when this is the case the tree should be cut out root and branch.

MEANS OF DISSEMINATION.

If the young shoots of a tree affected with blight be examined, small drops of sticky, thick fluid will be found exuding from the edge of the diseased area. If one of these drops be examined with a high power of a microscope, myriads of little oblong bodies will be seen, some separate, some in short chains. These are bacteria. Arthur proved that these bodies, inoculated into a sound tree by a needle, would produce the disease; Waite proved to us beyond dispute that insects, especially **bees**, are the main instruments in their dissemination. They are attracted by the viscid sap, suck up part or all of the drop, and then carry thousands of these germs with them to inoculate flowers, shoots, or wounded places in the bark. Undoubtedly heavy currents of wind assist in spreading the disease and probably account for the commonness of "twig blight." The

question comes right here: Shall I keep bees if I have an orchard? Certainly, and for two reasons. First, the honey, and the revenue derived from it, are often no small object to the farmer. Second, the bees are absolutely needed to assist in proper cross-fertilization or pollination of the flowers. This leads us to the subject of remedies, for preventives there are none.

REMEDIES.

As soon as the bacteria are carried to young flower or wound, they effect entrance, and living upon the sap and starch, multiply rapidly. If they gain entrance along a limb or trunk, they live in the inner bark and cambium-layer,—that layer which adds yearly to the growth of both bark and wood.

It can readily be seen from this that they are well covered, and consequently spraying does no good. **The only remedy thus far found has been and is the careful and continuous use of the saw and pruning knife.** All diseased shoots and limbs should be cut off at from 6 inches to one foot below the place of evident infection or injury, as the bacteria have always gone down deeper into the limb than seems to be the case from the outside. Many pruners have the habit of splitting down the bark to see how far the disease has proceeded, but this practice is to be condemned, as they never can see how far the disease has proceeded, and the incision of the knife may carry the bacteria from diseased to healthy tissues. If the blight is bad in either the pear or apple-orchard, the knife or saw should be **sterilized** each time it is used, by either passing it through a flame, or dipping it into weak carbolic-acid water, or into kerosene. The pruned limbs or fragments should be collected and **burned** and both pruning and burning should be done mainly in the dormant season, before the sap has started, the bacteria have awakened, and the bees are visiting the orchard. This is the best time for pruning and burning, but not the **only** one; it should be done whenever the disease makes its appearance. All large wounds should be painted over with paint as soon as the tree is trimmed, to prevent the re-inoculation through the exposed tissues. Where the blight is bad, even young shoots or water-sprouts should have their cut bases painted, for it has been known time and again that the limbs and even trunks have been inoculated through these cut stubs.

The pear is much more easily pruned for this disease than is the apple. On the former it commonly manifests itself in dead or dying shoots, limbs, or trunks, which can readily be cut away below the progress of the disease. On the apple, however, it is commonly the shoots all over the tree, and **especially the fruit spurs and their clusters of flowers**, which are most affected. Pruning here becomes a much more difficult and even serious undertaking. Where only a few shoots and fruit spurs are affected these can be cut away close to the tree, and the wound immediately covered with paint. Where, however, almost all of the fruit spurs on the whole tree have died,

the best way is to cut off entire and large limbs, cover the wounds with paint, and stimulate the production of new shoots and subsequent fruit spurs. In one place my attention was called to a very interesting though sad evidence of the efficacy of bees in spreading the disease. All the splendid large apple trees near the hives were without exception seriously injured by blight, while as we proceeded on radii from the hives the blight grew less and less, and almost disappeared on the edge of the orchard farthest from the hives.

OTHER HELPS.

It has been often noticed that rapidly growing trees are more subject to blight than slower growers, and that those in low ground or "swales" are more subject than those on drier ground. Orchards should therefore be planted on well drained land, and should not be stimulated by too much water or too much fertilizer.

Though all of the varieties of the pomaceous fruits are subject to this disease, as said before, some varieties have been found more subject to the attacks of blight than others. Of the apples, the crabs of all kinds have been found very prone to blight. Amongst the pear, in most places, the Anjou, Angouleme and Seckel are most resistant, Bartlet and Flemish Beauty are less so, while the Idaho, Clapp and Winter Nellis are very subject to blight.

L. F. HENDERSON, Botanist.