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Maine Agricultural Experiment Station

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MARCH, 1906.

ORCHARD NOTES.

This bulletin contains notes on spraying for caterpillars, scale insects, apple scab, and pink rot; the results of an unbalanced ration on fruit; the winter injury to trees from freezing and mice; and suggestions as to handling fruit and pruning.

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AGRICULTURAL EXPERIMENT STATION,
Orono, Maine.

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Figure 1. The effect of an unbalanced ration (?)
See page 72.

ORCHARD NOTES.

W. M. MUNSON.

The fact that the apple grows in many parts of the State as though it were indigenous and that orchards will exist and bear a partial crop of fruit though seriously neglected, is responsible for much of the ill-treatment so common to the orchards of Maine. There is little doubt, however, that a well managed orchard is a most valuable farm property, and one of the surest sources of income. For many years the Experiment Station has devoted a large amount of attention to the orchard industry, as evidenced by its publications on this important subject. It is the purpose of the present bulletin to report recent observations and experiments upon successful orchard management.

NOTES ON SPRAYING.

“Watch and spray,” as well as “cultivate and feed,” must be the motto of the successful orchardist. The importance of watchfulness, and the direct value of spraying, as a means of holding in check insect and fungous enemies of the orchard, have been repeatedly urged by this Experiment Station* and in so far as suggestions made have been followed, the results obtained by the fruit-growers of the State have been satisfactory.

By the work of this Station it has been shown beyond doubt that, by spraying at the proper time, and in the proper manner, the canker worm, tent caterpillar and forest caterpillar may be held in check; that the “apple worm” or codling moth may be controlled; that scale insects may be destroyed; that the green aphid or plant louse may be killed; that apple scab, cracking of pears, and rotting of plums may be very greatly reduced;—and still spraying is not a common practice among the fruit-growers of Maine!

* Repts. Maine Expt. Sta. 1891, 1892, 1893, 1894; Buls. 8, 52, 56.

With the great orchardists of New York, Michigan and the Pacific slope, spraying is just as much a part of the regular work of fruit growing as is pruning, or even harvesting. No live orchardist of California or Oregon would think of omitting the five or six treatments with Bordeaux mixture and Paris green, or with kerosene emulsion or resin wash, as the case might demand, any more than he would omit frequent cultivation or irrigation. It is because of this thoroughness in the production of fruit, as well as in grading and packing, that the fruit growers of the northwest are able to send their fruit across the continent and so nearly control the local eastern markets.

REASON FOR SPRAYING.

The leaves of plants have two functions essential to life and health. They act, in a measure, as both lungs and stomach for the plant. Consequently if they are destroyed or diseased, the whole plant suffers; the crop of fruit is lessened; and the vitality of the plant is weakened. It is for this reason that spraying is of importance, even in those seasons when there is no fruit. Spraying is an insurance and not a remedy, and there should be a definite purpose in view for every application. Specific directions for controlling the leading insect and fungous enemies of the orchard are given in "How to Fight Apple Enemies," published by this Experiment Station and sent free to any one requesting it.

RESULTS OF SPRAYING.

In a recent canvas of the orchards of Wayne and Orleans counties, New York, by Dr. George F. Warren,* it was found that in Wayne county, of 66 sprayed orchards, representing 626 acres, the yield in 1903 was at the rate of 280 bushels per acre; while 107 unsprayed orchards, covering 673 acres, yielded at the rate of 253 bushels per acre. For the sprayed fruit the average price per barrel was \$2.02; while for the unsprayed fruit the price was but \$1.80.

* Bul. 226, 227, Cornell Univ. Expt. Sta.

Of 179 orchards canvassed in Orleans county the following report was made:

Yields and incomes from orchards sprayed different numbers of times.

How treated.	YIELDS.			Portion of crop barreled.	INCOMES.		
	Number of orchards.	Number of acres.	Average yield per acre.		Number of orchards.	Number of acres.	Average income per acre.
Unsprayed	43	381.0	328	66	54	449.5	\$103
Sprayed once	33	352.0	346	74	30	316.0	139
Sprayed twice	70	701.0	374	78	64	644.0	143
Sprayed three times	27	247.5	414	87	25	236.5	184
Sprayed four times	6	43.0	569	77	6	43.0	211

The significance of the figures given is so obvious that comment is unnecessary, except that they corroborate in full the experience of those who have practiced similar treatment in this State.

THE MENACE OF THE CATERPILLAR.

The approach of the gypsy moth and the brown-tail, has stirred the people of Maine to such an extent as to insure active steps for the control of these pests. Every year, however, trees are defoliated by canker worm, forest caterpillar, tent caterpillar, and similar enemies, with little attempt on the part of growers to protect themselves from damage.

It is well understood that the forest caterpillar appears in destructive numbers at more or less irregular intervals; only to disappear again, after ruining many orchards and defoliating hundreds of thousands of forest trees. This disappearance is caused by the rapid increase of natural parasites. With the destruction of the caterpillars, the parasites die, and so there is an alternation in the period when there are many and when there are few of these pests.

The last serious invasion of the forest caterpillar was in 1897 and 1898, when whole orchards were swept as if by fire for two successive seasons. The results were naturally disastrous. It is now nearly time for a return of this caterpillar and the enterprising orchardist will be ready to meet it.

That the pest may be held in check was plainly demonstrated by the work of the Station during the last invasion. A large orchard of Baldwins which was sprayed with Paris green when the caterpillars first appeared and twice afterwards, was almost free from injury, while adjoining trees, not sprayed, were completely defoliated, and never recovered from the injury. The accompanying cuts represent the condition of the two orchards late in June.

Similar results have repeatedly been obtained in fighting the canker worm. It is highly important, however, that, for either of these pests, spraying be done just as soon as the leaves begin to unfold, and again in about a week or ten days. After the larvæ become half grown, spraying is not always effective.

Another precautionary measure to be borne in mind, in dealing with the forest caterpillar, is to prevent migration from tree to tree, and from forest trees to the orchard trees. This may be effected by placing a band of tarred paper about the trunk of the tree and smearing this with a thick coating of equal parts of lard and sulphur. It is very important that this mixture be not placed directly on the bark of the tree, as injury almost invariably results.

The method here noted was used with remarkable success in the orchards above mentioned. The caterpillars gathered by the hundred beneath the band, but would not cross the line, and were readily disposed of by means of a swab dipped in a very strong solution of washing powder. The masses of caterpillars upon the limbs were destroyed in the same way; those that escaped by dropping to the ground being stopped by the bands, and then killed as above.

OYSTER-SHELL BARK LOUSE.

An insect which is nearly as destructive as the dreaded San Jose scale, is annually doing thousands of dollars worth of damage in the State without the slightest notice on the part of farmer or fruit grower. This insect—the oyster-shell bark louse—is so familiar, and yet so inconspicuous, that it is usually overlooked. The insect is fully described in Bulletin 56 of this Station, to which the reader is referred. It frequently is the unsuspected cause of the stunted, sickly appearance of certain trees to be found in almost every orchard. The mature form, shown in



Figure 2.
The menace of the caterpillar.—Trees not sprayed.
See page 67.



Figure 3.
The menace of the caterpillar.—Result of spraying with arsenical poisons.
See page 67.

figure 5, may very readily be seen where the foliage is off. Every young orchard should be examined early in the spring and, if found infested, should be thoroughly treated with caustic soda or some other strong alkali.

The eggs of this insect hatch in June, or early in July, and the little lice travel rapidly over the surface of the young wood and the fruit until they find a satisfactory feeding ground, when they insert their beaks and begin their campaign against the life of the tree. Figure 4 shows the young lice, natural size, early in July.

Spraying the trees thoroughly with kerosene emulsion when the lice are in the migratory stage, as described in "How to Fight Apple Enemies," has in every instance, at the Station, been effective in controlling this pest.

APPLE SCAB.

Another ever present, and very generally neglected, pest of the orchard is the fungus disease, apple scab, or "black spot" as it is sometimes called. This disease, figure 8, has been so frequently described as to be perfectly familiar. As shown in former reports of this Station,* spraying is effective in securing a crop of fruit relatively free from this disease, even in those seasons when the scab is most prevalent.

For several years the conditions in most parts of Maine have been such that the fruit has been relatively free from scab, and as a result many growers who took up the practice of spraying some years ago, have gradually ceased to spray. It should be said, however, that this neglect is wholly comparable to the neglect which permits the lapse of a fire insurance policy. It may be unnecessary to spray to secure a crop of fair fruit one year, or even two or three years in succession; but when the unfavorable season does come, if spraying has been neglected, there is frequently a needless loss of several hundred barrels of fruit in orchards of average size.

As a result of the studies above mentioned † the fact was clearly demonstrated that, in a bad season, there was a difference of 50 per cent in the amount of perfect fruit upon sprayed and unsprayed trees; the best results being obtained from the use

* Ann. Rpt. Maine Expt. Sta. 1891, 1892, 1893, 1894.

† See details and summary, Rpt. Maine Expt. Sta., 1893, 125-128.

of Bordeaux mixture. In other words, trees not sprayed gave on three successive years 4.1, .9, and 38.2 per cent of the fruit free from scab; while the same years an equal number of trees sprayed with eau celeste (copper sulphate, carbonate of soda and ammonia) gave 57.8, 30.1 and 72.8 per cent respectively. The third year Bordeaux mixture was used and gave still better results—79.9 per cent of the fruit being free from scab.

From these, and similar results obtained all over the country, it is evident that spraying has ceased to be an experiment as a means of controlling certain orchard diseases. The results above cited have been repeatedly confirmed both at this Station and elsewhere. Reference is made to the subject at this time only to emphasize the importance of using precautionary measures. Even though there be no crop of fruit, the increased vigor of the trees as a result of clean healthy foliage, will far more than repay the cost of spraying. This spraying with Bordeaux mixture should be done first before the buds burst, and again immediately after the blossoms fall, if but two treatments are to be given. If the season is very wet, however, at least four treatments at intervals of two or three weeks are found to be advantageous.

PINK ROT.

In 1902 a comparatively new fungus disease made its appearance to a very destructive extent in western New York. This disease, known as "Pink Rot," because of its pinkish, mildew-like appearance, had long been known to botanists but only, or mainly, as a saprophyte, or fungus which grows on dead or decaying matter. It did not come under the writer's personal observation until the present season; although said to have been destructive to stored apples in Maine in 1902.

The appearance of this trouble is well shown in figure 9, from a photograph of fameuse apples grown at the Station the past year. The best description of the trouble, with a full account of its life history, is given by Eustace in Bulletin 227 of the New York Agricultural Experiment Station.

The disease attacks the fruit on the scab spots, where it appears like a pinkish mildew. Later in the season, the spots become brown, sunken and rotten. If badly attacked the whole fruit soon decays. Because of its appearance only on the scab spots, many have regarded it as simply another form of the

apple scab. Others have referred to it as a parasite on the scab fungus. Eustace maintains, however, that "there is absolutely no connection between the two. The only part that the scab had in the matter was that it ruptured the epidermis (skin) of the apple, thus making an entrance for this fungus to grow into the tissue and cause the rot."

A distinctive characteristic of this disease is that the decayed spots are rather dry and corky, and not very deep. Apples thus affected might, in some cases, be used for evaporating, as the diseased portion could be removed in paring; but because of the bitter character of the rot, affected fruit would be worthless for cider.

The disease is specially destructive to stored fruit, the "sweating" of the fruit furnishing just the right conditions for its rapid development. Eustace reports that: "It was noticeable that the fruit in the bottom of large bins, such as are used about cider mills and drying houses, would become one mass of decay if allowed to remain there longer than a few days."* It was in stored fruit that the loss before mentioned occurred in Maine.

As is well known, the "scab" is ever with us, and growers have become accustomed to its disfiguring presence; but with the advent of this destructive secondary enemy, the importance of warding off the attack of both becomes imperative. Thorough spraying with Bordeaux mixture is the only safe means of preventing this trouble.

EFFECT OF AN UNBALANCED RATION?

In 1904 an obscure disease affected the fruit of certain trees in the orchard of Mr. Chas. S. Pope, Manchester. No similar trouble had ever come under the notice of the writer and this note is made simply as a matter of record. A careful study of the cause of the condition described is being carried on at the present time.

In August, when about the size of walnuts, the fruits began to crack and to drop. Marked indentations, somewhat similar to those made by *curculio*, were abundant. No evidence of insect work could be discovered, however. When the fruit was opened, the tissue under the indented parts was found to be dry

* Bul. 227, N. Y. Expt. Sta., 378.

and brown. Most of the fruit ceased to grow, and by the first of September the larger part of it was on the ground; though early in the season all the trees were well loaded. The leaves, however, appeared perfectly healthy.

At the time of harvesting, October 10, most of the trees had lost all of their fruit. Such as remained on some of the trees was, for the most part, small and deformed. Some of the fruit, however, was of medium size with one side cracked as in figure 1, and a small portion was without marked blemish. In all cases, however, the texture of the fruit was soft and spongy,—about as might be expected in April or May. The surface of the fruits was also characteristic, there being numerous minute elevations or “pimples,” corresponding to the grayish dots on the fruit. This feature is shown in figure 1, and was so noticeable that the workmen spoke of it in handling the fruit after removal to the cellar. Though a small portion of the fruit was on the trees at harvest time, it dropped so easily that no attempt was made to save it for packing. The slightest jarring of the limbs would cause it to fall.

The reason for the condition above indicated is, as already noted, very obscure. A careful microscopic examination was made without finding evidence of any fungous enemy, even in the brown dry tissue above mentioned. It was then observed that the condition existed only with certain trees included in a fertilizer experiment in which an excess of available nitrogen is applied every year. The first tree noticed was in the plat receiving nitrate of soda and acid phosphate, and later it was found that every tree on this plat, as also on the adjoining plat which received nitrate only, was affected as described. In one or two instances check trees which adjoined the nitrate plat, and received no direct application of fertilizer, showed a tendency in this direction. None of the other trees in the whole orchard, however, gave the least indication of the trouble. A fertilizer plat on which were muriate of potash and acid phosphate, and another on which was muriate only, separated from the first by only a single row of trees, were entirely free from the disease.

The supposition was therefore made that the trouble was physiological and due to the excessive amount of available nitrogen and the lack of potash. Of course this is a matter of conjecture and can be settled only by definite and careful experiment.

In partial support of the supposition adopted, is the report of Mr. P. L. Ricker of the U. S. Department of Agriculture to whom specimens of fruit and leaves were sent. Knowing nothing of the conditions under which the trees were growing, Mr. Ricker reports: * "I can make out no signs of any fungus mycelium in the apple. There is a little ordinary mould around one of the holes in the apple, but not in condition to determine. It is not connected with the disease of the apple—if it can be so called. The main trouble seems to be from the bites of curculio. * * * The apples have been in a moist chamber ever since they came but no fungus has developed yet. There is a little core rot in some of them, the cause of which is not definitely known, but it is physiological and supposed to be due to some trouble in nutrition, or perhaps some root trouble. This, however, can only be determined by examining the roots and the conditions under which the tree was growing. There are none of the fungous diseases on the leaves, either. * * * Of course none of the physiological diseases can be determined from samples of the plants sent. A careful study of them in their natural surroundings is necessary, with, perhaps, experiments looking towards the improvement of soil conditions."

The outcome of a further study of this problem may be of much interest and some importance in connection with the rational fertilization of orchards.

WINTER INJURIES TO TREES.

The injuries to trees during winter, in Maine, are usually due to the freezing of buds or young wood, and to girdling by mice. Both classes of injury have been emphasized by the severe winters of the past two or three years.

FREEZING.

The winters of 1903-4 and of 1904-5 were exceptionally severe in Maine, and as a result many complaints were made that the apple orchards had suffered more than for the previous twenty years. An explanation of this condition is not difficult; and a partial remedy is easily applied. More important than a remedy, however, is an awakening to the need of using measures which will prevent a recurrence of the trouble in the future.

* Personal letter to the writer Oct. 21, 1904.

There is little doubt that, to a large extent, the injury noted was due to the full crop of fruit borne in 1904, immediately following a trying season, and succeeded by a particularly severe winter. In the early part of the season of 1903, there was a very slight rainfall. This drought was followed late in the season by excessive rains which caused a full development of fruit buds and late growth of wood. Though the trees did not appear to suffer much after the trying winter which followed, they were doubtless considerably weakened, and the heavy loads of fruit borne in the next season left them in an exhausted condition before the second severe winter came on. From the first, the winter of 1904-5 was trying. In December there were twenty-six mornings when the mercury went to zero or below, and several times during the winter 20° to 30° below zero were reached. As a (probable) result of these conditions, the trees suffered as indicated. In almost every case coming under the writer's observation, the trees which suffered most were those which bore a full crop the previous year.

The injury was manifested by the killing of the smaller limbs, and in many cases by the death of the whole tree. The central portions of the tops of many Gravenstein trees were ruined. Many Baldwin tops were thinned. So far as observed, however, there was not a marked difference in the destruction of nursery grown Baldwins as compared with those top-worked on seedling stocks; although it is commonly supposed that the trunk of the Baldwin is tender.*

Trees which had been well cultivated and fertilized, if allowed to overbear were, in many cases, ruined. One Baldwin tree which bore 8½ barrels of fruit in 1904 (see figure 10, Bul. 122) was practically ruined. There is little doubt that had one-half of the fruit been removed from such trees early in the summer, less trouble would have been experienced.

In neglected orchards, or in many cases where good thrifty orchards were left in sod, the injured trees continued to deteriorate, and many died later in the season. In those cases where the land was plowed and fertilized, however, the trees started a new growth of vigorous shoots near the base of the main limbs, and it will be possible to build a new top on such.

*In Bulletin 269, N. Y. Agr. Expt. Sta., page 336, Eustace reports that in 1903 young nursery trees of Baldwin are very susceptible to injury by cold; and Baldwin and Gravenstein are reported as injured most by some New York growers.
Mr. F. H. Morse of Oxford County, Me., reports injury to the Baldwin trunks in winter of 1904.5.

Those orchards which were not pruned last spring should be treated *at once*; all dead wood being removed and injured branches being shortened, to give the new wood a chance to develop. In many cases, too, if a vigorous growth was made last season, cions may be set which will aid in re-forming a good top.

To prevent future injury in this way, avoid allowing the trees to be over loaded with fruit. The fact that as many barrels of fruit may be secured, with much less strain on the vitality of the trees, as a result of systematic thinning, has been fully demonstrated; and the price received for such thinned fruit will usually be enough higher to pay cost of labor. In fact the fruit must be harvested at some time, and it is wiser to remove wormy and deformed fruit in August, rather than in October.

Proper cultivation and feeding will go far toward putting trees in condition to withstand a severe winter; but in no case should cultivation be continued later than August 1st to 10th. A cover crop of some kind sown at the time of last cultivation will often aid in checking late growth of trees.

Young trees which fail to mature their wood before cold weather, frequently suffer. Such trees should have the young wood pinched back about the time of the first frost,—about the middle of September at Orono; two weeks later in the southern part of the State.

MICE.

More complaint as to winter injury by mice was heard during the past season, than since 1891. Whole orchards of bearing age were ruined. The attention of the writer was called to trees ten inches in diameter which were almost completely girdled. This condition was of course due to the very severe winter with the prevailing deep snows from early December till late in March. While so much trouble may not be experienced again for some years, it is liable to occur at any time; and the careful orchardist will not only repair past injuries but, as far as possible, prevent future ones.

Any ordinary case of girdling by mice may easily be repaired by "bridge grafting." This consists simply in trimming the edges of the mangled bark back to where it is firm and healthy, and inserting cions at intervals of an inch or two around the girdled portion. This is done by raising the bark, both above

and below the girdle, with the point of a knife, and putting under it the end of a cion which has previously been made wedge shaped at each end. The cion must be fresh, vigorous, young wood and may be of the same tree, or of any other variety. When finished the work will be as indicated in figure 6.

To prevent drying of the wood, and of the edges of the bark before the cions unite, it is well to cover the injured part with a plastic made of clay and cow dung, and cover the whole with a piece of burlap,—as an old fertilizer sack.

A tree nearly a foot in diameter was treated by the writer as described last spring, and every cion united and made a good growth during the summer.

Figure 7 shows a pear tree about thirty years old that was bridge grafted when young. It is now more than a foot in diameter and bears well every year.

Better than repair, however, is the prevention of injury to a young orchard. This may easily be accomplished by the use of some protective covering at the base of the tree. The most common materials used are wire screen, tarred paper, and wood veneer.

The protectors should be about two feet high, otherwise they are not always effective. They should also be pressed into the ground so that mice cannot crawl under. The first cost of the wire screen is greater than that of the others, but as it lasts several years, and requires no attention after the first putting on, the cost is more than balanced by reduced amount of labor.

The practice at the Station has been to get a roll of 3-foot wire cloth and cut it into strips two feet long. These strips would then make four protectors, each nine inches wide. There is an advantage in using 2-foot wire, if available, because of the selvage ends, and the reduced amount of cutting required. These strips are put loosely about the tree and held in place with small annealed wire at top, middle, and bottom.

The strips of tarred paper are put on in the same way as the wire cloth, and usually held in place with pieces of twine. It is very important, however, that the paper be removed in the spring, as otherwise the trees are in danger of scalding. The material for protecting 400 young trees with wire last year, cost \$7.50. Tarred paper for an equal number cost 84 cents,—refuse binding twine being used as tying material. The time required for applying was about the same in each case. Next spring,



Figure 4.
Oyster-shell bark-louse,—just hatched.
See page 69.



Figure 5.
Oyster-shell bark-louse,—mature form.
See page 69.



Figure 6.
Bridge-grafting of a girdled tree.
See page 76.



Figure 7.
Saved by bridge-grafting.
See page 76.

however, the paper must be removed, only to be renewed the following winter, while no further attention need be given the wire.

Strips of wood veneer, costing \$5.00 per thousand, are largely used in the western states. About 200 of them were used in comparison with the other materials named. Very little time is required for applying them, as no tying is needed, but the work must be done before freezing weather comes, or many of them will crack and be worthless.

Another protective measure which has been used with satisfactory results is the tramping of the snow about the bases of the trees after a heavy storm. This make a wall of ice which serves as a barrier. If, after tramping, a covering or mulch of stable manure is applied, there is less probability that further tramping will be needed.

Still another, and cheaper, method of protection, is to apply a coat of paint to the tree. Many fear the effect of the paint, but if pure materials are used no ill effect appears to follow. On nursery trees at the Station, white lead, zinc white, and a special preparation, "Tanglefoot," have been used. While it cannot definitely be said that any of these keep the mice away—since none of the other trees in the nursery have suffered—no injury to the trees has in any case resulted.

SUGGESTIONS AS TO HANDLING FRUIT.

Just when and how to pick fruit depends largely upon the kind of fruit, the distance it must be shipped, and the demands of the market supplied. If one is delivering fruit directly to the consumer, and catering to a so called "fancy market," he must see that the produce is in the very finest desert condition, and fully ripe before picking. Consumers of such fruit are always willing to pay an extra price for the advantage of having it in the highest state of perfection.

The process of ripening is incipient breaking down of plant tissue, and there is no well marked distinction between "greenness," "ripeness" and "decay." One stage passes into the other insensibly, and it may be seen that the riper the fruit the sooner the breaking down of the tissues (in other words decay) may be expected. Fruits that are picked when very green or immature will not break down so quickly as those that are

farther advanced. As a rule, however, such fruits never reach the most edible stage, and they frequently shrivel and become unmarketable. Many of the peaches brought into the markets of Maine are, because of too early picking, totally unfit for use, but we eat them,—and some call them good. Some of the winter apples, like Roxbury Russet, and Ben Davis, if harvested too early, will shrivel and become practically worthless before spring.

The precise stage at which fruit may be most advantageously harvested is a matter which each grower must decide for himself, in accordance with the conditions of his market. Some successful orchardists depend upon Williams' Favorite as their chief market apple, allowing the fruit to ripen on the tree and marketing only choice dessert specimens. Naturally such a course would be possible only when there is a good local market.

It may be superfluous to suggest how to pick fruit. Nevertheless this is one of the most important factors in the successful handling of the product. The hiring of cheap laborers for picking is of doubtful economy, although for many kinds of work such laborers, who will do as told, are valuable help, even though not familiar with the details of the business. In general, however, the picker should understand the importance of his work, and should bear in mind the fact that every evidence of handling detracts from the market value of the fruit. There is a general notion that any one can pick apples, but such is not the case; and every year large amounts of fruit are lost and many trees permanently injured by careless or ignorant pickers. During the past season some of the Tolmans and Alexanders in the Station orchards were rendered almost unsaleable because the pickers grasped the fruit so firmly as to leave an imprint of every finger on the apple.

It is, perhaps, unnecessary to urge that usually the apple is not ready for harvest until it will part readily from the fruit spur. The fruit should never be pressed with thumb and fingers, or thrown into a basket or bag. All fruit should be handled as carefully as would be necessary with eggs.

During the last apple harvest, in spite of the high price of fruit, the writer saw a prominent farmer carefully hand pick his Baldwins and Greenings and then pour them into fertilizer sacks to carry to the cellar. Nor, strange to say, is this unusual with

many farmers who grow a few apples as a side issue. Almost every day, otherwise good fruit is brought to market in this careless manner. It is frequently the man who handles fruit in this way who complains that fruit growing is not a profitable feature of his farm work.

Pears are frequently injured by being left on the trees too long. These should be gathered just as soon as they will part from the tree readily, and should be ripened in a cool, dark place. In the case of winter pears, the usual guide for harvesting is the time when the pears begin to drop.

SUGGESTIONS ON PRUNING.

Intelligent pruning at the right time is absolutely essential to the production of the best fruit. An unpruned tree may, in many instances, produce a larger number of apples than an adjacent pruned tree; but the percentage of merchantable fruit will invariably be smaller. Small apples contain just as many seeds as large ones, and therefore make practically as great demands on the store of plant food. They do not, however, fill the basket, nor the pocketbook, so rapidly as the others.

The amount of pruning necessary depends largely upon the location and exposure of the orchard. Trees on a warm, southern slope, freely exposed to the winds, require much less pruning than do those in a cool, sheltered location which is lacking in sunshine. Plenty of light is essential to the production of highly colored fruit. It is desirable that trees should be pruned intelligently from the time they are set, but old trees may often be given a new lease of life by judicious management. If the trees have been long neglected and require heavy pruning, do not remove all of the wood the first year. Removal of a portion of the top, thus distributing the food gathered by the roots to a smaller number of branches, tends to produce rapid growth and a renewed vigor of the tree. The removal of too much at one time, will start the growth of water-sprouts and defeat the very purpose in view.

The best time for pruning is on warm days from January to May. More can be accomplished in the longer days of March, April and May, but many prefer to go through the orchard on the crust of a deep snow. The time of year when the cut is

made has little effect on the readiness with which the wound heals, but more care is necessary to prevent injury to trees pruned when the wood is frozen.

A wound made by removing a limb heals best if the cut is made close to the trunk or branch. A stub two or three inches long does not heal, and becomes a lodging place for spores of fungi and bacteria which cause decay and death of the tree. The splitting down of large limbs may often be avoided when pruning, by sawing in from the under side first; but in every case, see that the wound is left clean and smooth. Wounds should also be covered immediately with a coat of paint, shellac, or grafting wax to keep out the moisture and the spores before mentioned.

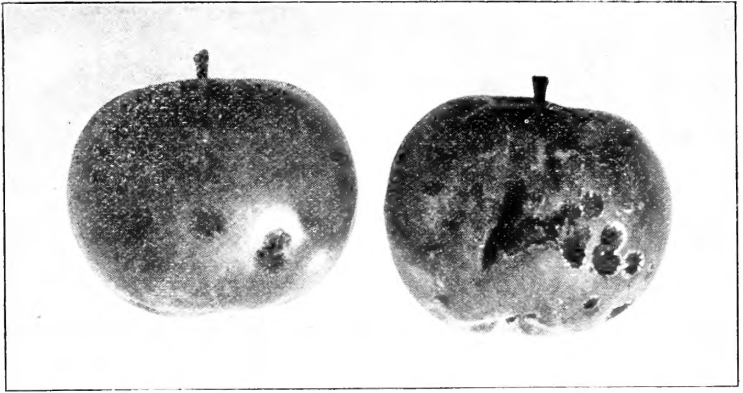


Figure 8. Apple Scab. See page 69.

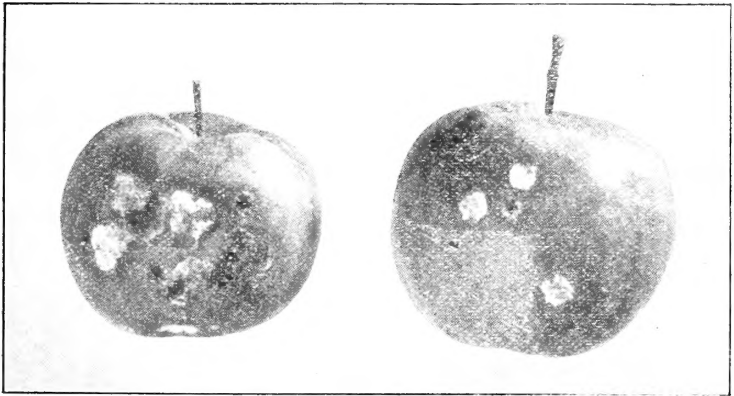


Figure 9. Pink Rot. See page 70.

