

he will soon find out which elements his soil lacks and which give him best returns. Commercial fertilizers are expensive, and require intelligent handling. Many growers have, without sufficient cause, condemned their use, while others, after studying their soil conditions are securing excellent returns for the money invested. There is no comparison between the labor involved in handling the same amount of available plant food in the form of stable manure and of fertilizer, and labor nowadays is worth saving.

Commercial fertilizers being the subject of much controversy amongst leading horticulturists, it naturally follows that considerable differences arise. A certain investigator in the United States claims that fertilizers used on an orchard in New York State over a period of 12 years produced no appreciable increase in the yield of apples. The nitrogen content of the soil in this orchard, however, was sufficient for a great many years, hence many are of the opinion the experiment did not demonstrate that commercial fertilizers would not be of any use in an impoverished soil. The high cost of fertilizers makes their application a matter of serious consideration and forethought, especially at the present time when potash is practically off the market, and others are away up in price.

The Pruning of Young Apple Orchards.

Apple growers have differed to a marked degree in their opinions as to the proper methods of treating young trees before they reach the bearing age. This is true both as regards the training and the actual pruning of the tree. Too few growers distinguish sufficiently between training and pruning, with the result that the pruning problem is intensified by the confusion likely to be created in the mind of the pruner who does not usually separate the two operations when he is using the knife or saw. We do not mean that the pruner should go over the orchard twice, but merely that he should understand clearly that when branches are being taken out of the tree for the purpose of bringing it more nearly to the shape that is most convenient for cultivation and harvesting, the tree is not necessarily being pruned for increased fruit production. In fact, some kinds of training may readily result in delayed fruit bearing and are, therefore, the direct opposite of pruning, which, as it is correctly understood, is the effort of the grower to increase the quality and the quantity of the fruit by the judicious use of the saw and clippers.

Apple growers are usually particularly anxious that the young orchards set out shall bear at the earliest possible date and the matter of handling the young tree so as to secure precocity or early bearing, has given rise to serious differences of opinion. Just as growers differ as to whether trees should be headed low or medium high, so do they differ in the matter of pruning heavily, moderately or not at all, while the tree is young. At one time it was thought that young trees must be cut back more or less heavily each year, but of late years the opinion has become more prevalent to give the minimum of pruning until the bearing age is reached. The efficiency of summer pruning also in bringing trees into bearing has been fairly widely advertised and in some orchards it has become one of the regular orchard operations of the year. It has been the practice hitherto to summer prune about the last of July or even later in some districts, depending upon when growth ceases for the season. The theory of summer pruning at this time is, briefly, that if young trees are pruned at just about the time growth ceases in the summer, the little time for growth that still remains will be just sufficient to swell some of the leaf buds (that have been formed during the season) into fruit buds that will bear fruit the season following, but that there will not be time, if the right period is chosen, for a second growth to occur. This theory was based upon apparent experimental evidence that while the fruit buds that will produce fruit for the following year are partly developed during the summer months, these may develop into leaf buds and produce branches if the stimulus to growth is too strong. The practice of summer pruning in Canada and the United States is taken from the practice of European fruit growers who successfully summer prune earlier in the season by the method of pinching out the tips of the young growth when it has attained only a short length and leaving only about six good leaves.

The pinching out must needs be done by hand, of course, and is, therefore, a very laborious operation. It does, in fact, require too much expenditure of labor for new world conditions, with the result that the adaptation explained above, was made. This European practice is based upon the primary fact that the work of the leaves in elaborating the raw food materials sent up by the roots is necessary to the continued growth of the tree and that any checking of this growth has a tendency to produce greater quantities of fruit or seed. This increased fruitfulness is, of course, merely following out the law of nature that the primary function of plants and animals is to reproduce themselves.

These problems of the grower have given rise to experiments in one form or another with the idea of proving the usefulness of summer pruning. One of these experiments it is our intention to refer to at some length in as much as it was conducted at the Horticultural Experiment Station at Vineland, Ontario. The orchard was set out in 1911 to 14 varieties of apples and the pruning experiment was begun in 1914. The orchard, it will be seen, is still young and the experiment is still in progress, but certain results are observable as a representative of "The Farmer's Advocate" was able to note on the occasion of a recent visit to the experiment station.

The 14 varieties were all treated in three ways, some trees being given summer pruning in August,

tance from each tree so that the relative size is well produced, while the three trees are all of the same variety, Cranberry Pippin. The results to date were summarized as follows by E. F. Palmer, Director of the Station, who is fair enough to point out the weaknesses of the experiment in the light of present knowledge, as well as to draw attention to the points brought out:

"The heavy winter pruned trees have made much less growth than either the unpruned or the summer-pruned trees. Moreover, the summer-pruned and the unpruned trees have been bearing fruit since 1915, which would lessen their ability to make new growth. Their real gain over the heavily pruned trees is therefore greater than actual figures would indicate. The winter-pruned trees have been much later in coming into bearing, producing in 1915 only 3 pounds of fruit for the whole block, as against 127.7 pounds for the summer-pruned block and 209.4 pounds for the unpruned block. With the season of 1919 and those intervening, the ratio of production has been practically the same. The winter pruned trees have barely started to bear as yet, while the summer pruned and unpruned trees have increased in productiveness each season. The summer-pruned trees have made considerably more growth than the winter-pruned trees and have practically held their own with the unpruned trees except in the case of the Greening variety, where the unpruned trees have outdistanced the summer-pruned trees. The unpruned trees while having made more growth than either of the other systems are on the whole becoming very dense, which increase very materially the difficulty and cost of spraying, etc. There are indications also that the fruit is falling off in color, due to the dense growth. This density of growth varies, of course, with the variety, the Spy being very thick and bushy, while varieties such as Wealthy and Duchess are quite open. Even these varieties, however, lean badly from the prevailing wind, due to the resistance offered by their unchecked growth.

"In the light of our present knowledge of pruning it will be seen that this experiment as outlined in 1914 has several objections. In the first place the consensus of opinion from various pruning experiments seems to be that so-called summer pruning given at the time that growth has practically ceased, is equivalent in its effect to dormant or winter pruning. If this is so, then our experiment is really a comparison between heavy dormant pruning vs. light, dormant pruning vs. no pruning. This points out a further defect, which is that moderate, dormant pruning has not been taken into consideration. In spite of these well-founded objections, our results, while of course, incomplete as yet, have been of very considerable value. In view of the results already given, light, annual pruning just sufficient to retain the proper shape of the tree to allow sunlight and air to get through and to keep out all crossed and broken branches, seems, therefore, to be the proper method to pursue for the young orchard until it comes into bearing. After bearing age is reached pruning will likely have to be more severe so as to maintain a proper supply of new wood each year. What constitutes severity of pruning will, of course, vary with the variety."

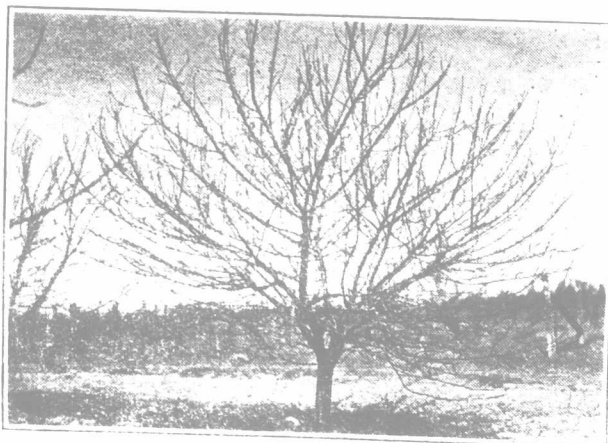
The latter point mentioned by Mr. Palmer is well instanced by the larger illustration, which shows two unpruned trees, one of Greening and one of Wealthy, standing side by side. The smaller or Wealthy tree shows every indication of bearing a good crop and the branches are not noticeably thick or dense. The other one, however, the Greening, shows a very dense growth and indicates clearly that this variety needs



The Greening on the Left and the Duchess on the Right were Both Unpruned, and Indicate that Some Varieties, Even When the Trees are Young, Require More Pruning Than Others.

others being winter pruned in March or April, while still others were not pruned at all except to remove broken or otherwise injured branches. The trees that were winter pruned were severely cut back and thinned out in March or April, the object being to form a strong framework for the tree that would be capable of bearing a heavy load of fruit when maturity was reached and at the same time form a growing tree that would be pleasing to the eye. Fruit bearing was not to be taken into consideration for at least seven years. The summer pruned trees were well thinned out in August when growth is stopping in that part of the province and the maturity of the wood is beginning to take place. Terminal growths were cut back only sufficient to keep the tree within bounds, which meant cutting back only the main branches. The object of this type of pruning, as already explained, was to promote early bearing, to admit as much sunlight to the centre of the tree as possible and at the same time not to sacrifice the natural shape of the tree any more than necessary.

The results of the experiment to date are well shown by the accompanying illustrations, which were taken so as to show the average difference between trees of the three different types that is shown over the whole of the orchard. The photographer stood at the same dis-



Unpruned

Not a single one of the greatest amount of growth has the tree attained, and it is so dense that when maturity is reached it will be heavily cut back to form the shape of a bush.



Summer Pruned

Note that this tree is neither so dense, nor so large as the unpruned tree to the left. Photos were taken at the same distance from each.



Heavy Dormant Pruning

The heavy winter pruned trees attained the least size on account of the severe cutting back they received. They were also the slowest to come into bearing.

much more pruned, the less vigor of this and similar trees, which are too heavily pruned to get them back into bearing.

From this summer-pruning effect in bringing possibly a definite light shaping, Palmer that has also been by virtue of the formed during which the crop of the fruit sets for fruit buds for beyond any point the fruit sets for this to have been by two independent and that it has from part of, so give a fine crop of fruits on the other after they are the following year.

Six acres of land to Spy, M. for the purpose of pruning. F. kinds of pruning, light, dormant, 4, heavy, dormant, age, followed into shape; 6, been borne, for tree into shape, sought that with both young and

Constru

For the far is a considerable house for the type on account vantage does not. The laying floor permanently in the barns and feeding them. During the summer should be given and if the hopper may be placed requiring an un them. For the convenient and can be is steadily becoming.

Colony house when built for type on account les to be content permanent house sweet. It is among success frequently needed. As mentioned always possible the growing of why, where 7? should not be to provide the range over the buildings will ditton for the l

Speaking of house, F. C. says: "With the at will, the p another and t a nuisance th help scatter the have a rotati helps the other with a fruit f edge of the c most advanta especially with chicks are ea headland, or houses. The hawks etc., an the grain is insects eaten.

"An added paratively sm house room is required; a as the increa otherwise go of the weathe house can be becomes too bluff, where sun.

"With m while a perm the fencing o house. Colo system of fe