

# PRUNING THE APPLE

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Among the various orchard operations it is doubtful if there is a single one concerning which there is such a diversity of opinion as that of pruning. This diversity of opinion arises not so much out of the question as to the desirability of the practice as of the matter of methods. One grower follows a certain rule in his pruning; another grower follows a rule quite different; still another follows no set rule but just prunes, hoping that his method or lack of method may be the best but not at all certain regarding what to expect in the way of results. It is little wonder that the novice, and even the man with experience, becomes confused when he listens to arguments for methods that apparently are opposite but which seem to have given equally good results in the hands of different men. Much of this confusion may be avoided by obtaining a grasp of a few simple underlying principles and then making an intelligent application of these principles to concrete cases as they arise.

## THE DIFFERENCE BETWEEN PRUNING AND TRAINING

In the first place it seems desirable to distinguish clearly between pruning and what may be termed training. Many, if not most, growers fail to draw the line between them, and here their troubles begin. They often **train** their trees very well and then think that because they have been trained they are likewise pruned, when, as a matter of fact, little or practically no **pruning** has been done. Training has to do primarily with form, with shape. Pruning has to do primarily with function, with activity. Training determines how the tree looks; pruning determines what the tree does. To illustrate:

We have one of our best examples of training in the case of grapes. Without cutting off or cutting back a single cane, it is possible to train a grapevine on a one-wire trellis, a two-wire trel-

lis, a three-wire vertical trellis, a three-wire horizontal trellis, an arbor, or in any one of a dozen other ways. The training simply gives the vine its form and has comparatively little to do with the number or size of the bunches of fruit it produces. Similarly, we make our fruit trees assume one form or another—e. g. high-headed trees, low-headed trees, open-centered trees, leader-type trees, flat-topped trees, pyramidal trees—and production is influenced comparatively little by these shapes. It is true that the pruning saw and shears are generally used in forcing the trees into the one shape or the other, but the operation, nevertheless, is essentially one of training. On the other hand, when a part of the grapevine or apple tree is cut away, production is more or less directly affected. Yield and grade may be increased or decreased very materially depending upon the kind, amount and time of the cutting. Cutting which influences function is pruning.

In this connection attention may be called to the fact that a comparatively large part of the training that trees are to receive should be given during the first several years of their growth in the orchard. It is during this period that they are building their framework and taking on the general form that the grower has decided upon and that shall be theirs during the rest of their life. During later years we seek mainly to preserve the form already given the tree, and we are correspondingly more interested in what the tree does, in what it produces. Consequently as the tree grows older and reaches bearing age we turn our attention to its pruning as distinguished from training.

## THE TRAINING OF FRUIT TREES

This circular is not intended as a treatise on training, but it may be well to discuss briefly several phases of the training question.

**Height of Head.**—By height of head is meant the distance from the ground at which the main or scaffold limbs branch from the trunk. Trees in which the scaffold limbs come from within two and one-half or three feet from the ground are spoken of as low-headed; those in which they come out from the trunk four or more feet from the ground are high-headed. The height of head generally is established at the time of setting by the distance from the ground at which the top is cut off. In the older orchards high-headed trees are the rule. It was thought that high-heading facilitated cultivation and other orchard operations and perhaps was

better for the tree. More recently the tendency has been in the direction of lower heads. If properly handled such trees are no more



FIG. 1.—A typical two-year-old Jonathan tree before and after pruning. It was originally headed at "a". Note that the scaffold limbs are well spaced. Thus far it has been trained as a closed center or leader tree. After another year it may be developed as a closed center, or modified leader tree, depending upon whether the center is encouraged or subordinated. The pruning that has been given the tree shown at the right has consisted in thinning out, only. Its shoots should be headed as indicated by the cross lines in order to encourage stockiness and prevent the tree from becoming rangy. Note that the first year the tree was pruned heavily and one result of heavy pruning has been a vigorous growth. Its pruning at the end of the second season is likewise heavy, but distinctly less severe than that of a year earlier

difficult to cultivate around and under; and other orchard operations, such as pruning, spraying, thinning and picking are greatly

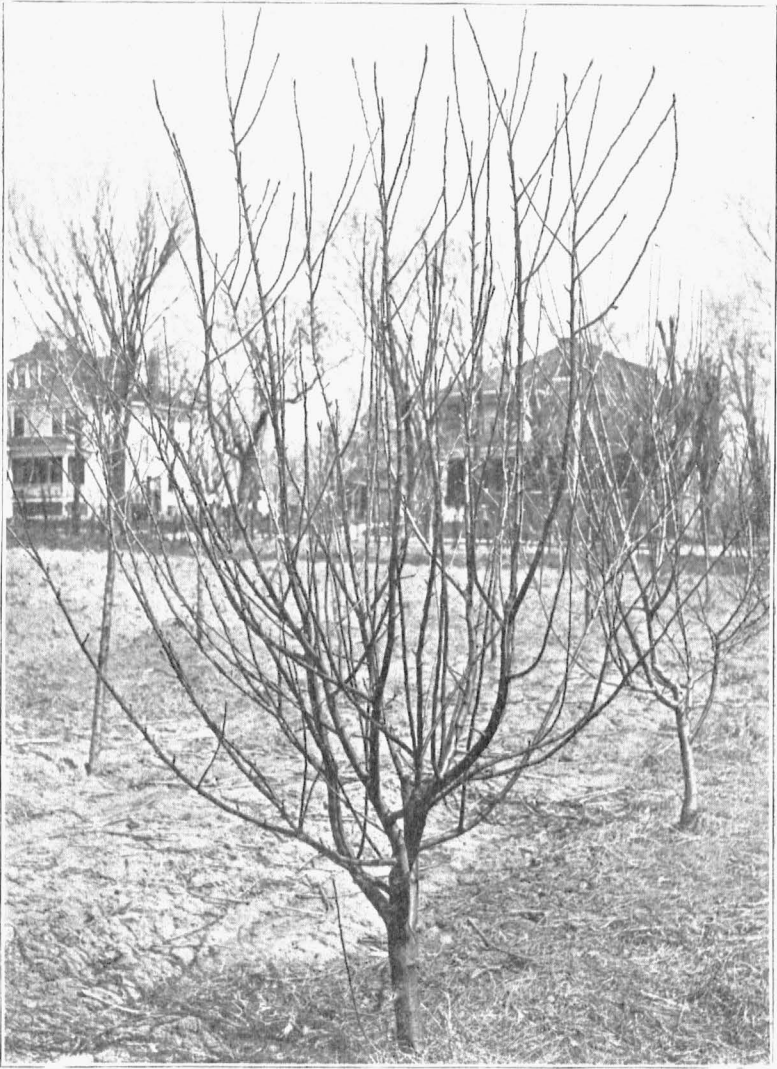


FIG. 2.—A five-year-old tree that one year ago was given a heavy pruning consisting almost entirely in thinning out. There was no heading back of shoots that were left. The center was thinned severely, so as presumably to encourage the open center type of tree. Note the large number of fruit spurs formed on unheaded shoots of last season; the new shoots of the current season spring mainly from near the ends of last season's growth. The failure to head back the shoots a year ago has thus resulted in a "rangy" tree. The large number of water sprouts springing from old wood in the center of the tree is a result of heavy pruning and the effort to develop an open centered tree by severe cutting out. This tree illustrates the evil of too heavy pruning and of no heading in the case of trees of this age



FIG. 3.—The same tree as shown in Figure 2, after pruning. Notice that there has been a moderate, but not severe thinning. The “ranginess” has been corrected partially by heading back into two-year-old wood to outward-growing laterals. This will serve to strengthen the fruit spurs and aid in developing the open centered type of tree

facilitated. Furthermore, low-headed trees are less subject to sunscald and give less trouble from high winds. They are to be recommended.

**Number of Scaffold Limbs.**—The number of scaffold limbs found in orchard trees varies from two to fifteen or twenty.

Neither extreme is to be desired. If there are only two or three main scaffold limbs they are almost certain to form crotches with each other—crotches that are very apt to split and allow one or both parts to break down. A large percentage of the injury resulting from trees breaking when heavily loaded with fruit or when subjected to severe winds is due indirectly to sharp crotches that could have been avoided by the use of more and better spaced scaffold limbs. On the other hand too many scaffold limbs give rise to thick, brushy tops that are difficult to work in. A moderate number, five to eight, makes a mechanically strong tree and at the same time one that may be kept open enough to facilitate necessary orchard operations.

**Distribution of Scaffold Limbs.**—Of still greater importance than the number of scaffold limbs is their distribution. When they come out from the trunk at points close together, as for instance, when the upper one of five is only eight or ten inches above the lower one, they form bad crotches much sooner than if they are distributed over a longer distance on the trunk. By having them distributed over a foot and a half or two feet of the trunk each limb has a chance to make more or less of a shoulder, and crotches and subsequent splitting down is avoided. It may require a little more pains to select and develop scaffold limbs that are separated well from each other, on account of the tendency of the tree to make its most vigorous growth from buds near the end of the trunk but it is well worth while. Furthermore, it should be remembered that the distribution of these limbs is determined once and for all at the time of the first two prunings and no amount of later work will entirely correct a mistake made then. If a tree is headed at a height of 33 to 36 inches it is possible to have a good number of well-distributed limbs and at the same time have a low-headed tree.

**Open and Closed Centered Trees.**—There has been much discussion over the relative merits of open-centered or vase-shaped and closed-centered or leader trees. Both forms have their advocates. Both are extensively used and both are successful—good evidence that the exact form in which we train trees is a matter of secondary importance from the viewpoint of production. Theoretically at least, the open-centered method of training admits more sunlight to the interior of the tree and thus enables the fruit to attain a higher color than is possible in the closed-centered tree. This may be a

distinct advantage in sections and with varieties where it is difficult to develop high color. It is to be doubted if it is a matter of great importance in this general region. From the very nature of the case the central-leader type of tree forms more scaffold limbs than the open-centered tree and consequently it is less prone to split down at the crotches. It is often more brushy topped than the open-centered tree but this need not be the case. It may be stated that the general method of procedure in training a tree to the central-leader type is each year to prune back the central and upper shoot or leader less severely than the lateral shoots or limbs surrounding it. If an open-centered tree is desired the opposite method should be followed. That is, the central and upper branches are cut back more severely than the outer ones. It is a mistake in attempting to train a tree to the open-centered type to cut out entirely the interior and central limbs. This merely provokes the production of water sprouts to take their place and more cutting out must be resorted to. By simply cutting back the interior and upper shoots and limbs more severely than the outer ones, the former are subordinated and the latter are made the dominant limbs in the tree. In other words, it is easier and better to grow an open-centered tree with a comparatively open center—with only a few, small, subordinate, fruiting branches in the interior—than one with a completely open or hollow center.

Another type of tree that is coming into favor is known as the "modified leader" tree. As the name suggests, it is intermediate in type between the open-centered tree and the leader tree. It is developed by training the tree to the leader type for the first four or five years and from then on treating it as one would the open-centered type. This results in a tree with a central leader some three to five feet high coming from the point where it was originally headed and then an open center above. It possesses practically all of the advantages of the two other types.

**Trees of Different Shape.**—Less attention is devoted to the general shape of the tree than to certain other features of its training. Nevertheless we occasionally find arguments for flat-topped, or round-topped trees or trees of some other shape. In general it may be stated that little emphasis should be placed upon these particular shapes. It is not a bad plan to allow the tree considerable freedom in assuming the general shape that is natural for it. Training for form should be limited to correcting minor defects rather than extend to altering profoundly the shape of trees.

## THE OBJECT OF PRUNING

There is apt to be much less misunderstanding regarding methods of pruning if first there is a clear conception of the objects in view, of the reasons why we prune. Stated in general terms pruning, in common with nearly every other orchard operation, aims (1) to increase the amount of fruit produced, (2) to improve its grade, and (3) to lower the cost of production by the bushel or barrel. To these three general objects of pruning may be added a fourth that applies particularly in the case of young trees which have not yet reached bearing age. With them it aims to assist in developing quickly a strong body and framework for the support of the fruiting wood and fruit crops of the future.

There are many other specific objects that are aimed to be accomplished by particular pruning practices; such for instance as the removal of diseased limbs, preventing limbs from rubbing, thinning the fruit, destruction of water sprouts, etc. In the last analysis, however, the attainment of these more or less specific objects is worth while only to the extent that they (1) increase production, (2) improve grades, or (3) lower production costs. Their real utility can be measured by the way in which they contribute toward these general ends; and the grower will do well to keep this constantly in mind.

## PRUNING YOUNG TREES

It has just been stated that one of the main objects in view in pruning young trees is to assist in the development of a strong framework for the later support of fruiting wood and fruit. Furthermore it is desirable that this framework be developed as quickly as possible, at least as quickly as is compatible with a proper maturing or ripening of the wood in the fall. The main scaffold limbs and their branches which go to form the framework of the tree are developed from shoots. That is, in the young apple tree the shoots of one season become the limbs of the next season. Consequently any practice which promotes a strong vigorous shoot growth in the young tree is a direct aid in building its framework. It is a well established fact that comparatively heavy pruning is a great stimulant to shoot growth, a stimulant in the sense of causing larger and stronger, tho fewer shoots. In other words, while heavy pruning does not cause the tree to produce more total shoot growth, it reduces the number of new shoots and those that do grow are correspond-



ingly longer and stockier. In the very young trees we expect to retain only a few shoots, enough to form the main scaffold limbs and their branches, and we want these to be as strong and vigorous as possible. Hence we desire only a few to form, perhaps twice as many as we wish to retain, thus giving us a choice in order to secure their best possible distribution from the viewpoint of training.

In the case of the tree a little older (3 or 4 years) we expect to retain a larger number and also a larger proportion of the shoots because then we are developing the branches and sub-branches of the scaffold limbs; and we still want enough shoots produced so that some choice may be made between them. With these general considerations in view it becomes evident that the very young tree should be pruned severely, but as it becomes older and larger pruning decreases in severity. It is impracticable to attempt to reduce this general principle to a definite rule to be followed with all trees. Good judgment should be exercised in its interpretation. However, it may be a kind of a guide to some to state that the amount of pruning to be given after the first year's growth in the orchard should in average cases remove perhaps three-fourths of the shoot growth of the preceding year; the second pruning should remove perhaps two-thirds of the shoot growth of the second season; the third pruning should remove a half to two-thirds of the shoot growth of the third season; and the fourth pruning probably should remove something less than a half of the shoot growth of the fourth season. Pruning the fifth and sixth seasons should be somewhat less severe.

When it is suggested that the first pruning should remove approximately three-fourths of the shoot growth made by the tree during its first year in the orchard, this does not mean that three-fourths of all the shoots should be cut out of the tree. Probably a third to a half should be removed, and the remainder cut back to a half or a third, or in some cases a quarter, of their length. In other words, the pruning should consist partly in a thinning out and partly in a heading-back. The same statements hold for the pruning of trees a little older, except that as the trees become older relatively more of the pruning should consist in thinning-out and correspondingly less in heading-back.

### **PRUNING THE TREE JUST COMING INTO BEARING.**

The culture, training and pruning that the tree receives during the first five or six years it is in the orchard should so develop its

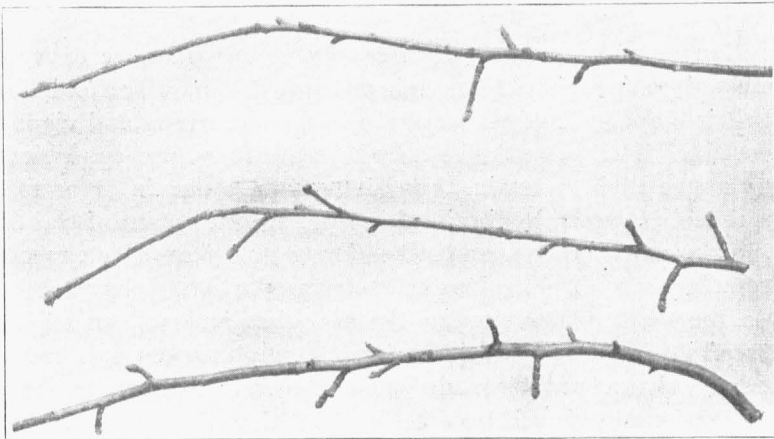


FIG. 4.—Small branches from a well-lighted portion of a bearing Jonathan tree, showing one-, two-, and three-year-old wood. Note that spurs are found on two-year and older wood. The large plump buds terminating some of the spurs are fruit buds; the small terminal buds are leaf buds

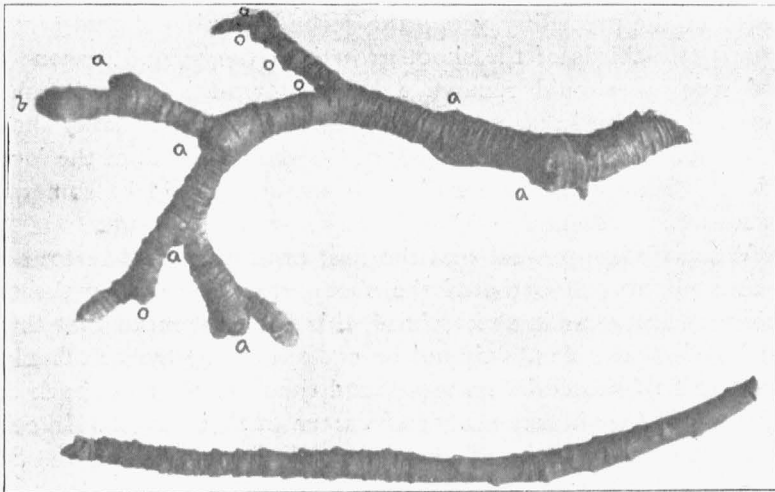


FIG. 5.—The upper spur is fourteen years old. Note the large scars (a, a, a) where fruit was borne and the smaller ones (o, o, o) where flowers, but no fruits, were produced. Even now it has a fruit bud at (b) for next year's fruiting. It illustrates the fact that old spurs may be valuable fruit producers if the tree is so pruned and cared for as to give them plenty of light and food. The lower spur is twelve years old, but it has never fruited or even flowered. It has been a "boarder" all this time and the grower should either remove it or so prune and handle the tree as to force it to bear

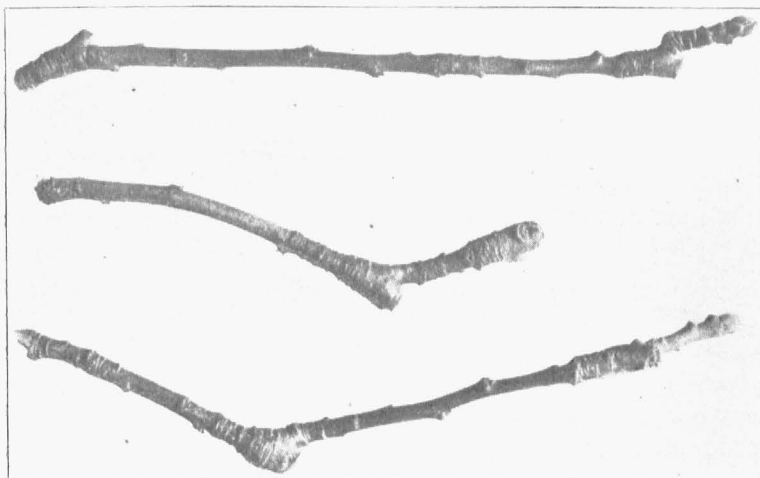


FIG. 6.—Three strong vigorous Ben Davis spurs. Note the large scars occasioned by the bearing of fruit. Note also how the difference in size between the terminal buds enables the observer to distinguish between fruit and leaf buds. The upper and lower ones have borne twice, first in 1916 and again in 1918. This past season, 1919, neither produced fruit; but the upper one has developed a fruit bud that normally would flower and fruit in 1920, while the lower one has produced only a leaf bud. The center spur fruited first in 1917 and again in 1919. All three are profitable spurs. They are from a part of the tree well exposed to light

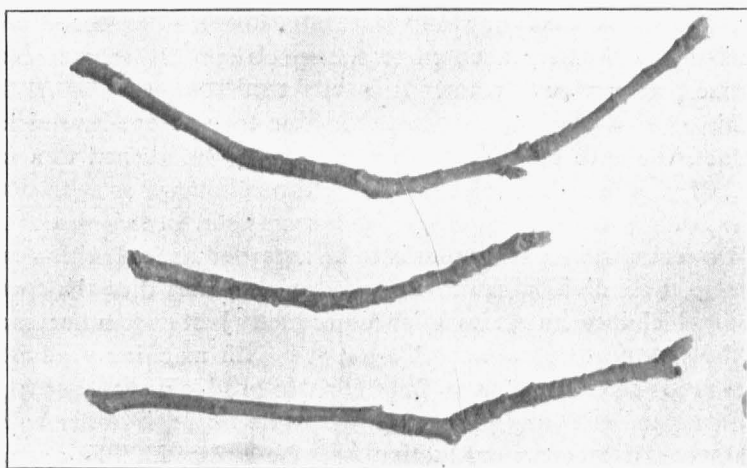


FIG. 7.—Three weak Ben Davis spurs. The upper one flowered once, in 1917, but has never borne fruit. The lower one flowered twice, in 1919 and in 1914, but has never borne fruit. The center spur, tho five years old, has never flowered. Spurs of this type are of little use in the tree. Pruning so as to permit more sunlight to reach them would tend to make them fruitful

framework and bring it to such a size that it is ready gradually to come into bearing. We are satisfied with the five or six-year-old tree if it is healthy and vigorous and if it has a good strong framework capable of supporting heavy crops in the years to come. However, the tree has not been grown for the picture of health and vigor it may present when it is five or six years old, but for the fruit that it will produce. Between the ages of five and ten years we expect the tree to come into bearing, and we prefer to have it begin bearing at six or seven years of age rather than at eight or nine. From the viewpoint of the fruit grower, this is often a critical period, for bearing is sometimes delayed two, three, four or more years after apparently the trees have reached a size and age sufficient for moderate or even fairly heavy production. Many environmental factors influence the earliness of bearing; but without doubt, the kind and amount of pruning is one of the most important determining factors.

At this point it may be well to consider briefly some of the growing and fruiting habits of the apple tree. An apple tree may be likened to a factory, in fact regarded as a factory or manufacturing plant for the production of apples. An ordinary factory, an industrial plant for the manufacture of shoes or pianos or automobiles, is more than just a building of four walls and a roof and one or more floors. Its distinguishing feature is that it is equipped with machinery, machinery adapted to the special processes that characterize that particular plant. It is only thru the operation of this machinery that the industrial plant is able to turn out its finished product. We have said that the apple tree may be likened to a factory. If so, it too must be equipped with machinery, or with what corresponds to machinery, of one kind or another. In the case of the apple tree, its fruit-spur system is to be regarded as its fruiting machinery. Its individual fruit spurs are the machines thru the operation of which it turns out its finished product. Just as it is necessary for the shoe factory to be well-equipped with machinery adapted to its needs so is it necessary for the apple-producing factory to be well-equipped with machinery adapted to its needs, in other words with spurs, if capacity production is to be realized. The average young tree of four or five years of age has practically no fruit spurs. It naturally is not prone to produce them at that age and its pruning treatment is such as practically to prevent their production. As a matter of fact we do not want spurs but rather strong vigorous vegetative growth in the very young tree. However, we want the

six- or seven-year-old tree to begin to bear and that means that we want it to have fruit spurs. If then, the pruning treatment that we afford trees their first few years is such as practically to prevent fruit-spur formation, obviously pruning methods should be changed materially when the trees reach the age for coming into bearing. One of the main reasons for trees not coming into bearing as early as they should is because pruning methods often are not changed at this critical period and consequently they are prevented from developing their fruiting machinery, or its development at least is postponed.

In the case of the apple, fruit spurs develop from lateral buds on the shoots of the preceding season. The impression should not be obtained that all the lateral buds of the shoots of any one season develop into spurs the following year. Some of them grow out into new or branch shoots; many others remain dormant. Careful study will convince anyone that it is mainly the large, plump, vigorous lateral buds that grow out into spurs. Abundant spur production, then, is seen to be dependent upon an abundance of large vigorous, lateral buds on shoots. This means in turn that at this stage of the tree's growth, pruning should not remove too many shoots. In other words, pruning at this period should be comparatively light. In extreme cases the grower may be warranted in omitting pruning entirely for a season or two so as to be sure of leaving plenty of lateral buds for fruit-spur formation, tho in general it is not necessary to go to that extreme in order to encourage the tree to equip itself with fruit-producing machinery. The facts that have just been brought out regarding fruit-spur formation suggest that if possible any pruning given should be such as will increase the size and vigor of the lateral buds, thereby causing more of them to develop into spurs instead of into shoots or instead of remaining dormant. Investigations have shown that thinning out, as opposed to heading-back, is particularly useful for this purpose, because it permits more light to enter the tree and thus the leaves well down on the shoots that have been left have a better chance to manufacture the food materials necessary for the formation of large strong buds. Pruning at this particular stage, then, should in the first place, be light in amount and in the second place should consist almost entirely in a thinning-out. This thinning-out should be limited mainly to the shoot growth of the past season, tho if it is evident that the tree is too thick and brushy it may extend to two-year-old or even three-year-old branches. This general method of treatment is

certain to result in the formation of a large number of spurs without which the tree would remain comparatively barren.

In passing it may be noted that the same general principles apply to the pruning of old trees that recently have been top-grafted, or dehorned or otherwise stimulated into the production of strong, vigorous, closely-crowding shoots. Such trees, like those newly planted, are practically without fruit-producing machinery and their treatment should be such as will equip them with it.

### PRUNING THE BEARING APPLE TREE

Since the apple tree has been likened to a factory, and its fruit-spur system to the machinery with which the factory is equipped, it may not be out of place to carry the comparison a step or two

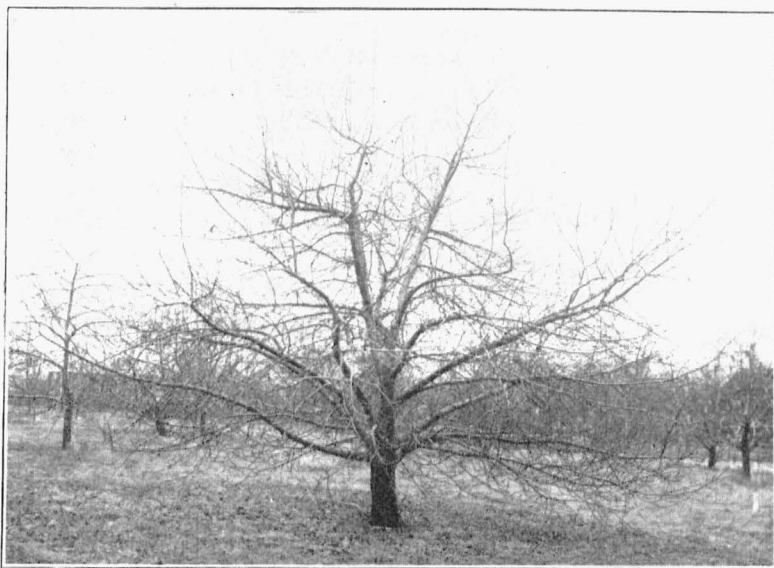


FIG. 8.—A vigorous Ben Davis tree about twenty years old, not in bad shape, but getting rather thick and brushy

further. The most perfectly equipped manufacturing establishment cannot turn out finished products unless it is supplied with the raw materials from which those products are made; and for maximum production it must have an abundant, or at least an adequate supply. Similarly the apple tree must be well supplied with the raw materials out of which fruit buds and the tissues of the fruit are manufactured if many apples are to be produced. The chemist

can give us some clue as to what those raw materials are. They include sugars, starches, acids, pectins, proteins and many other compounds. These raw materials are not obtained directly from the soil, but rather they are manufactured in the leaves out of simpler compounds obtained from the soil and air. The question of supplying needed plant foods thru the soil is one that need not be considered at this time for it is more or less distinct from the subject of pruning. However, attention may be called to the fact that it is necessary that there be the right proportion or balance between the carbohydrates (starches and sugars) that are manufactured in the leaves and nitrogen that comes directly from the soil, if fruit spurs are to produce fruit buds and fruit; and pruning is an important means of modifying or changing this balance in that it may re-

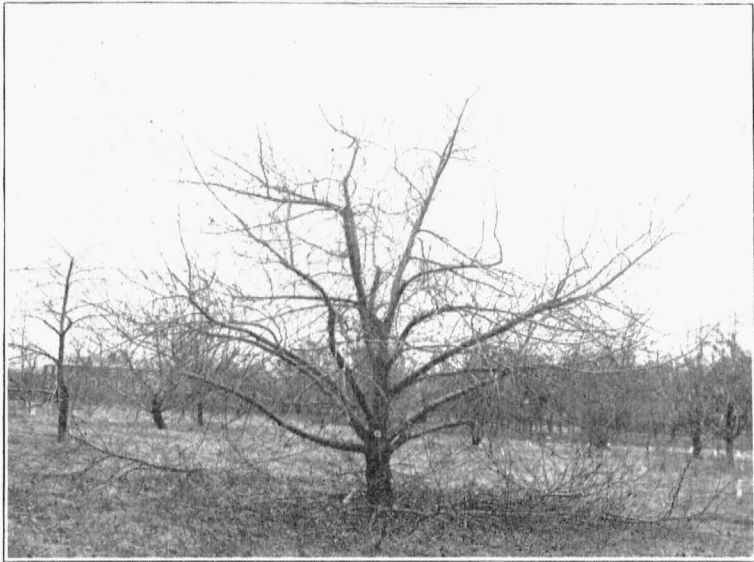


FIG. 9—The same tree as shown in Figure 8 after a medium to heavy pruning. This tree was not badly pruned, but too many large limbs and not enough small limbs were removed. It is a pruning that approaches "bulk" pruning in kind

move directly a considerable part of the carbohydrate supply which is stored largely in the top of the plant, while it leaves the nitrogen intake by the roots unaffected. Heavy pruning of over-vigorous trees in which the carbohydrate content is overbalanced by the nitrogen supply only increases the trouble, making the tree grow still more vigorously and still further delaying fruit production.

On the other hand, comparatively heavy pruning of rather weak trees that are inclined to be over-productive tends to restore the proper balance between carbohydrates and nitrogen and consequently to induce a more vigorous growth and a more normal fruit production. To return to the comparison of the apple tree with a factory, both need not simply raw materials but raw materials of the right kind and in relatively the right amounts. In the case of the tree, pruning affords a means of at least partly regulating the amount of the various materials that are available for growth and thus of regulating the type of growth (finished product) produced.

Attention has been called to the fact that the factory which manufactures shoes or rugs must have equipment or machinery and it must have raw materials. It must also be provided with motive power, for lathes and looms and presses will not turn themselves. Furthermore, provision must be made for the distribution of this motive power to each and every machine in the establishment. Likewise in the case of the tree there must be motive power to operate its machinery and this motive power must be distributed to each and every machine if the plant as a whole is to work at full efficiency and turn out a maximum quantity of a high-grade product. Sunlight is the motive power for the manufacturing processes of the tree. The supply is abundant and practically beyond any control and it might seem entirely unnecessary for the grower to give it a second thought. However, it is necessary for this motive power to be distributed thruout the tree. Careful investigations have shown that to a very great extent each individual fruit spur in the tree is dependent upon its own resources. That is, it is very largely dependent upon its own leaves for the manufacture of starches and other foods that it uses. It cannot draw upon the food supplies accumulated by spurs near by or in other parts of the tree at least to any important extent. Its manufacture of food materials is absolutely dependent upon light, hence its production of fruit buds and fruit is likewise dependent upon light. In other words it is necessary for light to strike the leaves of each and every fruit spur; and the more light that reaches each spur the better. If the bearing apple tree is left to itself its top becomes thick and brushy, little light filters thru to its lower and interior spurs, they cease bearing and finally they die. If an abundant light supply reaches them they remain alive and produce fruit buds and fruit, not simply once or twice, but many times. Such spurs are profitable. Pruning is our most effective means of letting light in to the individual spurs



in the interior of the tree, of distributing the motive power for the tree's manufacturing processes to its individual fruit-producing machines.

In the case of old bearing apple trees this is probably the most important function that pruning serves. Let the pruner grasp this one fundamental fact or principle and he will have less difficulty in deciding intelligently upon how much pruning to give a certain tree and how to distribute that pruning thruout its top. If the tree is comparatively open and spreading it needs comparatively little pruning. If it is thick and brushy it needs correspondingly more pruning. Moreover, the points that have been brought out make it clear that pruning afforded bearing trees should consist almost exclusively in thinning-out, rather than in heading-back. Heading-back serves only to make the top more dense and thus tends to shut out rather than to admit light to the fruiting spurs. It disconnects the fruit-producing machines of the tree from their motive power instead of establishing a more direct and certain connection. A limited amount of heading-back in the bearing tree may be warranted from the viewpoint of checking or controlling wayward branches—that is, from the viewpoint of training—but it is apt to do more harm than good from the viewpoint of normal fruit production.

It is also clear from what has been said that "bulk" pruning—that is, the pruning out of large limbs—has little place in the normal handling of orchard trees. Removing a few large limbs may entail less labor than removing a larger number of small limbs and it may give the appearance of a more thoro or more complete job. To the casual observer the tree looks more as if it had been "pruned." However, the removal of a few large lower limbs, about the only kind of pruning afforded their trees by some owners, accomplishes practically nothing from the viewpoint of modifying the tree's functions, for obviously these lower limbs are not shutting out light from spurs high up; and the removal of a few large limbs from the top of the tree serves only to make a few vacant spaces in the top, admitting light to spurs bordering them but not admitting of its even distribution thruout the tree. On the other hand a thinning-out of small branches thruout the top of the tree in such a manner that a more abundant supply of light is made available for each and every fruit spur, those on the lower and interior branches as well as those around the outside, will serve to make the tree as a whole more productive. Such a pruning connects up the tree's



FIG. 10.—A vigorous Ben Davis tree about twenty years old, not in bad shape, but getting rather thick and brushy.

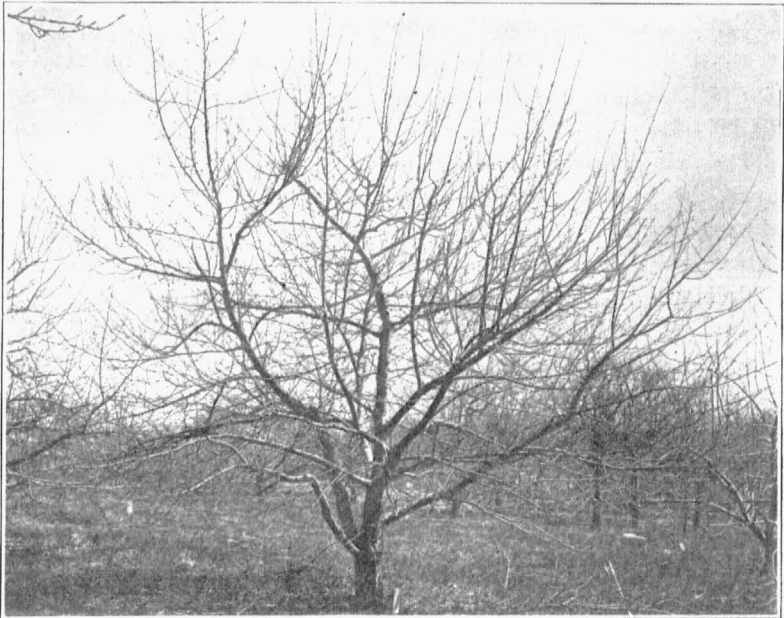


FIG. 11 The same tree after a moderate pruning, which consisted in the removal of many small limbs. This pruning was distributed thruout the top of this tree, and will serve to admit light to all of the interior and lower portions. This a better type of pruning than that shown in Figure 9

fruit-producing machines with the motive power that runs them. In severity this pruning may be equal to, or greater than, that occasioned by the removal of a few large limbs because it involves as many growing points; but in kind it is quite different. It is hardly necessary to call attention to the fact that the wounds left by a pruning of this kind are much smaller than those resulting from cutting off large limbs and that consequently there is much less danger from infection by the canker and other wound diseases.

### GENERAL PRUNING TREATMENT BRIEFLY STATED

Briefly, the general pruning treatment recommended for apple trees may be stated as follows: During the first few years of a tree's life in the orchard it should be pruned severely (starting out with perhaps a 75 per cent pruning) and this should consist in both thinning-out and heading-back, with perhaps the emphasis upon the heading-back. This heavy pruning is for the purpose of encouraging wood growth and developing the framework of the tree. As the tree becomes older pruning gradually decreases in severity until at six or seven years when it is reaching bearing age and size very little pruning is afforded; and as it gradually lessens in severity it gradually changes in kind, consisting less and less in heading-back and more in thinning-out. This general method of procedure serves to develop a fruit-spur system and bring the tree into bearing. After the tree is once in bearing pruning gradually increases in amount but continues to be mainly a thinning-out; and this thinning-out should consist in a removal of small limbs thru-out the top of the tree rather than in the removal of a few large limbs. When this plan is followed there is some thinning of fruit spurs and the fruit crop, over-bearing is prevented and the length of life, regularity of bearing and efficiency of individual fruit spurs is promoted.

### TIME OF YEAR FOR PRUNING

Ordinarily pruning is done at some time in the dormant season—after most of the leaves are off in the fall and before the buds open in the spring. Doubtless this is the best time of the year for most pruning. The tree is bare and it is easier for the pruner to see what he is doing and choose more intelligently between limbs that should be removed and those that should be left. There is more apt to be time for the work than during the growing season.

Probably it is better to prune while the tissues of the tree are not frozen as there is less apt to be mechanical injury to them from bruising, splitting, etc. Certain specific objects may be accomplished by summer pruning, but it is necessary that the summer pruning be timed just right and that particular care be taken if those objects are to be attained. At least in the case of the apple it is believed that summer pruning should be attempted only by the professional grower who is prepared to make a careful study of the subject.

### PRUNING TOOLS

A word may be said regarding the use of pruning tools. A complete outfit for pruning will consist of a pair of small hand shears, a pruning saw, a pair of two-foot shears or loppers, and a long-handled pruning shear for reaching into the top of the tree. If the suggestions made in this article are followed, the pruning saw will be used comparatively less and the pruning shears comparatively more. This is true particularly of the long-handled pruning shears. A large part of our pruning should be limited to cutting out limbs of such a size that a saw is not needed for them.

### TREATING PRUNING WOUNDS

Occasionally it is necessary to cut off a large limb, thus leaving a considerable area of wood exposed. All limbs, and particularly large ones, should be cut close to the main branch from which they spring so as to leave no stub. If the wound left is over an inch or inch and a half in diameter it should be painted with a good paint to which some kind of antiseptic has been added. One ounce of either the cyanide of mercury or mercury bichloride dissolved in a little turpentine and mixed thoroly in a gallon of white-lead paint makes a good covering for pruning or other wounds.