

Bulletin No. 47

February, 1905

UNIVERSITY OF IDAHO
AGRICULTURAL EXPERIMENT STATION

Department of Horticulture

PRUNING THE APPLE ORCHARD

By L. B. JUDSON

1905:
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BULLETINS.

The regular bulletins of the Station are sent free to all citizens of Idaho who request them. Late Bulletins are :

38. Grasses and Forage Plants in Idaho.
39. Some Experiments in Fungus Diseases in 1903.
40. Winter Spraying for the Apple Aphis.
41. Grasshopper and Cricket Outbreaks.
42. Experiments in Pig Feeding.
43. Planting the Apple Orchard.
44. Alkali and the Treatment of Alkali Lands
45. Trap Rock of the Palouse Regions. Road Material
46. The Grape Phylloxera.

PRUNING THE APPLE ORCHARD

L. B. JUDSON

Introduction

The tree is a plastic organism, and in the hands of the skilful grower can be made to conform to his needs and ideals almost as clay in the hands of the potter. The tools with which he works are less tangible, but the results no less certain. He may cause a tree to change amazingly in form, vigor, productiveness, and size and quality of fruit, by giving it better soil and taking it to a more favorable climate, and by crossing and careful selection. He may also modify it in each of these particulars by skilful pruning. For instance, pruning will quite change the form in a few minutes, and this form may be given permanence by subsequent work of the same sort. Vigor of growth may be greatly increased by severe winter pruning. The age of bearing may be to some extent hastened or retarded, and the habit of bearing only every other year changed to annual bearing, by appropriate trimming. Finally, the amount of fruit borne may be readily limited so as greatly to improve the size and quality of the product.

Nor is pruning a violent practice, robbing the tree of its vitality by lopping away its parts, and shocking its system by the infliction of many wounds. We are prone to project our own feelings into insensible things, like the child who falls to beating the chair on which it has bumped its head. We impute to the tree a sensitiveness, not to say sensibility, which exists only in our

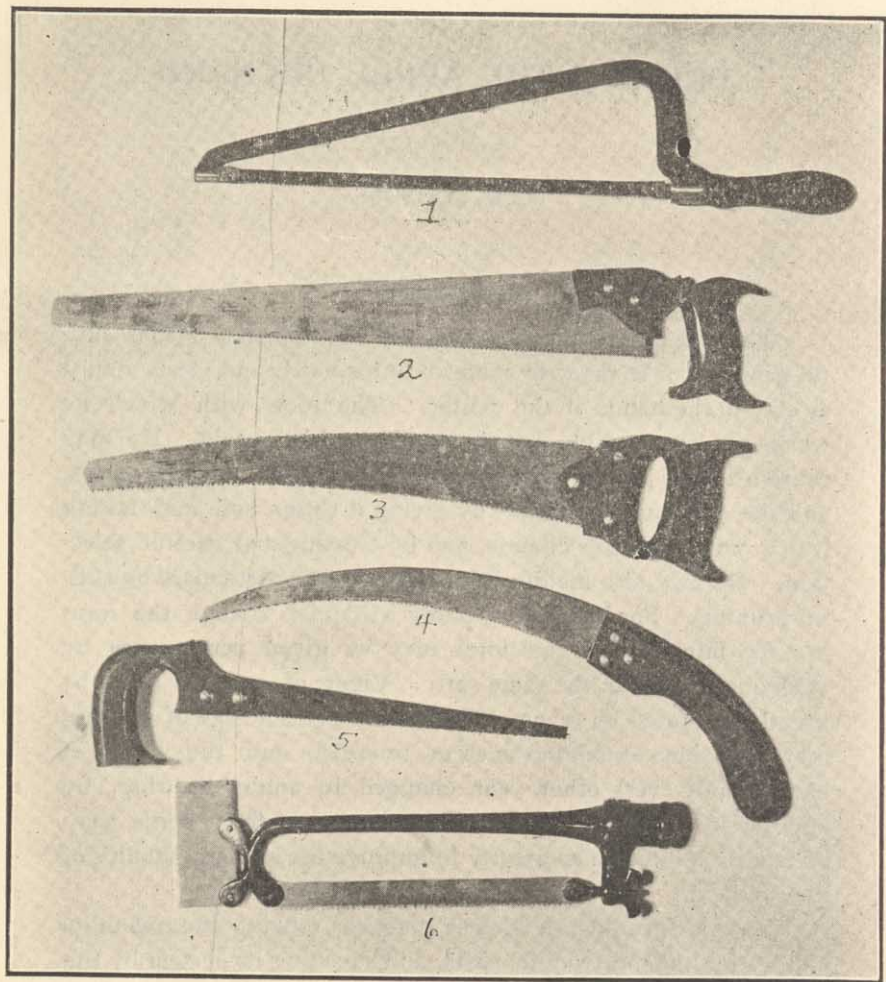


FIG. 1.—Different styles of pruning saws.

imagination. Such an idea vanishes as soon as we realize that the tree is not an individual, but a collection of individuals, or colony, each member consisting of a bud and the bit of branch between it and the bud below. These are constantly in competition with each other for food and light—a struggle in which more die than survive. Any injury to part of the top is, therefore, a direct benefit to the remainder. So by judicious pruning you may actually increase instead of impair the vigor of the top. But pruning is a practice which needs no defense. Numberless instances of pruning done by nature show it not unnatural, and the principles of plant physiology prove it not injurious; but when all arguments are in they count for little beside the overwhelming mass of testimony from those who know by experience that it is extremely beneficial.

What to Prune For.

Before touching saw or knife to a tree, you should have well in mind what you ought to accomplish by the work. Among the following are the chief objects sought in all intelligent apple pruning:

1. To restore the balance between top and roots at time of setting out.
2. To make the top open-centered, regulate the number of limbs composing it, fix it at the proper height from the ground, and do away with weak crotches.
3. In older trees, to remove crossing branches, and thin them out to admit sunlight and facilitate spraying.
4. To induce the production of fruit rather than wood, and *vice versa*; in other words, to correct shy bearing and over bearing.
5. To keep lower limbs out of the way of cultivation, and upper ones from growing out of easy reach for spraying and picking.
6. To change biennial to annual bearing; in other words, to break a tree of the "off-year" habit.
7. To correct too compact or too spreading growth of top.

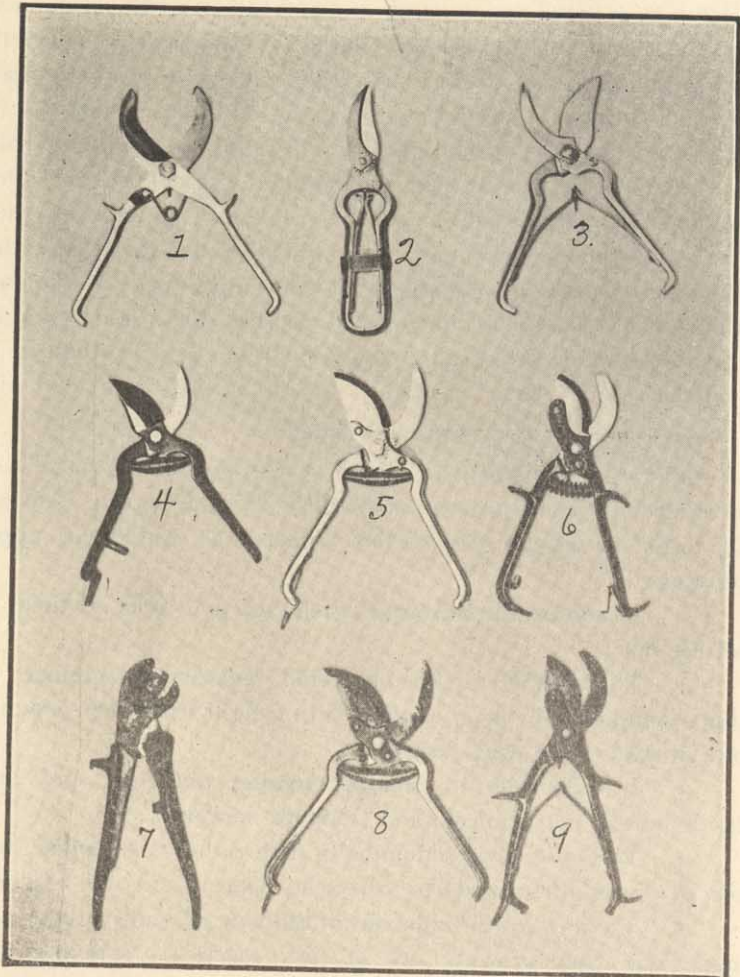


FIG. 2.—Different styles of hand shears.

Effect of Climate on Pruning Practice.

Some books and bulletins dwell on the importance of regulating pruning according to the climate, and it certainly seems good sense to head a tree low and thick where the summers are hot and rainless, but open and somewhat higher where they are moist and not very hot. Yet, though we have extremes almost as great as these within the confines of our state, I believe that one type of tree, namely, the open-centered, low-headed, is most satisfactory for every locality. I have seen plenty of sun-burned apples, but they were just as numerous on dense bushy topped trees that hadn't been pruned for years, as on open topped trees. We don't want any thick topped or high headed trees in the orchards of this state!

When to Prune.

Practically all the orchards in the state are pruned in winter, not from any well-considered convictions as to the effect on the tree, but merely because it is the slack time of the year. Winter pruning may be all right, and generally is, but the man behind the saw ought to know some better reason for it than mere convenience, and when it may with profit be exchanged for summer pruning. Generally speaking, an apple tree may be pruned any month in the year without serious injury, but there is a definite time when it may be done most advantageously. For winter pruning the best time is late winter or early spring, as the time of sap flow is then not far distant, which will start the healing of the wound and prevent excessive drying. Wounds made in early winter have to remain too long exposed to the air before they begin to close. Pruning just after the leaves fall is better than mid winter, as there is usually enough sap circulating to start the healing process before severe weather comes; but I have found in the Station orchard that trees pruned even in August, a month or two before the leaves fall, fail to close up their wounds like trees pruned in February and March. This fall pruning neces-

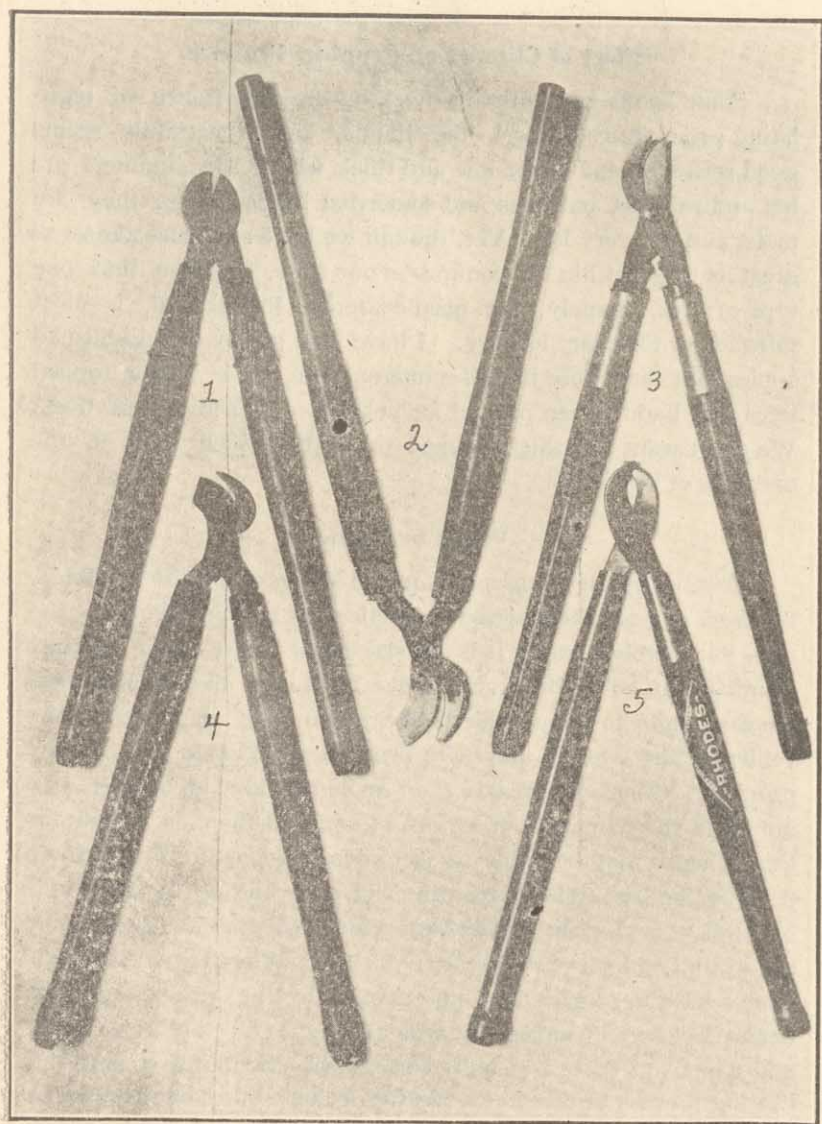


FIG. 3.—Different styles of lopping shears.

sitates going over the trees a second time early in the spring to take out limbs broken by winter storms. Summer pruning is best done in July or early in August, after the tree has practically finished its growth for the season. If done too early, it will cause the buds below the cut to break and produce a thicket of shoots; if too late, there will be no opportunity for these buds to swell into fruit buds, which is the chief object of summer pruning. This is well shown by Figures 11 and 12. The limbs in Figure 11 were cut back last May, and have developed nothing but long shoots. Those in Figure 12 were trimmed late in August a year ago, too late to thicken up any buds in B, D, and E, which put out long shoots the following summer, but all right for A, C and F, each of which developed a fruit spur, though A also produced one long shoot. The arrows mark the end of the stub. The stubs, which were removed from the trees for convenience in photographing, were cut close to the trunk to show the full length.

The effect of annual winter pruning is to give the tree a tendency to produce wood rather than fruit. In an unpruned tree there is roughly an equilibrium or balance between the top and roots, just about enough of the latter to furnish the proper amount of sap to each bud or growing part. If a third of the top is cut away the balance is disturbed, and when growth starts in the spring the roots will deliver the same amount of sap to only two-thirds as many buds, making the sap pressure on each bud approximately one-third greater. But the amount of sap pressure on any bud determines exactly the rate of growth, consequently each bud in a winter pruned tree will, under the increased pressure, make a longer shoot than otherwise.

The effect of summer pruning is just the reverse; it gives the tree a tendency to produce fruit rather than wood. A tree in the first half of summer has used up much of its reserve in putting out leaves and growing new shoots; if these leaves are allowed to remain through the season they will repay this, and store the tis-

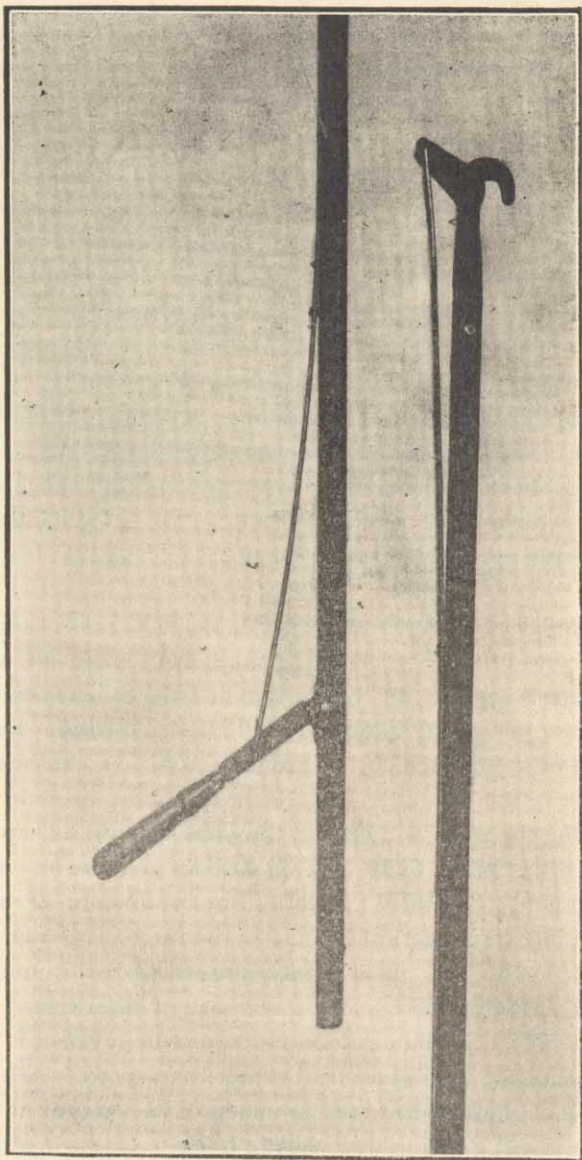


FIG. 4.—Pole shears.

sues again with food, for they are the stomach and lungs of the plant; but if the branch holding them is cut off in the middle of the season, the tree loses somewhat of vitality. Though the removal of part of the top is to a certain extent stimulating to the rest, it will not, if properly timed, as we have seen just above, (Figure 12), cause the unexpanded buds to break, but the surplus food will be deposited in and just behind them, causing them to swell to double their size, and enabling them to form flower organs. All buds are at first leaf buds, but some are later changed to flower buds by the storage of food in and near them.



FIG. 5.—Manner of pruning roots.

Thus, in a word, we practice winter pruning for wood and summer pruning for fruit. As already stated, summer pruning is scarcely practiced at all in this state, and probably will never increase much, as the tendency of trees in nearly all parts is to bear too early and too much; and even if this were not so, not one grower in a thousand would stop to putter with trees in full leaf in the busy season of picking and packing. Summer pruning and pinching are special practices useful for a petted tree in the dooryard, but out of the question for a large orchard.

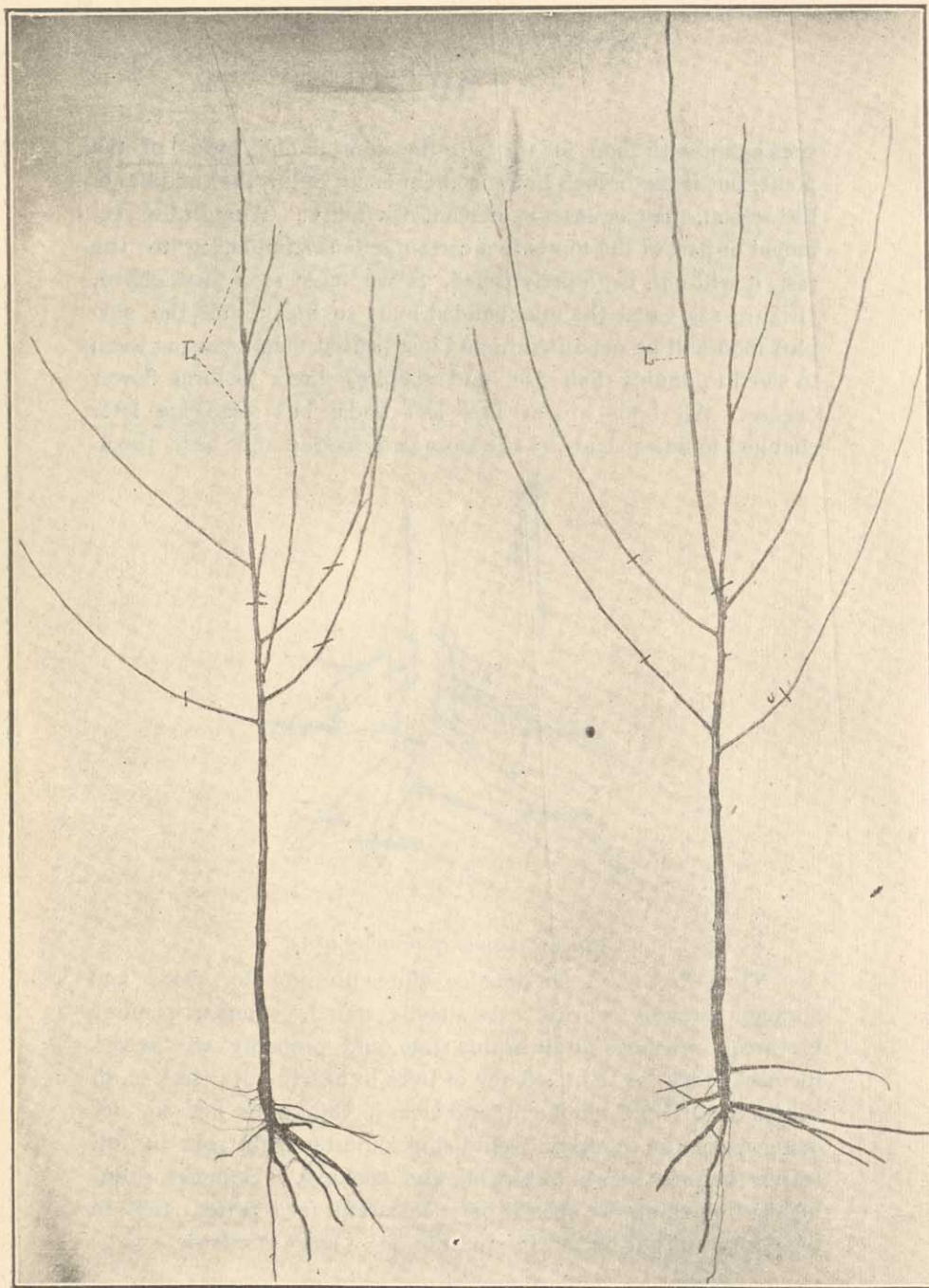


FIG. 6. —Two-year-old trees, unpruned.

Tools to Use.

Besides knowing what to prune for, and when, another indispensable preliminary is to have the tools. Some say you need none but your thumb and finger; that is, that all undesirable limbs should be pinched off while green and tender, or the superfluous buds rubbed off and never allowed to grow at all. Many practical difficulties to this plan will appear when you come to deal with broken or diseased limbs, to say nothing of neglected trees; and it is absurd to attempt to handle the pruning with such meager equipment. Some fly to the opposite of this gentle treatment, and go after their trees with an axe. The books say an axe should *never* be used for pruning, but I have seen good jobs done with this comparatively blundering tool, just as a man might kill a grizzly with a blunderbuss. Success is far from certain, but it can be done! I have also seen other cases of alleged pruning done with the axe that left the stubs looking as if a woodchuck had gnawed off the limbs. The axe may occasionally be admitted to the orchard if in the right hands, but for the great bulk of the pruning it is clumsy and dangerous.

The saw and shears are the only pruning tools worthy of much consideration. The knife is of very limited usefulness: it is convenient in trimming the roots of young trees at setting out, but not very satisfactory when used on the tops, as it often tails out a long piece of bark in cutting a small limb, and the force necessary to cut a limb the size of the little finger is apt to send it slashing through parts not intended to be cut.

There are several types of saws in common use, a fair idea of which may be had from Figure 1. The saw at the top, No. 1, is the gem of the collection, worth all the others put together. The blade is very thin, rigidity being supplied by the frame, and though it makes a very narrow kerf, it never pinches, because the blade is less than half an inch wide. You don't have to cut out a pint of sawdust to take off a three inch limb, as you almost do with such a saw as No. 4; and the way it slips through the

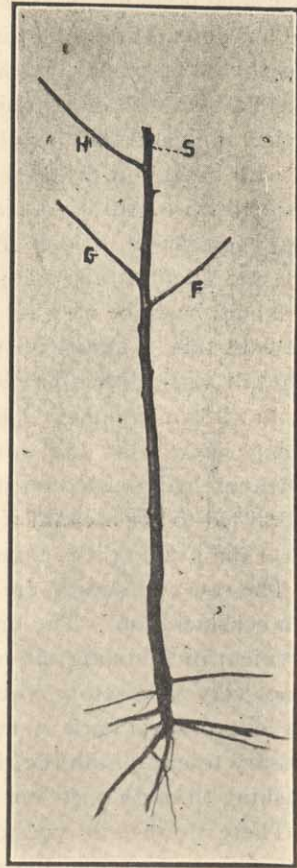
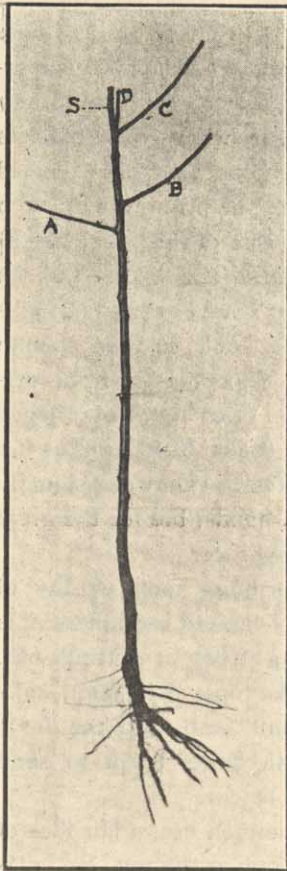


FIG. 7 — Same trees as in Figure 6, pruned.

wood will surprise you if you have been using one of the other kind. Repeatedly I have sawed through two-inch limbs without the slightest peeling down of the bark, though the limb fell unsupported and no cut was made from beneath. The saw cut so fast that I would have the limb off before it touched the ground. The trick will not work with other kinds of saws. It is the handiest saw made for cutting in difficult places, for the blade is on a swivel and can be turned to work at any angle. It will work in tighter places than the compass saw, (No. 5) and much faster. The tension is regulated by twisting the handle. Twisting to the left loosens the blade so it can be removed when dull and another substituted, as it is more economical to put in a new one than try to file such a thin, hard blade. Extra blades cost fifteen cents, and stay sharp for a long time; the saw complete costs a little over a dollar. It is evident from the shape of the frame that the saw is not adapted to extremely heavy work, as the greatest distance between the blade and back is only $3\frac{1}{2}$ inches. Limbs over three inches through would require a saw like No. 2, for instance. The only defect in No. 1 is the shape of the handle, which tires the hand when used steadily. A saw of similar design is made in California with a handle like No. 3, but the frame is so weak it buckles when heavy tension is applied; and owing to a blunder in construction the blade is drawn out of a true line when turned on the swivel. There is also a saw with a square frame, much like a butcher's saw, but it is less convenient than the triangular shape.

Next to No. 1, No. 2 is the most satisfactory design. It is narrow enough to avoid serious pinching, yet wide enough to give the requisite strength and stiffness. It cuts at least a third slower than No. 1. It is sometimes made with wide, heavy teeth like a cross cut saw, which doesn't make it any faster. No. 3 is a double-edged freak made to sell rather than use. The other edge is always ripping into the bark where you don't want it, and the slight curve in the blade only adds to its awkward-

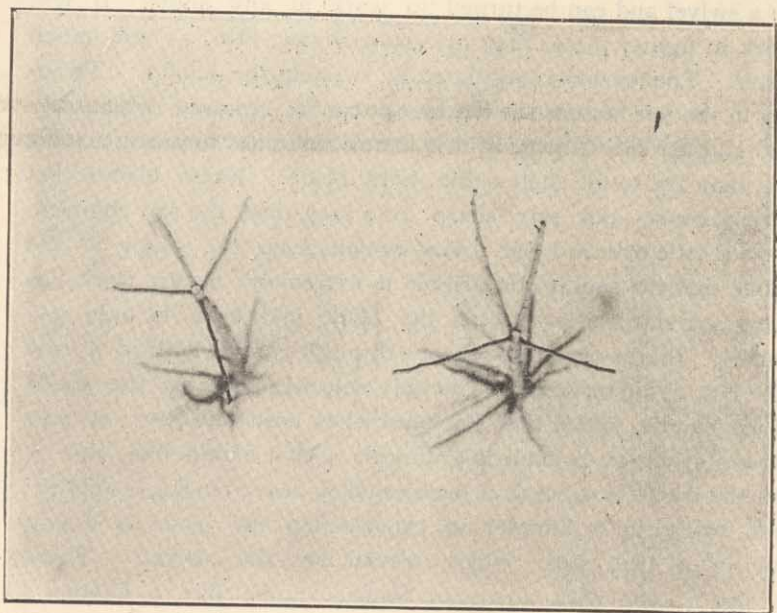


FIG. 8.—Two-year-olds pruned, viewed from above.

ness. No. 4 might have been designed by a Chinaman, so strong is its "heathen perverseness." It is not only hump-backed, but the teeth point backward, making it a most bungling tool for any one accustomed to handling an ordinary saw. The blade is thinner at the top edge to prevent pinching, but the cutting edge is thick, and makes a wide kerf that would do credit to a buzz saw; and finally the handle is very tiresome to the grasp, making it altogether the acme of awkwardness. No. 5 is simply a compass saw that is used by some pruners. It is handy in close quarters, and doesn't pinch, but it is too apt to kink and is altogether too slow. No. 6 is a compound pole saw and chisel that is chiefly interesting as a museum specimen. A socket is provided at one end for a pole, and a double-edged chisel at the other for cutting off small limbs or smoothing wounds with a thrust or pull. It would do for some kid glove farmer to experiment with, but has no place on a business farm.

Of quite as much importance as saws in a good pruning outfit are shears, and of these there is a far larger variety. A fairly representative collection of hand shears, so far as usefulness in trimming apple trees goes, is shown in Figure 2. No. 8 is a type that is perhaps more commonly used than any other, and is one of the best. No. 5 are higher grade shears of the same pattern, with the addition of a ratchet nut which insures against working loose. One man who has used these objects to the ratchet attachment on the ground that the hole drilled through the handle to receive the ratchet pin weakens the handle too much, and says he has had several pairs break at this point. But others who have used them assure me the handle never breaks, so I am inclined to think they are strong enough for any fair usage. The same grade may be obtained without the ratchet nut, if desired. Too many try to make a pair of hand shears do the work of lopping shears, putting all the strength of both hands on them, and prying and straining enough at an oversized branch to ruin the best shears ever made. No. 5 is nickel-plated and better

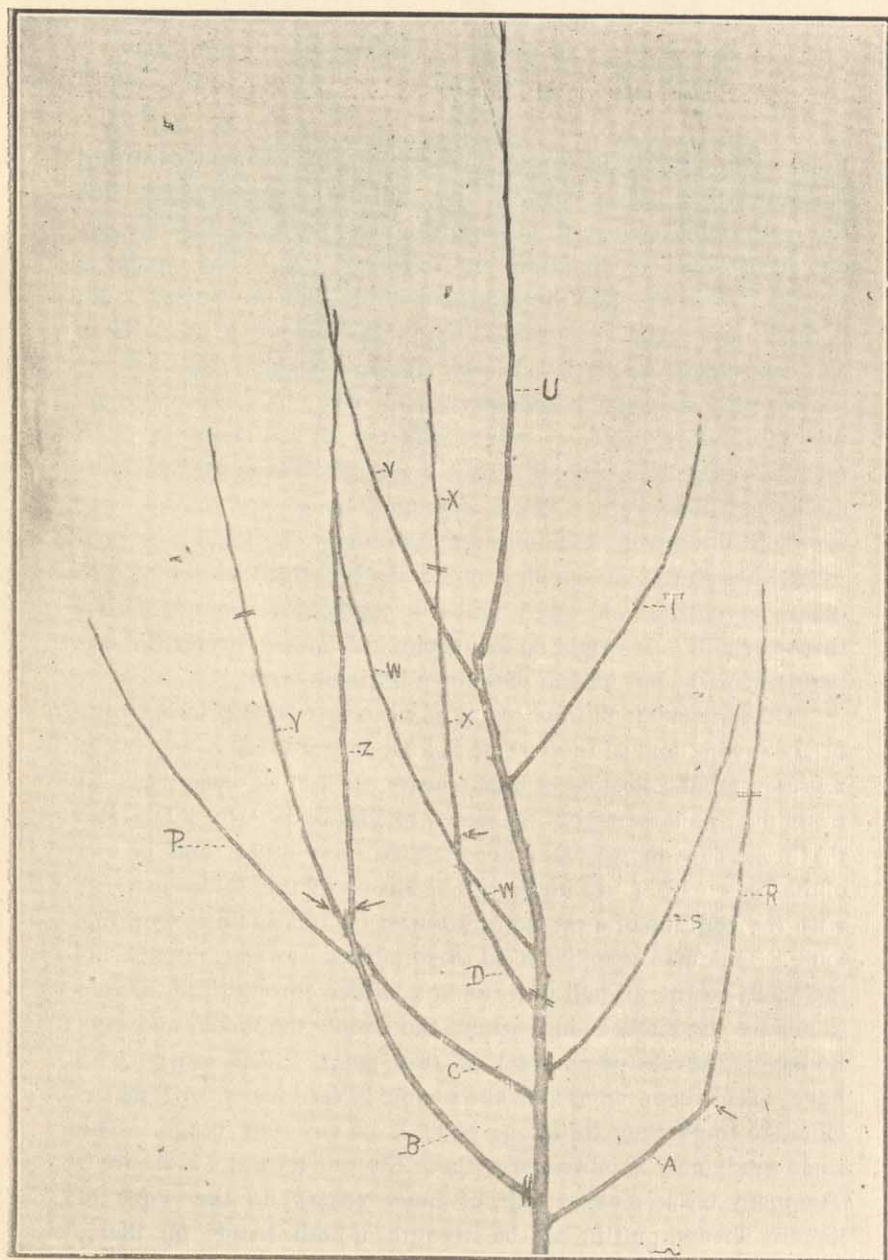


FIG. 9.--Three-year-old, with pruning indicated.

made throughout than No. 8. but costs about four times as much. The best pair in the collection, as well as the most expensive, is No. 2, the Rieser shears, an imported article of high quality, though the domestic shears of the same pattern, (No. 3), seem in all respects almost if not quite their equal, and cost only about one-third as much. In fact, the latter are in one point superior, as the guard fully protects the blade when closed, whereas the point and edge of the Rieser project beyond. Both cut more easily than any of the others, and have the advantage over No. 5 in that the blade, instead of being merely beveled, is ground down across its whole width like the blade of a knife. The blades are removable, and new ones may be had for about twenty-five cents each. The spring is not as good in design as No. 5, as it sometimes pinches the hand or glove, and the device for holding them shut (a steel C, shown in No. 2) is less convenient. All such shears as Nos. 2, 3, 4, 5, 6, 8 and 9 will bruise the bark somewhat unless the cutting blade is turned toward the tree. To prevent this bruising the double cut pruning shears shown at No. 1 have been devised, each blade being ground to a thin cutting edge. To prevent the blades cutting each other under the side pressure of the wood when passing through a limb, the points are curved so that they overlap while there is still a half inch in the clear between the middle of the blades. This is certainly ingenious, and the double cutting idea is a good one, but I have found in practical test that they are altogether too light in construction, and quickly work loose at the nut. The curved blades are also something of a nuisance, as they do not admit a branch conveniently unless open to the full width, which makes them tiresome to handle.

No. 4 is an English pattern, too small for heavy work, and not as well designed or made as No. 3. The blade and handle are one piece of steel. In No. 6 both blades are clumsy in shape, the spring is not as good as in No. 3 or No. 5, and does not open the shears enough. They do not cost much but are dear at any

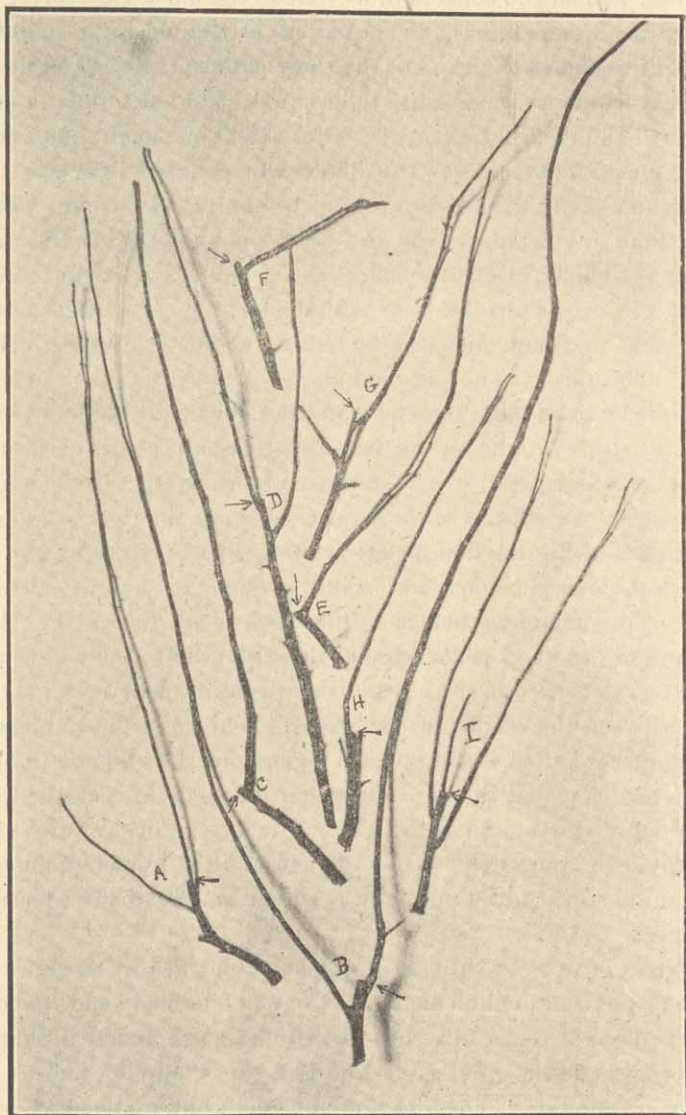


FIG. 10.—Growth of shoots from stubs left at winter pruning.

price. No. 7 is the Levin pruner. Don't use it unless you have lots of patience to fit the comparatively small opening around the limb. The handles must spread so wide to draw the blade out of the way that it is tiresome to the hand. As the blade works in a slot, the bark is always bruised which ever way the shears are turned, and it is impossible to cut cleanly and closely to the trunk. The spring is also weak and apt to come out. No. 9 are cheap and inferior shears. The blade is of poor stuff and the spring does not open them wide enough. The handles are elaborately provided with guards, which are more in the way than of any real use. The handles on Nos. 2, 5 and 8 are the best kind. All but Nos. 1, 2, 3 and 5 cost less than a dollar.

The long-handled, double-hand, or lopping shears are the logical development of hand shears to meet the need for a stronger and more powerful tool. For wood up to the size of a broomstick lopping shears are far quicker than the saw, and require far less strength than the hand shears to cut any given thickness. Some pruners who have had their forearm and wrist give out from steady use of the hand shears—and there is scarcely a man who can use hand shears all day without a swollen and painful arm—have discarded them entirely for a pair of lopping shears with short, say twelve inch, handles. They are of course less convenient in cutting small wood than hand shears, but they can be manipulated quite rapidly with a little practice, and they save the strain on the muscles, and the bother of changing shears. Several types of these shears are shown in Figure 3. No. 1, the Cronk, is objectionable because of the straight blade, which makes it cut harder and tends to force the limb from between the blades. The blunt blade is not beveled a particle, which makes it a "bruiser" of the first magnitude. The ferrules are heavier and less apt to come off than those on No. 2 and No. 4. This is a serious nuisance with the last named, for after the rings once come loose it is almost impossible to tighten them permanently, and the tang persists in coming out in a most annoying fashion.

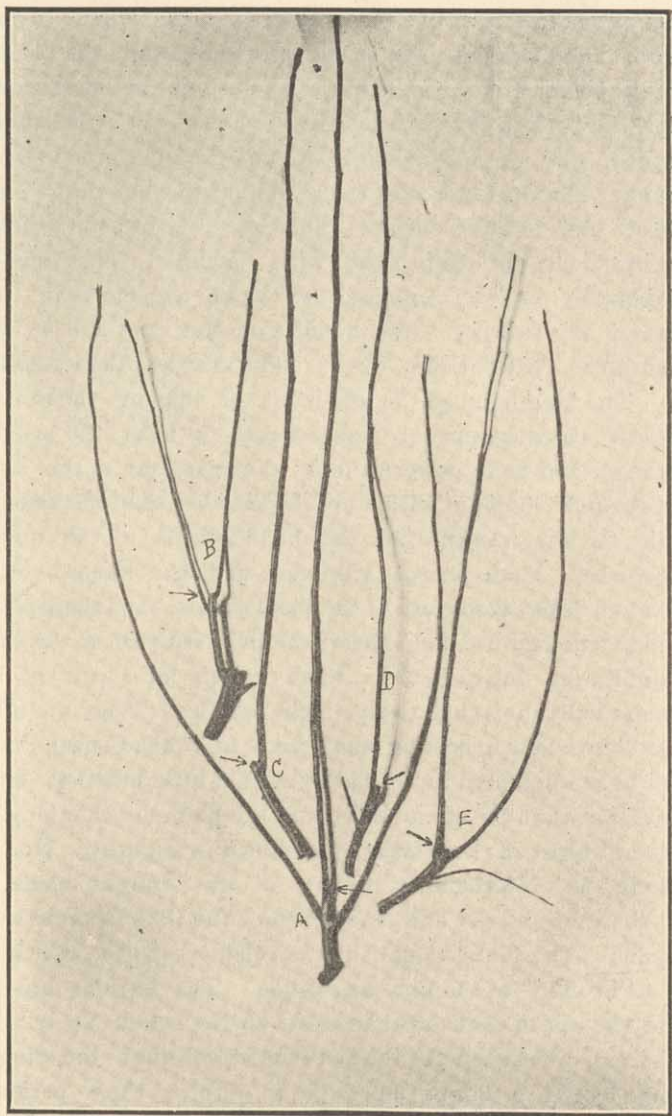


FIG. 11.—Growth of shoots from stubs left at May pruning.

The loosening of the ferrule on No. 2 has caused the handle to split where it is wired. No. 2 is a clumsy contrivance to secure a draw cut, the nut working in a slot in the shank of the blade. With so many joints to work loose the shears quickly become un-serviceable, and in the ones pictured the cutting blade actually rides right up on the blunt one. No. 3, the New Yolo, is the most strongly made and powerful pair in the lot. The blade is of good shape, works smoothly and snugly, and cuts with less effort than any other. The wire winding ensures no trouble with loose ferrules. They are altogether the most satisfactory lopping shears I have seen. No. 4 are rather light in the blades and have very poor ferrules. All four so far mentioned bruise the bark more or less, though No. 3 does least damage, because the blunt blade is rather strongly beveled; but the injury can be greatly reduced by turning the cutting blade toward the tree. No. 5, the double cut, are designed to obviate this difficulty, as already explained under hand shears. These shears appear to be well made, but the blades are too light, will not cut as large a limb as No. 3, and have to be opened too wide to admit a limb of much size. The prices for lopping shears range from 70 cents to \$2.50.

Pole shears, or telegraph pruners, as they are sometimes called, (Figure 4) are of limited usefulness in large orchards. They find their best place in the trimming of shade and other tall growing trees. Yet we have found one with a six foot pole considerable use in the station orchard in cutting out crossing twigs in the top of rather young trees. It is not easy to guide it accurately enough to cut to a bud, and one generally gives up trying after using it a short time. The Waters shears, from which the picture was made, cost about seventy-five cents.

Pruning at Time of Setting Out.

If yearling trees are planted, as I believe advisable for the reasons given in Bulletin No. 43, the pruning is very simple. The tree at that age is generally a mere whip, and the only trim-

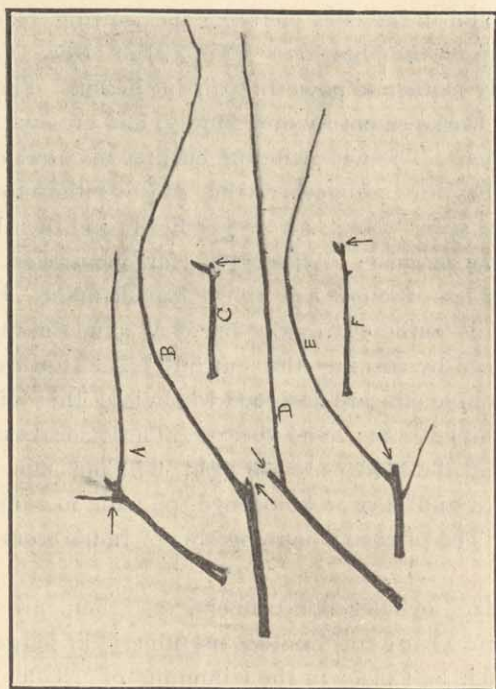


FIG. 12 —Formation of fruit buds on stnbs left at August pruning.

ming necessary is to cut back straggling roots, removing rough and broken root ends, and shorten the top to a height of three feet or a little less. In shaping up the roots it is better to make the cuts in a sloping direction from the under side so the cut surface will rest flat on the bottom of the hole, as indicated by the short lines in Figure 5. The top should be cut to a bud, that is, about a quarter of an inch above a good bud, and in a sloping direction to shed water, as shown at the left in Figure 5.

Trees two years old at planting require the same root pruning as yearlings. Don't be afraid to cut away any long sprawling roots that may interfere with ease in planting, as it will not hurt a young tree to trim the roots severely. Why, the String-fellow fellows cut off all the roots and top, too, and still get a good many of their trees to grow!

The two-year-old top will have numerous side branches, though it is a common practice among nurserymen to remove all but four or five, which usually means that you get the objectionable high-headed tree, or too close bunching of the limbs. If the limbs are properly spaced, and the first one comes out about two feet from the ground, you may accept the nurseryman's work with thanks; but my experience is that he more often mars than mends. Figure 13 shows a common type of nursery tree which has both these faults. Figure 14 shows how badly such trees may be caused to lean by the wind. This particular tree leans to the east, exposing the whole trunk to the scalding effect of the afternoon sun. The only objection ever urged against the low-headed tree is the difficulty of cultivating under it, and that is more imaginary than real. Figure 17 is headed less than two feet from the ground, yet very easy to cultivate. The head of this tree is not otherwise commendable, however, as it has too many branches forming the main framework. Your duty in any case will be to cut away enough of the top to restore the balance between it and the roots, and at the same time give the head the proper shape. The only desirable form for apple trees in this

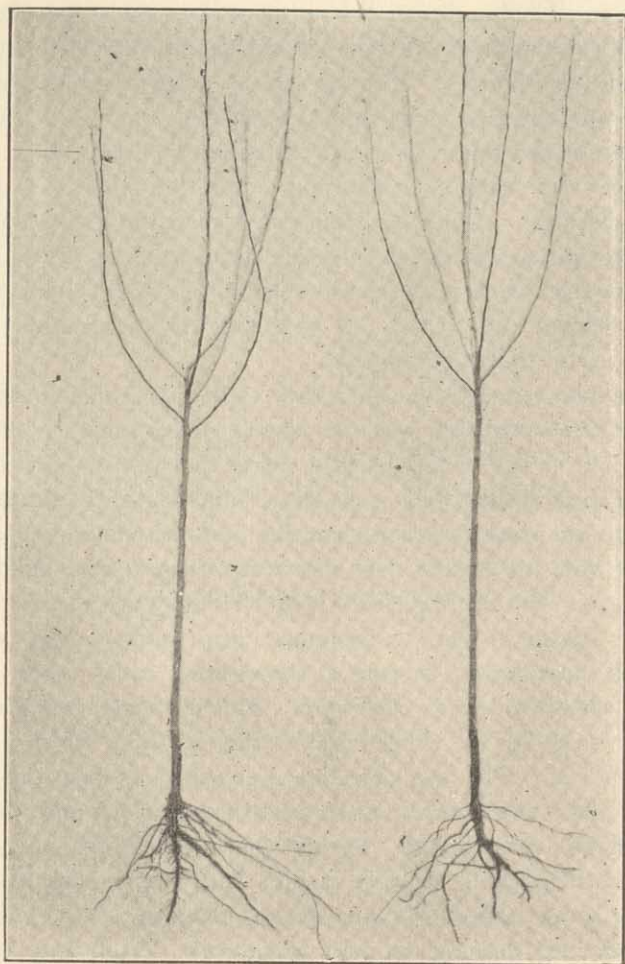


FIG. 13.—Headed too high by the nurseryman,
and limbs too closely bunched.

state, as already said, is the open-centered vase or goblet form, the central shoot or leader being cut out and three or four side limbs allowed to form the main framework of the top. In cutting out the leader (Figure 6, L) it is a good plan, especially if the limbs are not naturally well spread, to leave a stub of a few inches from which buds if any are removed, as this tends to keep the top branch from straightening up too much and forming a thick centered tree (Figure 7, S). The following winter the dead stub may be cut off cleanly at the top branch, when healing will readily take place. In selecting limbs to form the main framework, see that no two come out nearly opposite, forming a weak crotch, or one directly over another, throwing the lower into the shade. In the picture (Figure 7) C appears to be directly over B, and H over G, but this is not really the case. Figure 8, taken from Bulletin No. 43, shows how the limbs should appear (like the spokes of a wheel) when viewed from above. Having decided on three or four limbs, cut them back to six or eight inches. On very vigorous trees make it a foot, or you are liable to get a crow's nest on the end of every branch. Cut to an outside bud if the head is compact and ingrowing, but to an inside bud if it is naturally too spreading. When in doubt, cut to an outside bud. You cannot, of course, expect that this will entirely alter the habit of the tree, giving the *Yellow Transparent* the spreading habit of the *Ben Davis*, or *vice versa*, but considerable can be accomplished, as shown by the shoots R and Z in Figure 9, the limbs A and B having been cut to inside buds at the point indicated by the arrows. The shoots have taken a decidedly inward course. The shoot P shows the direction a shoot from an outside bud takes, though this no doubt would have grown up a little straighter if B had been cut off just above it. The other limbs are now removed, either close to the trunk or within two or three inches of it. If the short stubs are left they will put out shoots the following summer, the leaves on which will nourish and increase the size of the trunk, as they are the digesting organs of the plant.

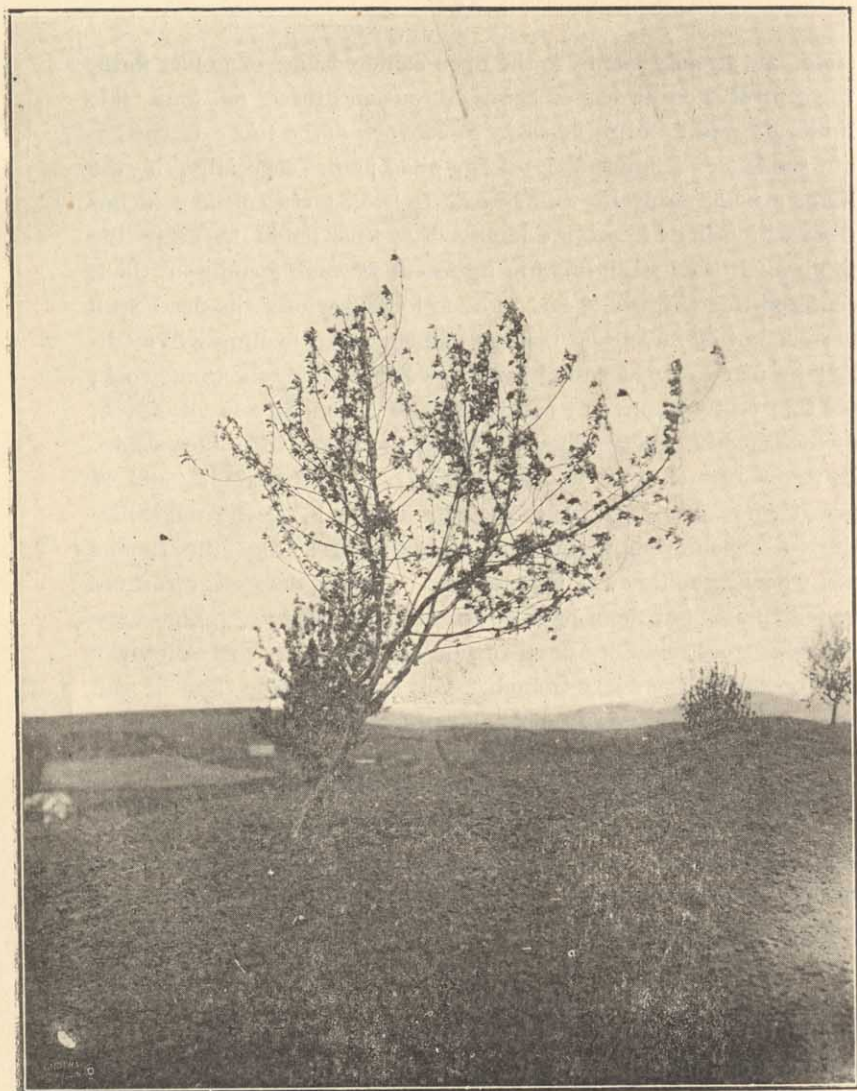


FIG. 14.—High headed tree made to lean by the wind.

But these temporary shoots are apt to be too vigorous, and rob the main limbs; so if they grow much more than six inches they must be pinched back in the summer. This involves more trouble than the average grower is willing to take, especially as young trees in this state make very rapid growth under almost any conditions, so the best treatment will usually be to cut them off clean. One grower tells me he has found the wounds heal better if the stubs are left as indicated, and cut off clean the following winter. This might naturally be expected from the tree being well established and better stored with food material, but in any case the wounds are small and close over the second season if not the first. To summarize, then, we have cut out the leader, shortened the main branches to about six inches, and removed the superfluous wood. These cuts are indicated by the short lines in Figure 6, and Figure 7 shows the appearance of the tree after they are made. This completes the pruning for this time. Trees set out as yearlings should have the same treatment after they have made one season's growth.

Subsequent Pruning.

The pruning of the following winter consists in cutting new growth back about one-third, and removing superfluous or crossing branches. The ideal is to double the number of branches each year for several years, by training two shoots from the end of each limb of the previous season, but sometimes only one shoot will be produced on each limb, (B in Figure 9 is the only limb which has produced two) and we must, perforce, be content with that. It is fair to suppose, however, that the result would have been quite different in the tree pictured, had it been properly headed, and the energy used in producing W, T, V and U thrown into the lower limbs.

A, B, C and D (Fig. 9) are the limbs left at time of setting out last spring, the arrows showing the point to which they were cut back. About fourteen inches of the leader was left above D. The shoots

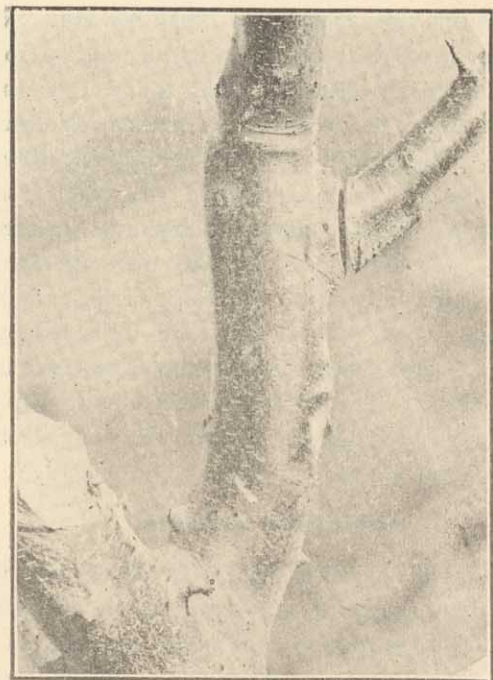


FIG. 15.—The right way to make the cut.

which grew during the summer are P, R, S, T, U, V, W, X, Y, and Z. The first thing to do in a case of this kind is to rectify the mistakes of last year. The best that can be done is to cut the stem off just above D, as indicated by the cross lines. B is a little too nearly opposite A, considering that there is a good branch D coming out in the same direction, so we remove it. The shoot S is not needed so it, too, is taken off, and finally the shoots R, X, and Y from the main branches are shortened as indicated. This concludes the pruning for this time, and there would have been less of it if the tree had been properly headed in the first place, as well as a better branched tree.

The pruning of the fourth and fifth years follows the same lines as that of the third: reduce somewhat the length of the strongest shoots, and thin out those that are crossing or crowding. As the tree gets larger it becomes increasingly difficult to follow out this plan, nor is the shortening back or "heading in" desirable after a tree begins to bear full crops. Only a moderate amount of wood growth is then desirable, and heavy bearing will tend to keep it within reasonable bounds. The pruning of older trees consists in taking out broken and diseased wood, cutting back lower limbs to keep them off the ground, (always cut these back to a branch on the upper side) and keeping the center of the tree thinned out and moderately open to the sunlight. Some say it is better not to remove shoots entirely when they become too thick inside the tree, but to cut them back to stubs of two or three buds, which will eventually form fruit spurs. Figure 10 shows how unsatisfactory this is if done at the usual winter pruning: it produced a worse growth of long shoots than ever. The result is not much better if done in May (Figure 11), and only in August are the results unquestionably good (Fig. 12). If the tree is shy in bearing and makes a rank growth of wood, it should be pruned heavily in midsummer, as already described. If it bears only every other year, either prune it heavily after the off year to remove many of the fruit spurs, or thin the fruit severely early in the season of the bearing year.

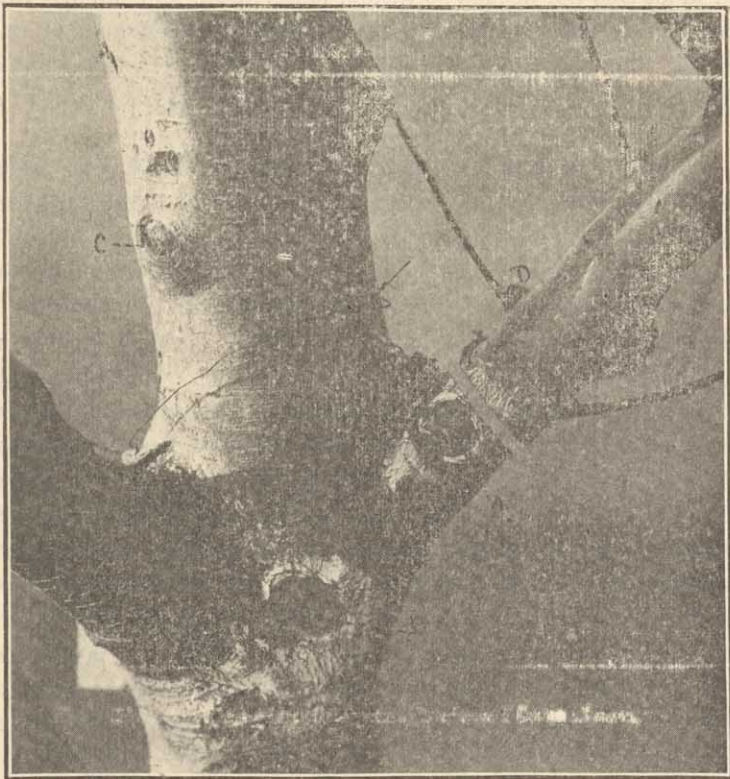


FIG. 16.--The wrong way to make the cut.

In cutting off a limb of any size, there is only one proper way to make the cut, and that is parallel to the part from which it springs, as shown in Figure 15. Some reason that the cut should be made at right angles to the limb, as shown in Figure 16, as that makes the smallest possible wound. It is true the wound is smaller, but it will take it much longer to cover over—if, in fact, it ever does—because the lower edge of it is too far out from the current of sap which is passing down the trunk from the leaves, and which supplies all the material for making new wood. Long stubs never heal over, but even a short one like this will scarcely do so. Painting the wound does not hasten the healing very much—though certain rows in the Station orchard which have had their wounds painted show less drying of the bark around the edges—but it prevents the decay of the heart wood. Common lead paint may be used to advantage on wounds over an inch in diameter, and should always be applied to very large wounds. A wound six inches across will not cover in years, since new tissue is not formed over the whole surface, as when an arm is amputated, but only by the cambium layer, which forms a thin ring around the edge of the wound just inside the bark. This rolls out a thick ring of wood and bark, which gradually folds in and covers the heart wood of the branch, which is dead even in growing branches. A, B, and C in Figure 16 are good examples of well covered wounds. Some pruners take pains to make the cut just outside the collar or swelling usually found at the base of the branch, believing such a one will heal more rapidly. Better practice would be to cut as close to the tree as convenient, paying little attention to the collar. The wound may be slightly larger, but it will heal faster. Besides there are always a few bud-germs concealed under the bark about the collar, and these are quite likely to throw out water sprouts if the collar is carefully spared. The collar was saved at D and E in Figure 16, and each has produced a lusty sprout. On the other hand, it has been found by some that cutting too close tends to leave a hole in

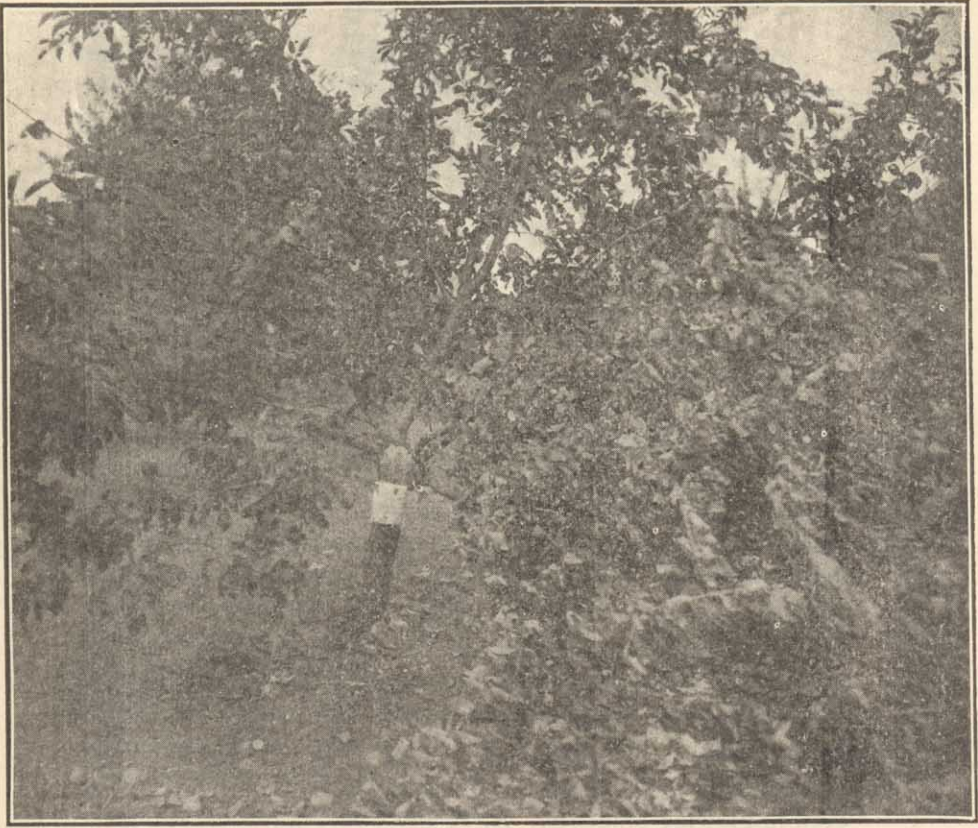


FIG. 18.—Weak crotch formed by limbs all coming out at about the same height. A large limb has split off under the weight of fruit, and ruined the tree.

the tree. An intermediate course is, therefore, probably the best, cutting into the edge of the collar, but not wholly removing it. (Figure 15).

Old neglected trees that are choked with wood and bear great loads of small worthless fruit may be restored to usefulness by severe winter pruning, thinning out the center and cutting back all over the tree. Trees that have become inconveniently tall should be shortened back in August; if done in winter, the top will become a thicket of ungainly shoots.

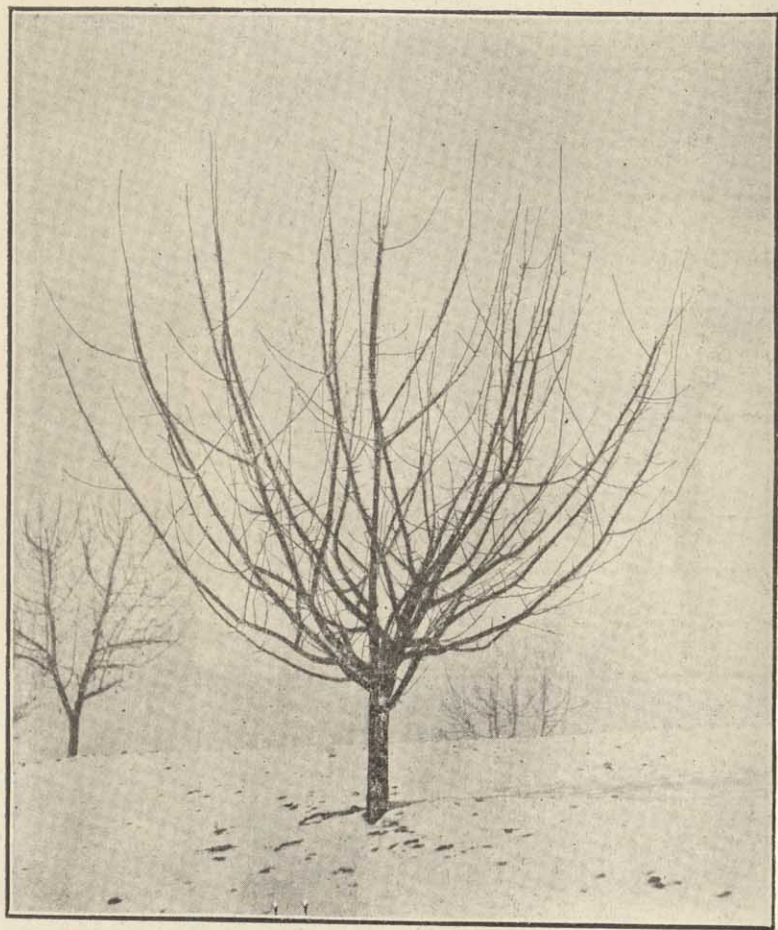


FIG. 17.—Headed low, but easy to cultivate.



FIG. 19.--Nine-year-old trees which have not been pruned for several years. Cultivating and spraying are out of the question.