The pruning of fruit trees—part 3, the pruning of deciduous fruit trees

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THE PRUNING OF FRUIT TREES
By H. R. POWELL, B.Sc., Agric., Superintendent of Horticulture

PART 3—THE PRUNING OF DECIDUOUS FRUIT TREES

In the first two articles of this series some time has been spent discussing the principles involved in pruning, and the importance of providing a satisfactory framework to the orchard tree. Consideration will now be given to the fruiting habits of the various kinds and varieties of deciduous fruit trees, and an attempt will be made to indicate in a general way satisfactory pruning treatments.

It must be emphasised however, that no article of this nature can provide the solutions to all the difficulties that will be encountered when the inexperienced pruner commences to use the secateurs on his trees. The only sound basis for ultimate success is a knowledge of the fruiting and growth characteristics of the trees to be pruned, together with experience of local conditions. In the commercial fruit growing districts, district Horticultural Instructors are available and willing to assist any new or old grower with demonstrations and advice.

PEACHES AND NECTARINES

The growth and fruiting characteristics of peaches and nectarines are identical, and the observations made in this section will apply equally to both kinds. This is understandable when one realises that the nectarine after all is but a smooth-skinned peach.

The foliage of a well-grown peach tree is luxuriant and dense and it is necessary during the early framework prunings to ensure that the leaders are not crowded. The usual number
varies from six to ten and ample space must be left between them to permit the annual growth to develop and mature properly. (See Figs. 40, 40A and 41.)

There are many varieties of peaches and nectarines grown in this State ranging from early varieties maturing in time for the Christmas market to late sorts ripening well into April. Individual treatments vary a great deal and moreover, pruning treatments which give good results in one locality, may have to be modified to meet the requirements of another. Consequently a new grower should always ascertain from the district Horticultural Instructor or from neighbouring growers, the specific treatments for the varieties he is growing. Some differing varietal treatments will be mentioned later on.

The Annual Wood Growth

The annual wood growth consists of wood shoots, laterals, fruit spurs, leaf spurs and water shoots. A general description of these parts was given in Part 1 and the treatment of wood shoots and water shoots was outlined in Part 2. As the laterals and spurs have specific functions on peach trees, some detailed knowledge of their structure and behaviour is necessary before the trees can be confidently pruned.

The crop is carried each year on the laterals and to a lesser extent on the fruit spurs, produced during the preceding season's growth. This means that sufficient fruiting wood must be left at each pruning to carry a satisfactory crop and at the same time provision must be made for new growth renewals to carry the following season's crop. On vigorous trees adequate crops can be produced with little or no pruning, but the time will come when the fruiting wood becomes weaker and weaker until cropping is greatly reduced (see Fig. 2). Once the laterals complete their second year they are, apart from the production of secondary laterals and fruit spurs, of little use for fruit production (see Figs. 43, 47, 53, 55 and 57).

The general term "laterals" refers to the weaker and more horizontal growth. With peaches this growth includes fruit shoots and the fruit and leaf twigs. There are however transitional stages when it is difficult to distinguish the fruit shoot from the wood shoot. Vigorous wood shoots however usually bear secondary laterals, which is not the case with the fruit shoot. At the same time there are transitional stages between the fruit twigs and fruit shoots and between the fruit twigs and leaf twigs and so on. However the growths are sufficiently distinct to make the following definitions:

Wood Shoots.—These are strong growing, upright shoots essential for the extension of the leaders and the formation of subsidiary leaders when necessary. Secondary lateral growth is common on these shoots. Flower buds are often associated with the leaf buds, one on each side, but fruit however rarely sets on these vigorous shoots (see Figs. 51, 52 and 61).

Fruit Shoots.—These shoots are the main fruit bearing parts of the tree. Their length varies with the age and vigour of the tree and they are often inclined to the horizontal in growth. They are fully clothed with leaf buds and should be pruned, new growth can be expected to take place from leaf buds during the following growing season. On many varieties each leaf bud is associated with two flower buds, one on each side of the leaf bud, but on others the flower buds are only found towards the ends of the shoots (see Figs. 43, 44 and 47).

Fruit Twigs.—These growths are weaker and more twig-like than the fruit shoots. They also differ from the fruit shoots in that the flower buds are placed singly and the leaf buds are usually found at the extremities of the twigs. Should the terminal leaf bud be removed, the twig will be unable to mature any fruit that has set, and will eventually wither. When too numerous the twigs should be thinned out and those not wanted cut back to basal buds (see Fig. 42).
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Leaf Twigs.—These twigs are similar in growth to the fruit twigs but all the buds are leaf buds. On most trees however there are transitional stages, where leaf twigs can be found with some flower buds and fruit twigs with some lateral leaf buds (see Fig. 42).

Secondary Lateral.—When a fruit shoot is pruned back or left unpruned, the subsequent lateral growths produced during the following growing season from one or more leaf buds, are known as secondary laterals. They are also formed on strong wood shoots during the current season’s growth (see Figs. 44 and 51).

Fruit Spur.—These short spur-like growths, bearing flower buds, like modified fruit twigs, are more common on some varieties than others. They are of value for fruit production but often do not persist for more than one season (see Fig. 43).

Leaf Spur.—Leaf spurs like modified leaf twigs are usually devoid of flower buds and are of little value for fruit production. When numerous, they indicate weakness in the growth of the tree.

Flower Buds.—These buds are easily picked out, being larger and plumper than the leaf buds. Should a flower bud develop properly it will give rise to a single fruit but in some instances ‘twin’ fruits are produced (see Figs. 42 to 50).
Fig. 44.—At the previous pruning the fruit shoot was spurred or cut back to several buds. Cuts should be made wherever possible to underneath buds. The reasons could have been that the variety set satisfactory crops with short pruning, or that the shoot was shortened back for renewal growth during the following growing season. As a result of growth during the past growing season, two secondary laterals were formed; both are fruit shoots.

TREATMENT OF THE ANNUAL WOOD

Hard unintelligent pruning will cause stunting of the tree and delay cropping. Most of the annual growth consisting of strong water shoots and wood shoots, will have to be cut away at the next pruning. Growth will be dense and any suitable laterals will be too shaded to develop properly (see Fig. 2).

Should trouble be experienced in coping with strong growth on vigorous trees, even with the more orthodox treatments, the leaders should be left untipped until some stability has been reached. Young trees in their third or fourth year often make vigorous growth, and this growth can be utilised to better advantage by retaining the leaders untipped (see Part 2 and Fig. 28).

Leader extensions—current season

The leaders are extended each year by suitable wood shoots and other wood shoots are suppressed as was discussed in Part 2 (see Figs. 51, 52, 60 and 61). The wood shoots selected for leader extensions on the younger and more vigorous trees will carry secondary laterals and their pruning treatment is important (see Figs. 51 and 52).

The objective in pruning these secondary laterals on the leader extensions is not so much for fruit production, though some fruit may be carried, but it is to ensure that some suitable lateral growth is available the following year for fruit production.

Fig. 45.—Suggested pruning treatment of shoots shown in Fig. 44, the variety being normally short-pruned. It will be noticed that renewal growth is more or less automatic with a short-pruned variety. Secondary laterals nearest the framework branches or more suitably placed, should always be chosen; the remainder being cut away. If the reason at the previous pruning had been for the purpose of renewal growth, the suggested pruning treatments are shown in Figs. 46, 48 and 49.

Fig. 46.—Suggested pruning of similar shoots to those shown in Fig. 44, the variety being a long-pruned one. The secondary lateral nearest the leader is shortened back again—in some instances it may be inconveniently placed and the reverse action may have to be taken. The purpose is for renewal growth similar to Fig. 44. The other secondary lateral is retained and left long for the purpose of fruit production during the following growing season. At the next winter pruning the results of this treatment will be similar to those shown in Fig. 47.
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Fig. 47.—The results of one growing season of the previous treatment, similar to the illustration shown in Fig. 46. The fruit shoot left for fruit production has carried its crop and is of no further value. The renewal growth is similar to Fig. 44 and the suggested pruning treatment is shown in Fig. 48.

The secondary lateral growths on vigorous wood shoots are usually numerous, as is well illustrated in Fig. 51. This illustration shows an unpruned wood shoot on a young Rowes Red Slip and Fig. 52 illustrates the pruned shoot. It will be noticed that the laterals at the top of the pruned shoot have been removed to ensure that growth from the topmost bud on the leader will not be challenged. Though the laterals have been cut back, it is very probable that some new growth will be forced out from one or both of the two buds at the base of each shoot. Other laterals have been "spurred" or cut back to the nearest sound bud from their attachment to the leader. This is to ensure that fresh lateral growth will be made during the next growing reason. If they were cut back in the same way as the topmost laterals, it would not be certain that the basal buds would be forced into growth.

Fig. 48.—The result of pruning the shoots shown in Fig. 47. The old fruit shoot has been removed and the same procedure as shown in Fig. 46 is repeated. With care this treatment can be repeated year after year. It is similar in principle to the "rod and spur" method of pruning some varieties of grape vines. The same procedure can be adopted with medium-pruned varieties, though many of them produce secondary laterals fairly freely and it is only a matter then of cutting back to those nearest the leaders. The two-year-old lateral shown in Fig. 43, could be cut back if there was a dearth of other suitable shoots, to one of the fruit spurs or to the fruit twig or to a fruit shoot had it been available. Some renewal growth can be expected during the following season (see Fig. 49). Fruit shoots on short-pruned varieties are normally cut back to approximately 3-4 in., medium-pruned varieties 8-10 in. and long-pruned varieties 18 in. If the shoots approximate to these lengths on the medium or long-pruned varieties, the terminal buds are usually retained. Pruning cuts should normally be made to underneath buds to minimise the possibility of strong growth.

Fig. 49.—A two-year lateral similar to the one shown in Fig. 43, shortened back. Some renewal growth can be expected during the following season from dormant buds or leaf spurs. Often the growth cut back to, is a fruit shoot and not a fruit twig. If this is so, secondary laterals can be expected to be produced.
In this instance four laterals have been retained for fruiting purposes and to spread the new growth over a greater number of buds to minimise the production of excess wood shoots. The fruit twig on the right hand side has been retained untipped but the stronger fruit shoots have been shortened back to approximately half their length.

The terminal growth on the leaders decreases in vigour as the trees become older. There is a cessation in the production of secondary laterals and the wood shoots become indistinguishable from the fruit shoots (see Figs. 64 to 67). When this occurs the leader extensions can be shortened back as was discussed in Part 2. With the weaker extension growths however, it is preferable to leave them untipped and to cut back the leaders at the next pruning, to other suitably placed shoots (see Figs. 62 and 63).

**Leader extensions—older wood**

On the older wood of the leaders—previous year's extensions—the objectives in pruning are firstly fruit production and secondly to ensure each year sufficient new growth is made to maintain fruitfulness over the period the tree is a productive unit in the orchard. The laterals must be replaced each season and the renewals should be kept as close as possible to the framework branches. The degree of severity in shortening the fruit shoots will depend upon the variety and the district in which the orchard

Fig. 50.—The fruiting habit of Rowe's Red Slip peach. The illustration on the left shows a fruit shoot with a heavy crop of fruit with new vegetative growth. The illustration on the right shows the same shoot thinned. The variety is usually medium-pruned allowing, with normal thinning, spacing of the fruit for maximum development.

Fig. 51 (left).—A strong wood shoot selected for leader extension, unpruned. Secondary laterals are numerous. The distances between leaf buds towards the bases of the laterals, are much greater than the distances between the buds on similar shoots on older wood.

Fig. 52 (right).—The wood shoot shown in Fig. 51, pruned (see text). The secondary laterals at the top have been cut back to basal buds to ensure that their growth will not challenge the growth from the topmost bud on the leader. Others have been cut back to the nearest leaf bud from their attachment to the leader for renewal growth. Four have been retained for fruit production and to spread the new growth over a greater number of buds to minimise the production of excess wood shoots. The stronger ones have been shortened to approximately 10 in. and the weaker ones left untipped. Variety: Rowe's Red Slip, which is normally medium-pruned.
Fig. 53.—Leader extension, three years previous, with a portion of one year older wood at the bottom. Variety: Rowe’s Red Slip. Laterals left for fruiting the previous year have borne their fruit and produced secondary laterals and fruit spurs. Some renewal growth has been secured by action taken the previous winter (see Fig. 45). The previous pruning was based to a large extent on using secondary laterals (see Figs. 43 and 49).

is situated. Generally the pruning cuts should be made to underneath buds. Peach varieties are normally pruned, either short, medium or long. The fruit shoots are shortened from 3-4 in. for a short pruned variety, 8-10 in. for a medium pruned variety and up to 18 in. or even longer for a long pruned variety. When the shedding of flower buds is serious other measures have to be taken to safeguard the crop. These include the use of more fruiting wood than would normally be necessary (see Figs. 64 and 65), the general utilisation of secondary laterals (see Figs. 66 and 67) and in severe instances delayed pruning until the crop has set. Delayed pruning however must be used with caution as in some districts, stunting of the trees can occur.

When anyone is in doubt as to the treatment of the fruit shoots, a check should be made on the fruit scars on the previous year’s wood. If this evidence is not conclusive, then it is suggested that long pruning be adopted. Should the resultant crop be too heavy, it can be reduced by thinning (see Fig. 50) and the laterals can be treated more severely at subsequent prunings.

Various illustrations (Figs. 53-59) show methods of treating the laterals on the older wood. These perhaps can be summarised as follows:

Fruit shoots.—These laterals are normally effective for one fruit season. On short pruned varieties, secondary laterals are forced into growth and there is usually a number of suitable shoots to choose from (see Fig. 44). The choice should be made to suitable shoots nearest the framework branches (see Fig. 45).

With medium pruned varieties use can be made of secondary laterals and the system recommended for long pruned varieties can be adopted (see Figs. 49, 49 and 56).

With long pruned varieties it is not quite so easy. The longer laterals often extend in growth from their terminal buds and there may be a
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Fig. 55 (left).—Leader extension six years previous. Variety: Rowe’s Red Slip. Unless care is taken, it is difficult to retain suitable fruit wood on the older portions of the leader. The illustration shows the tendency of fruit wood to spread out from the framework branches.

Fig. 56 (right).—Portion of leader shown in Fig. 55, pruned. In some instances the laterals have been shortened to laterals closer in. Towards the bottom of the leader the “rod and spur” system has been utilised (see Fig. 48).

dearth of other suitable wood but their utilisation as third or fourth year laterals is not desirable. Consequently, efforts must be made at an early stage to arrange continuity of the supply of suitable laterals. This is done by spurring back some of the fruit shoots to three or four buds, the cuts being made to underneath buds.

During the following season’s growth, several of these buds should produce healthy secondary laterals. At pruning time, the secondary lateral nearest the framework branch or otherwise more suitably placed is spurred back again and the whole branch shortened back to the next suitable secondary lateral which should be either pruned long or left unpruned. With care this treatment can be repeated year after year (see Figs. 46 to 48).

Fruit twigs.—After one year’s fruiting these laterals are usually removed altogether.

Leaf twigs.—These should be shortened back to a sound leaf bud to encourage more suitable growth the next season.

Wood shoots.—Unless required for framework purposes these shoots cause trouble by con-
Portion of leader shown in Fig. 57, pruned. The variety is long-pruned and most laterals are left untipped. Secondary laterals are not produced as freely as varieties which can be short- or medium-pruned. Where possible secondary laterals are used, but the best insurance for future fruiting wood is the "rod and spur" system (see Figs. 46, 47 and 48).

Fig. 58.—Portion of leader shown in Fig. 57, pruned. The variety is long-pruned and most laterals are left untipped. Secondary laterals are not produced as freely as varieties which can be short- or medium-pruned. Where possible secondary laterals are used, but the best insurance for future fruiting wood is the "rod and spur" system (see Figs. 46, 47 and 48).

Fig. 59.—An illustration of short-pruning. Portion of aged leader, variety Watts Early. The flower buds are in bloom. Continued spurring has formed lateral branches which are still productive despite the age of the tree. With a short-pruned variety the fruit shoots are shortened back 3-4 in. at each pruning (see Fig. 45). Renewal wood is much easier to obtain than with the medium- and long-pruned varieties.
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continued strong growth if they are merely shortened back. It is advisable to suppress them entirely though there is always the chance that subsequent growth from the basal buds will also be strong. Should this be so, summer treatment by disbudding or pinching back will help solve the problem.

The presence of water shoots and excess wood shoots generally indicates that the past pruning treatment has been too severe.

Water shoots.—Unless required for framework purposes these growths should be removed entirely and summer treatment be given to prevent repetition of the nuisance.

VARIETAL TREATMENTS.

It was mentioned earlier that there was a great deal of variation in the fruiting habits of the various varieties. This is caused by different varietal characteristics, but at the same time an individual variety can be affected by differences in climate. Thus a variety which can be pruned with safety at the normal time, may be another district have to be left unpruned until the crop has set, owing to the liability of flower bud shedding. It is suggested that varietal characteristics, and location hazards, if these factors are not known, be discussed with the district Horticultural Instructor before the trees are pruned.

For general information, a list is given of the varieties commonly grown which are normally pruned either short, medium or long. Short pruning is up to 4 in., medium pruning 8-10 in. and long pruning up to approximately 18 in. and sometimes longer (see Figs. 53 to 59).

Short pruned varieties

Medium pruned varieties (in some districts long)
Peaches.—Carmen, Elberta, Royal George, Rowe's Red Slip.

Long pruned varieties
Peaches.—Spinks, Wiggins, Blackburn, Briggs's Red May, Triumph, Anzac.

Nectarines.—Goldmine, W. C. Fripps, Victoria.

(To be continued)
Fig. 62 (left).—Terminal growth slowing down. In this illustration there is an absence of wood shoots, all the growth being fruit shoots. The variety normally medium-pruned was pruned long the previous year.

Fig. 63 (right).—Portion of leader shown in Fig. 62, pruned. The leader extension is left untipped and it will be necessary at the next pruning to cut back the leader to another fruit shoot, which can again be left untipped. This system can minimise weak terminal growth which can occur on trees approaching their maximum development.

Fig. 64 (left).—Portion of a leader on a Triumph peach.

Fig. 65 (right).—Portion of the leader shown in Fig. 64, pruned. This variety in some districts does not set heavily. In the illustration long pruning is adopted and more fruiting wood is left than is usual to make up for the heavy shedding of flower buds. Where the shedding of flower buds is serious, it is better to leave the pruning of the fruiting wood until the fruit has set. Delayed pruning however must be done with caution, as in some districts stunting of the trees can occur.
Fig. 66.—Portion of a leader of Dripstone Elberta.

Fig. 67.—Portion of the leader shown in Fig. 66, pruned. This variety is long-pruned, but more reliable results are obtained by using the secondary laterals from shoots which at the previous pruning were left long. The illustration shows this very well.

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