

planting in its permanent position in the orchard; there will be no check in its development through transplanting in the nursery.

General attention to the nursery bed, such as cultivation and irrigation, should be carried out when necessary so that the growth of the young stocks is not checked. Frequently the main stem of a seedling will send out a number of side growths; from time to time these should be pinched out, leaving only the main stem growing unchecked so that it has a better chance of developing to a size fit for budding in the first season.

### Propagating Hardwood Cuttings

Hardwood cuttings should be collected from healthy trees only just before beginning of leaf-fall. Only well-ripened cuttings from the current season's growth should be taken preferably from the outside and top of the selected trees. The top of the shoot should be discarded and the remainder cut into pieces at least 12in. long. The advantage of a long cutting is that if there is insufficient young growth from it to be easily budded, the bud can be inserted into the bark of the original cutting. More satisfactory strikes are generally secured from cuttings taken from near the basal ends of the shoots. Water sprouts or soft, sappy growths should be avoided, as these seldom develop roots.

Best results are generally obtained if the cuttings are first planted in a special propagating bed, which should consist mainly of clean, coarse river sand. Three parts of sand to one part of soil, thoroughly mixed, will be found a satisfactory medium to start the callus forming. The cuttings may be planted as close as 2in. apart in rows in the propagation bed. They should be planted about 8in. deep in trenches. On no account should they be pushed into the soil, as this damages the bark at the basal end and may prevent callus and root formation. After planting, the sandy soil must be thoroughly firmed and kept moist, but not excessively wet. Small roots should be formed by late winter, when the cuttings can be carefully lifted and planted out in the nursery rows about 15in. to 18in. apart and about 5in. to 6in. deep. This should leave sufficient of the cuttings above ground for the insertion of the bud. Rows should be 30in. to 36in. apart for easy cultivation.

### Propagating Root Cuttings

Root cuttings from some varieties of plums and cherries strike fairly readily, and, like hardwood cuttings, they produce an even line of trees. Better strikes are usually secured from the roots of young trees (1 or 2 years old) than from those of older ones. Where propagation by root cuttings is done the root prunings from young trees being transplanted may be saved. These should be from 1/4in. to 3/4in. thick and about 5in. long. For a root cutting it is advisable to make the cut at the top of the root straight across and that at the lower end on the slant, to ensure that the cutting will be planted the correct way up.

The cuttings should be completely covered with moist sand until early spring. They should then be lined out 15in. to 18in. apart in a row in the nursery, with the top of the cutting level with the soil surface.

Frequently a number of shoots grow from each cutting. All except one of these should be eliminated by carefully rubbing them off when they are an inch or two long. It may be necessary to do this several times during the season. In favourable years a number of the root cuttings may produce sufficient growth to be budded the same season.

It is important that the nursery into which either hardwood or root cuttings are planted has good soil which will hold moisture readily and not pack too tightly, thereby excluding air. If the soil is inclined to be heavy, it can be improved by mixing coarse sand with it and by placing a small quantity of sand at the base of each rooted cutting.

### Budding and Grafting

There are two methods by which the scion variety can be worked on to the stock—budding and grafting. The choice of method is determined largely by climatic conditions. Peaches, nectarines, and apricots can be budded successfully in most districts. With plums and, particularly, cherries the buds seem to be more easily killed by cold in the winter and in some districts, for instance, Canterbury and Otago, better results are obtained by grafting.

### Budding

#### Time to Bud

The time to bud varies a little from season to season and is influenced by the condition of the sap flow in the stock. Budding must be done while the bark still lifts readily from the stock. If it is not possible to lift the bark cleanly from the wood without tearing it, budding should not be attempted. During a drought period it may be found that after a few days the bark will become hard to lift. If this occurs, budding should be postponed and the trees given a good watering to start the sap flowing again and so enable budding to be done.

The various kinds of fruit are normally budded in a definite

sequence, though there may be some overlapping owing to the condition of the stock, and also a difference in the maturity of the buds of different varieties within each kind of fruit. First come cherries in December or January, depending on the season and district, then apricots, followed by plums, and lastly peaches and nectarines, the best time for the last-named being from the middle of February to nearly the end of March.

#### Selecting Budwood Sticks

Budwood should be taken only from the best trees available. Any tree to be used as a source of budwood should be examined several times during the growing season to make sure that there are no symptoms of disease and that the fruit is of good typical shape and colour. Whenever possible budwood should be taken only from trees which crop consistently. Shoots of about pencil thickness will be found most suitable for budsticks, as buds taken from thick shoots are sometimes hard to fit snugly, particularly if the stocks are thin.

The shoots on the outside and top of the tree, where they get the maximum light, usually have good foliage and bud development and are the best. Water or sucker shoots that arise direct from the heavy wood, particularly on the inside of the tree or where saw cuts have been made, should be avoided, as the buds on these shoots are generally under-developed. If budwood is required from a special tree and the growth is poor, it can be invigorated by severe pruning the year before the buds are required. The shoots must not have completed their growth nor the buds be fully ripe when the wood is collected. The sap must still be flowing in both the bud and the stock before a union can take place.

**One point that cannot be stressed too strongly is that the trees from which the budwood is collected must be inspected thoroughly to ensure that they are not infected with virus or any other disease**



Side growth should be cleaned off the lower part of the stock a few weeks before budding is done. Left—Before the side growth is cut off. Right—The trunk pruned ready for budding.