

at least one side of the graft, as it is at this point of contact where the union begins to take place. In order to ensure a speedy and successful union, waxed cotton thread is wound tightly around to hold the parts together. Amateurs are also advised to rub grafting wax all over where the two parts are joined, as with this treatment success is likely to be more certain.

The operation having been completed, the grafts are packed away in moss or sawdust until spring. They are then planted out in nursery rows about three feet apart and one foot apart in the rows, the point of union being about three inches below the surface of the soil. The ground should then be kept thoroughly cultivated throughout the season. Some varieties of apples throw out roots quite readily from the scion and after a time they thus become practically on their own roots. If it is desired to have a variety on its own roots, a scion from eight to twelve inches long may be used and the graft planted deep in the nursery row, only leaving one bud of the scion above the surface of the ground. Roots will then be thrown out on the scion, and when the tree is dug the stock may be cut away, and the tree will then be on its own roots. Or, on the other hand, a piece of root from a tree of the same variety as the scion may be used as the stock.

**Crown-grafting.** Crown-grafting is usually done on young stocks in the nursery row in the spring. The trees are cut at or just beneath the surface of the soil at the crown or collar. A sloping cleft is then made in the side of the crown, and a scion, cut wedge-shape at the lower end, is inserted in the cleft. The same precautions should be observed as in root-grafting, of having the inner bark of both stock and scion touching on at least one side. The grafted part should then be well covered with grafting wax, in order to exclude the air. The trees usually make a strong growth when grafted in this way, but as the work has to be done in April before growth begins it is often inconvenient to do it at that busy season of the year.

**Top-grafting.** Where there are trees which produce poor or unprofitable fruit they may be made to bear good fruit by top-grafting other varieties upon them. If it is desired to grow a variety which, when grown in the ordinary way, proves a failure, on account of root-killing or sun-scalding, it is possible to grow it successfully by top-grafting. Varieties which ordinarily take a long time to come into bearing will fruit much sooner when top-grafted. These are some of the most important results which may be obtained by this method.

Up to the present time in Canada, top-grafting has usually been done on old or bearing trees which produce poor fruit, and as very satisfactory results have been obtained, this practice will continue to be popular.

The work is done in the spring before growth begins, but it is possible to graft successfully even when the trees are coming into leaf, provided the scion is quite dormant, but the chances of success are much lessened if it is done late. As the shock to a large tree would be very great if all or nearly all of the branches on which the leaves develop were cut off the first season, from three to four years should be devoted to removing the top of the tree. If, however, a large number of scions are inserted, the top may be changed in less time, but, as a rule, it is not wise to do it in less than three years. Furthermore, a too severe pruning at one time will cause a large number of shoots to grow on the tree, and considerable labour will be involved in removing them if many trees are grafted. Cleft-grafting is usually adopted in top-working trees, it being a simple and satisfactory method.

The branches to be grafted should not exceed an inch and a half or two inches in diameter. If they are larger it is so long before the stub heals over that disease may set in. It is possible, however, to graft larger branches by putting in more scions. The top-grafting of a large tree should be done with a view to having the new top as symmetrical as possible, and great care should be taken in selecting the branches to be grafted upon. After the branch is sawn off, it is cleft by means of a mallet and strong knife to the depth of an inch and a half to two inches. It is held open to receive the scion by driving a wedge into it. Scions for use in top-grafting