

APPENDIX No. 2

are cut from dormant wood which has been kept in good condition in the manner already described, or from wood taken from the tree before the buds swell in the spring. They should have about three strong buds and be cut wedge-shape at the base, one side, however, being a little thicker than the other. Two scions are now inserted in the cleft of the stub, with the wide side of the edge on the outside, and thrust down until the lowest bud is almost on a line with the edge of the stub. The inner bark of both scion and stub should meet at some point, so that the union will take place readily, and this is more easily effected if the scion is given a slightly outward slope when inserted. When the wedge has been withdrawn from the cleft the advantage of having the wedge-shaped end of the scion thicker on one side will be apparent, as it will be held much more tightly than if both sides were the same. If the scion is not a tight fit all along, there is something wrong in the way it has been cut or the stub has been cleft. The cut parts should now be covered with grafting wax to exclude the air and hold the scion in place. Cotton is also sometimes wrapped around the wax in order to more effectively hold the scion in place. If both of the scions grafted on a stub should grow, the weaker one should be removed after the other is well united and the surface of the stub at least partially healed over.

It is often desirable to top-graft young trees, and this may be done very readily. The main branches are cut back to within a short distance of the trunk, and the scions grafted on, either by cleft or whip-grafting. The closer the grafted part is to the trunk, the better, as the tree will be stronger than if the union occurred further out on the limb, since the growth of graft and scion may not be equal. It is well, however, to have one bud left on the stub so that in case the grafting is not successful a new shoot can readily start. Otherwise the stub may die back to the trunk. It is possible to cut off the whole top of the tree and graft successfully on the main trunk, when the tree is young, but unless one is sure that the union will be perfect and the top not outgrow the stock, it is better not to run the risk of losing the tree. Furthermore, if the whole top is cut off there will be such a growth the first season that the scions are liable to get broken off. In top-grafting a young tree that has been planted from three to five years, it is better to take two seasons to do the work, as the results will, as a rule, be more satisfactory.

It is necessary to examine the grafted trees during the summer and remove any young shoots from the stocks which are interfering with the scions. It is not wise however, especially when the tree has been cut back severely for grafting, to remove all the shoots until the grafts have grown considerably and furnish a good leaf surface. In the chapter on stocks, reference was made to the top-grafting of tender varieties on hardy stocks, in order to make the former hardier. The trees should be double worked as described there, planted out in the orchard, and when large enough, which will be in two or three years, top-grafted with the tender sorts.

In 1896, trees of McMahan, Gideon, Haas and Hibernial apples were planted in the orchards at the Central Experimental Farm. These are all very hardy, strong-growing varieties, which do not sunscald at Ottawa and which are fine, straight-trunked trees. They were grafted on hardy roots. In 1898 the work of top-grafting these with varieties that are not perfectly hardy was begun, and continued until 92 kinds had been tested. These included: Baldwin, Belle de Boskoop, Benoni, Domine, Early Harvest, Esopus, Spitzenburg, Fallawater, Keswick Codlin, King of Tompkins Co., Mother, Newtown Pippin, Northern Spy, Ontario, Rhode Island Greening, Roma Beauty, Sutton Beauty, Wagener, Winesap and York Imperial. Few of these varieties can be grown successfully at Ottawa as standard trees. Top-grafted, they endured several winters, but the severe winter of 1903-4 killed practically all of them, thus demonstrating the inability of hardy stocks to make tender varieties hardy enough to withstand test winters. The following experience had warranted the hope that the results would have been otherwise:—

In 1891, a tree of Duchess and two trees of Wealthy were top-grafted with Northern Spy, which will not live at Ottawa when grown as a standard tree. All of these