

of sugar beets and hay would like to have an open market. The Michigan sugar-beet companies say, if the duty is taken off, they will give us fifty cents a ton more for beets. Farmers in Michigan are getting \$12 per ton for hay, while we get \$8. Land in Michigan is worth one-half more than here, all things considered. Lambton Co., Ont. PETER CAMPBELL.

[Note.—Our correspondent is correctly informed as to the points about which he asks assurance. So far as our friend Mr. Johnson is concerned, we fear that his generosity induced him to lend the weight of his official position to a request on behalf of his brother fruit-growers that self-interest would never have prompted him to support.—Editor.]



Fig. 1.—View in apple orchard, Hood River, Oregon, showing upright habit of growth of low-headed trees. The trunks vary in length from 15 to 20 inches. Contrast this with the form of apple trees as they grow when headed high, and it will be seen that these low heads are not as much in the way as one might expect.

Pruning.

J. W. Crow, Professor of Pomology, Ontario Agricultural College, Guelph.

Various reasons for pruning have been given from time to time, and numerous attempts have been made to express in concise form all the reasons there may be for the pruning of trees and plants. If we accept the dictionary definition of a principle: "A law comprehending many subordinate truths; a law on which others are founded, or from which others are derived," then it seems possible to express the fundamental principles of pruning in these three statements:

1. We prune to modify the form of trees and plants.
2. We prune to regulate (in part, at least) the production of fruit.
3. We prune to improve the quality of the fruit.

I am quite aware that, in undertaking to present an article on the subject of pruning, I am expected by the majority of readers to deal with the matter in a purely technical way. Most fruit-growers wish to know how to prune and



Fig. 2.—Short trunks, but high heads—no bearing wood within ten feet of the ground. Most of the missing branches have died for lack of light. The dense top simply requires thinning out. Watersprouts should be allowed to grow from the lower part of the main branches. These in a few years would add very materially to the bearing area of the trees.

when to prune. Comparatively few men are interested in learning why we prune, but it seems to me that a man of intelligence, who understands the fundamental reasons for pruning, will be much more capable of carrying out the technical part of the work than a man who understands nothing more than what to do and when to do it. The necessity of understanding the reasons for doing a thing in a certain way lies in the fact that one is being continually confronted by new problems. One who does not understand the fundamental principles which underlie the operation is entirely at a loss with regard to finding for himself a solution of a new problem, whereas one who comprehends the underlying reason will be able to invent for himself a satisfactory method.

In this article we shall deal with the form of trees, leaving the other phases of pruning to be considered in succeeding issues. We may state that the natural form of the tree may be modified for the purpose of securing greater convenience in handling. It requires no demonstration in order to make plain the fact that a tree with a low head is easier to prune, spray, thin, or pick, than one with a high head. The formation of the head of a tree close to the ground is simply a matter of saving dollars and cents in carrying on these operations. The majority of trees in Ontario are headed at from three to five feet in height. This may be quite satisfactory from the standpoint of the farmer who does not wish to invest in a special line of orchard machinery; but, as a matter of actual fact, trees can be cultivated satisfactorily, even with ordinary tools, when the trunk is restricted to two feet in length. An orchardist who cares to provide himself with implements specially built for the purpose will be able to cultivate, with perfect satisfaction around trees headed as low as eighteen or even fifteen inches. It must be borne in mind that the natural growing habit of a tree headed low is entirely different from that of one headed at the ordinary height of four to five feet. The shorter the trunk, the more upright is the direction of growth of the branches, and, as the matter actually works out in practice, it is not appreciably harder to cultivate low-headed trees (provided the head has been properly formed) than it is to work around ordinary trees with trunks four or five feet in length, the branches of which have been allowed to take a horizontal direction of growth.



Fig. 3.—Open-headed trees (Tolman Sweet). Other varieties of this type are Duchess and Wealthy. They normally develop fruit spurs, and bear fruit to the very base of the main branches, for the simple reason that abundance of light reaches those parts of the trees. Should have been headed back at the points indicated, so as to increase the number of branches, and thereby provide additional area for fruit bearing. Spreading growers, such as the Tolman illustrated, should be pruned to inside buds, or to branches having an upright direction. Upright growers, such as most varieties of pears and many kinds of apples and plums, should be pruned to outside buds, or to branches growing outward.

It must not be thought that a tree with a short trunk is necessarily low-headed, and, contrariwise, it must not be imagined that a tree with a long trunk is necessarily high-headed. It is possible, in the first case, to keep the lower branches of the head cut away, and to form in that manner a tree, the lowest bearing branches of which may be several feet from the ground. On the other hand, it is possible, in the case of a tree with a long trunk, to give the branches a downward direction of growth, and to make a tree the bearing branches of which may reach nearly or quite to the ground. So far as convenience in handling alone is concerned, the ideal form of head is broad and flat-topped. Such a head is much more easily constructed on a short trunk than on a high one. Many of our peach-growers are growing trees with trunks scarcely more than a foot in height, and many of our apple-growers are adopting the low-heading idea in greater or less degree. In the West, apple orchards are headed as low as fifteen inches. The

proper method of forming a broad, low head on a short trunk will be described in detail in a succeeding article, and need not be more definitely mentioned here.

For the sake of convenience in handling, it is also necessary, in some cases, to head back the branches of closely-planted trees. It is not, of course, desirable to plant trees so closely that the branches will interlace, but correct pruning will in many cases obviate the necessity of cutting out any trees.

Another reason for modifying the natural form of a tree is that in some cases greater mechanical strength can be secured. Serious injury frequently results from allowing branches to come off from the trunk in such a manner as to form



Fig. 4.—Pear tree badly deformed by winds. Should be headed off at point indicated, but such treatment is likely to delay fruit bearing for a time, or prevent it altogether.

a fork. Branches should leave the main trunk at a broad angle, if possible, and it is desirable, as well, to have them spaced at least two or three inches apart on the main trunk.

There are two general types of trees, one being known as the open-center or vase-form, and the other as the central-leader type. As a rule, trees of the latter style suffer less from the breaking down of branches than do trees of the open-center type. We might have stated in a preceding paragraph that vase-formed trees are broader and permit of the construction of a wider and lower head. We can certainly state here, however, that the trees of this form are open to serious objection on the score of mechanical strength. It is much more difficult to secure a proper distribution of the main branches up and down the trunk in the case of the open-centered tree; and if the pruning is continuously aimed towards the production of trees of the open-centered habit, it is even more difficult to keep the scaffold branches in their proper place. It is probable that artificial support will be found necessary when the extreme type of this tree is adopted, owing to the fact that, after having been borne down by the weight of a fruit crop, they seldom regain their normal position if left to themselves.

A second point in which trees may be so formed as to give additional strength is with regard to the number of main branches they are allowed to possess. If too many are allowed to spring from the trunk, they are necessarily crowded, and therefore slender and incapable of bearing heavy weight. It is better to start with



Fig. 5.—Was in similar condition to No. 3. Illustration shows first year's growth after heading back.

Fig. 6.—No. 4 after pruning. Shoots growing against the wind were left wherever possible, and these in all cases were pruned to buds on the windward side.