

scragged, sickly appearance, although the four-year plants were about two feet high. The two-year plants of all varieties were about one inch apart in rows three or four inches apart. The four-year plants were about 8 x 10.

At the eastern end was a portion spaced and planted as for a practical forest plantation. The young trees were about four feet apart each way. Some looked healthy and others did not. I had no need to ask why. My friend of the hoe hastened to explain. He pointed out the specimens planted under the personal attention of the official in charge. He contended that their poor color was due to their being planted too deep, and led me off to another corner where, the Professor being called away for a few minutes, he had planted some in his own way. He proudly drew attention to the dark-green hue of the leaf, and told me quietly that he had half filled every hole he had dug under his superior's directions before he set in those trees. The others, he pointed out, were eight to ten inches deeper than before transplanting, and in some cases the lower limbs were covered.

"Young man," said he, "You're interested in trees. Well, don't get all your ideas out of books. It's well enough to have theories, but follow nature. That's it, follow nature!" And I felt inclined to think the old man knew a thing or two about how to "follow nature."

Cracking of Pears—Maple Galls.

1. Can you tell me the cause of pears cracking, and a remedy for it? I have a very healthy looking tree of Sheldon pears, and every season they are badly split.

2. I enclose a leaf of a young maple I set out two years ago. Almost every leaf is covered as this one is. Is it an insect or a disease?

3. I also enclose a weed that is growing in the orchard, and, I fear, will kill out the grass. Can you tell me its name, and how to get rid of it?

E. P. B.

Ans.—1. The cracking of your pears is, no doubt, due to the disease commonly known as pear scab, and is quite similar to that which causes the black spots on apples. Some varieties are much more subject to this than others. In the apples, we see it most frequently on Snow, St. Lawrence, and varieties of that class; while upon pears, it is most common on Flemish Beauty, although Sheldon sometimes suffers from it. This disease makes its appearance first as brown spots upon the leaves, which, in favorable seasons, rapidly spread, sometimes covering a greater part of the foliage and fruit. The fruits affected are always more or less deformed and shrivelled where the scab affects them, and in bad cases the fruit breaks open in large cracks. This disease can be controlled by thorough spraying with Bordeaux mixture, which should be applied early in the season, and at intervals of two weeks, as long as there is danger of the disease coming on.

2. The galls on the leaves of the maple are caused by a very minute insect or mite. There are two species of this—one affecting the hard maple, and the other the soft maple. This one upon the soft maple is known as *Phytoptus quadripes*. This mite hibernates during the winter in the crevices of the buds. In the spring, they crawl out upon the newly-forming leaves and deposit eggs beneath the skin on the under side of the leaf. When the eggs hatch and the larvæ begin to develop, these peculiar galls upon the leaf begin to appear. They are green at first, later on becoming red, and when old turn black. There are two broods of this insect during a season, but they do not spread rapidly from tree to tree. Because of the way in which they live inside the tissues of the leaf, they are extremely difficult to contend with. If the tree is badly affected, and there seems danger of it spreading to other trees, it would probably be safer to cut it out; or, if there are only a few leaves affected, these should be gathered and burned. If a treatment of the tree is attempted, the most satisfactory remedy is to spray the tree thoroughly before the leaves open in the spring, with a strong wash of kerosene emulsion or whale-oil soap, which help to destroy the insects in their winter quarters.

3. The weed, a sample of which you send, is wild tare or vetch, botanically known as *Vicia sativa*. This often becomes a troublesome weed in cultivated ground, but in an orchard I would consider it a useful plant, rather than a noxious weed. You speak of the danger of it killing out the grass. This is just what should take place in an orchard; in fact, an orchard should be cultivated thoroughly in the spring, until about the middle of July, and then it is well to allow the wild tare or any other plants growing upon the ground to grow. We usually sow one of the cultivated varieties of this plant, known as hairy vetch, after the last cultivation, to form a cover crop to protect the roots of the trees in winter, and to add fertility to the soil when it is turned under in the spring. The wild tare is a perennial which is not easily killed out, and if the orchard were properly seeded down with it, you would be saved the expense of buying seed for cover crop.

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Individuality of Fruits.

The stock-breeder has for a great many years paid especial attention to the individual animal in breeding for size, shape and markings, and for flesh and milk. In the writer's judgment, just as satisfactory results should be obtained in improving the strain of a variety of fruit, and although comparatively little has yet been done by horticulturists in this respect with fruits, much has been accomplished with flowers and vegetables. It is now recognized by the best authorities that each bud of a tree has individual characteristics which separate it from all other buds, and although the differences in buds are in most cases so slight that it is impossible to detect them, yet in some instances they may be quite marked.

Fruit-growers have often noticed that one tree or bush is more productive than another, or bears larger, more highly colored, or better flavored fruit. Take as an example the Fameuse apple. When this excellent old variety first bore fruit several hundred years ago, one tree produced all the Fameuse apples that there were at that time. Some apples on that original tree were probably not as highly-colored as others, although exposed to the same amount of light. Some branches, probably, were more heavily laden than others, although there was no apparent reason why they should be. On some branches the fruit was larger, though as well loaded as others. In time, scions were cut from that tree and grafted, and a new generation of Fameuse trees was the result. Were the trees thus produced identical in vigor and productiveness, and was the fruit borne on each of them exactly similar in every respect? We believe that they were not. Every bud on every tree of every generation of Fameuse apple trees had individual characteristics, and although the differences were rarely enough marked to see, there were doubtless always fine shades of variation. It does not need a great stretch of imagination to see that if such changes can be made, as have been made in live stock, flowers, vegetables, and other economic plants, by careful selection, that if, when that first generation of Fameuse apple trees began to bear, scions had been taken from the most productive tree bearing the finest-colored apples of the best size, that in the next generation of trees there would be at least a slight improvement, and if this selection had been carried on down to the present time we should have a better Fameuse than we have to-day. This selection, however, has not been carried out, and about all that has been done, in a few cases, is to graft from trees bearing highly-colored fruit, but as yet we have practically no reliable information in Canada as to whether the results have been satisfactory. In small orchards, where the fruit is intended for home consumption, the individuality of different trees is more noticed than in large orchards, where the record of each tree is not brought so prominently before the grower. The effect of the stock on the productiveness of the tree and characteristics of the fruit is not yet well understood. Whatever may be the influence of the stock there is no doubt that each variety maintains most of its individual qualities.

At the Central Experimental Farm the yields are kept from each individual tree in the orchard, making it possible to tell at the end of a certain period just what each tree has borne. It has been found that trees planted at the same time, and growing under practically the same conditions as other trees of the same variety, vary widely in productiveness. Some trees also bear a medium crop every year, while others bear a heavy crop every other year.

In our observations here it has been found that some trees have yielded two to four times as much as others. It is worth mentioning that of seventeen Wealthy trees under consideration, only seven bore fruit this year, and of those that fruited, the tree which had borne regularly during the past four years, again bore a good crop in 1903.

Experiments are now being conducted at the Experimental Farm by top grafting with scions from productive and unproductive trees, to determine how far the productiveness and unproductiveness of the trees is constant. Root-grafted trees are also being grown for this purpose.

In order that fruit-growers might learn, by personal experience, of the great variation in individual trees of the same variety, a co-operative experiment was begun this year. On application to the horticulturist, six pieces of zinc, bearing six consecutive numbers, were sent to each person. These pieces of zinc when received were to be attached to six bearing trees of a single variety of apple, pear, plum, or peach, the trees to be the same age, and growing under the same conditions of soil and culture. A record of the yield of each tree was to be kept for at least five years. A number of fruit-growers in different parts of Canada have already joined this co-operative test, and it is hoped that more persons will desire to take part in this experiment.

If scions from productive trees will produce productive trees when grafted, and if scions from unproductive trees will produce trees which are poor croppers, it is very important that scions should be taken from the best yielding trees. As grafting will, in all probability, become much more general among fruit-growers in the near future, the importance of knowing that trees vary widely in productiveness is easily seen. —[Report of Horticulturist, Central Experimental Farm.

Cyclamens and Azaleas.

P. A., Chesterfield, Ont., writes, asking information regarding the culture of Cyclamens and Azaleas.

Ans.—In buying Cyclamen bulbs, see that you are not given those that have dried out, as it is very difficult to do anything with one of these bulbs if it has once become bone dry. If the bulbs have to be shipped, specify in your order that you want good fresh ones packed in damp moss. Reliable florists will, as a rule, see to this, but occasionally there is carelessness somewhere, and it is as well to let it be understood that you know what to expect. Pot the bulbs immediately on their arrival. In potting, put some broken crockery in the bottom for drainage, cover with sphagnum moss or other fibrous material to keep the soil from filtering down, and fill up with good garden loam mixed with one-fourth the quantity of very old, well-rotted manure, or secure good rich soil from the woods or virgin field. Exercise great care about watering. Keep the plants moist all the time, but not too wet, for fear of rotting at the root. Good drainage will, however, do away with much danger of this. In spring, when the blooming period is over, give less and less water, until just enough is given to keep the roots from drying out entirely, and set away in a cool, shady place for the summer, remembering never to let the plants get bone dry. In rainy weather turn the pots over so that too much moisture cannot enter. When plants show signs of new growth, take out some of the soil from the top of the pot and fill up with rich earth, or if the pots be full of roots, repot carefully into pots a size or two larger, and set in a warmer, lighter place to grow. Cyclamens do best in an east window, and the foliage should be syringed every day.

In potting Azaleas, put in drainage material as above, and fill up with sandy peat or loam. Keep them away from direct sunlight, water liberally during the winter, and syringe the foliage every day. Amateurs find it rather hard to get azaleas to flower a second time, although some have succeeded by planting them out in the garden for the summer, and repotting with great care not to disturb the roots in the fall.

Wood Ashes—Apple Prices.

1. With regard to hardwood ashes, when should they be applied, in the fall or at the time the cover-crop is turned in in the early spring?

2. Then, again, could you give me any idea as to where such ashes can be obtained? In the south, where formerly I grew pineapples, etc., I used to find no difficulty in getting good Canada hardwood ashes, but here in Canada, so far as I have discovered in the last year or two, they are rarer than ice in July.

3. Another point, what fair average profit can be looked for from an apple orchard; I mean properly cultivated, sprayed, and so forth? Most extraordinary discrepancies in opinion seem to prevail, some saying there is no money at all; others speak of \$2 and more per barrel. I see in the papers that a good judge in Niagara district talks of an average price for apples this year, for thoroughly good No. 1 fruit, of only 60c. per barrel.

F. P. W.

Ans.—1. The best time to apply wood ashes to an orchard is in the spring before the cover-crop is turned under. This insures little or no loss of any of the soluble plant food which they contain. Of course, if the ground is quite level and there is little danger of loss from surface drainage, they might be applied at any time in the fall, but there is always more or less danger of loss of soluble plant food when applied at this time.

2. I cannot at present say where it would be possible to obtain wood ashes in any great quantity. I hope our fruit-growers are becoming so aroused to the importance of using them at home that no more Canadian hardwood ashes will be available for American orchards. My own impression is that a great deal of the so-called Canadian hardwood ashes advertised in the States are really American ashes.

3. I would not in any way attempt to reconcile what you call the "extraordinary discrepancies" in the statements of different growers as to the profits from an apple orchard. It is quite true as you say, that there is a great diversity of opinion, but there is fully as much difference in prices as you mention. I saw in a good apple section last week, orchard after orchard of first-class winter fruit which the growers were selling to a local buyer for forty cents per barrel. On the other hand, I know of a number of growers who will this year, as they do almost every other year, realize two dollars and more per barrel for no better fruit. The difference in prices obtained is a matter of business management. The growers who get the good price are those who keep in touch with the best export markets; while those who receive the low price are those who depend upon the buyer to come in and then take whatever they can get for their fruit. What is necessary to enable apple-growers generally to get full value for their fruit is that they form co-operative associations and appoint good business managers to look after the crop and see that it is placed on the market when and where it will bring the best price. This is already being done in several sections