

## SOME THINGS WE HAVE LEARNED

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*Mr. President, Ladies and Gentlemen:*

I believe the entire present day method of propagating Avocado trees to be unscientific and should be abandoned, especially in making orchards. The seed should be planted where the tree is to grow—the seedling budded where it stands and never moved.

In my humble judgment, this is the only way to obtain a one hundred percent, tree. I do not assert that very good trees may not be had by the old method of growing in nursery rows, balling and moving to the permanent location, but I do say that in no case can a tree be just as good as when left in its original location, while in many instances it is not nearly as good. The plan is hardly practicable for those needing only a few trees for home use, there being, as a rule, too many difficulties in the way of getting the work done. I see nothing in the way of its adoption by orchardists.

The Avocado when left to take its natural course will put down a deep tap root. In the balling process this tap root is almost invariably cut, from one to two feet below the surface and when it starts growing again does not take its original vertical course but puts out a number of lateral branches, none of which ever attain much depth. The result is a shallow and unnatural root system—the disadvantages of which are too numerous to mention here in detail. This much should be clear, however, to anyone who believes at all in Nature's wisdom. A tree which wants to make a deep tap root cannot attain its full strength and vigor if prevented in any way from doing so. The deep tap root gets the lower moisture, consequently the tree requires less irrigation and cannot be tipped over by wind.

A serious objection to the practice of balling and moving trees is that they are often placed in soil entirely different to that from which they were taken. Should the soil in which the tree is placed be of more porous nature than the ball of dirt surrounding the roots, great care must be exercised in irrigating to prevent the water from draining off before the small amount of heavier soil containing the roots has been saturated. This rule applies especially when the trees have just been moved and before the roots have had time to grow out into the new soil. Many trees have been lost in this way, I am sure, with the grower unable to account for their failure. With such conditions it would probably be better to move the trees "open root," thus eliminating all of the heavy soil. In moving either large or small trees "open root," first cut them back, then do not move at once but wait until the new growth starts. Keep the roots moist by puddling or some other means until the tree is safely planted and watered.

Let me here digress enough to say that Avocado trees planted in heavy soils where water does not readily drain off may easily be over watered, while it is practically

impossible to over water them in light, porous soil.

Another objection to the practice of growing trees in nurseries and shipping to innumerable places is the danger of spreading pests and diseases. This would be entirely eliminated by the plan here suggested. But you say "a seed may not sprout and I should have many blanks in my orchard." I suggest that several seeds be planted in a small circle around the location for each tree. It is not likely that they would all fail to grow. Bud all of the resultant seedlings, finally eliminating all but the best one. Avocado seeds sometimes take several months to sprout. In soils which bake easily a little sand mixed in where the seeds are planted is an advantage. Watering and caring for seeds thus planted in orchard form and widely separated would doubtless entail more trouble and expense than if they were in nursery rows, but this would be more than offset by doing away with the necessity of balling and shipping. On the whole, orchards could be had at less cost and with far better trees.

It would be a distinct economy—and in the end economy benefits all concerned—to send an industry happily and prosperously along, eliminate waste, stop up the leaks. The packers claim to make use of every part of the hog but the grunt, and see where they have arrived! One of the principal aims of this association should be the elimination of waste. This suggestion probably will not be relished by the nurserymen, but in the end I do not think it will hurt them. At present they are forever running the risk of propagating trees they cannot sell, thus imposing on the industry as a whole a certain amount of dead loss, which must be borne by someone somehow, and constituting, I believe, an unnecessary overhead expense.

Let the nurseryman contract to make orchards for people on the new plan and he can figure his profits in advance, also you may be sure he will stick to strong healthy varieties which he knows will grow.

This matter of sturdy trees brings us again to a subject on which I have talked more or less insistently for some years. In selecting varieties for commercial orchards, the tree is more important than the fruit. Its strength, vigor, rapidity of growth, and resistance to heat and cold should be considered before the quality of the fruit it bears. Why? Because if you have a strong tree and do not like the fruit, you may change it to any desired variety in two years by top-working, whereas, if you have selected a sickly variety because it bears the kind of fruit you want, you have only disappointment ahead of you. Happily, there is no longer any necessity for taking chances, as we now have sturdy varieties producing also very fine fruit. One of the best examples of this combination of good points is the Fuerte, a wonderfully strong tree and fruit of superfine quality. You can make no mistake in planting the Fuerte.

Plant strong trees, and if you are planting to make money, not too many kinds. There are, I believe, one hundred and thirty or more named varieties. Some of our friends, not knowing for certain which to select, have "played safe" and planted them all. That is not an orchard; it is a horticultural museum, and has no commercial value. Not much safety about that. We must make decisions. Playing too safe is the unsafest way of all policies. Consumers will eventually buy largely by brand, dealers the same way, demanding also uniformity of pack. Odds and ends will be hard to sell. One variety in an orchard is best, but if you must have two, start one in orchard form first, then interset the other in the

middle of the squares. If you live long enough to see them crowd, take out the poorer one, which you may do, and still leave the other in perfect orchard form. Some plant several varieties so as to have fruit the year round. Why does an orchardist want fruit the year round? If he can get the same amount of money for his crop and get through harvesting it in a month or two, I should think he would want to do so and take a vacation; take the folks to the beach! We don't want to work all the time. The tendency of the times in industry is towards more and more rest. The owner of a grove gets no extra pay for overtime. A single variety in a grove brings less care and more profit. "Put all of your eggs in one basket," said Andrew Carnegie, "and then watch the basket." No one was more competent than he to formulate a business policy or watch a basket.

Judging varieties by the fruit alone without regard to the tree has been the cause of more loss and disappointment than any other thing in this business. Many of you, for example, remember the Murrieta varieties—the green and purple, the latter now being called Colorado. Ten years ago they were propagated and planted by the hundreds, and I doubt that one of the trees is living today, except some that were top worked. The parent trees were healthy enough, although growing under rather adverse conditions, and up to the present day we have no better fruits than the Murrieta and Colorado. For some unknown reason they could not be made to grow and keep growing by any means known to horticultural science. The buds started all right in many cases, but after a year or two at most of miserable existence, finally died, having survived just long enough to fool both nurseryman and orchardist.

And here is the point I am trying to make clear—many varieties have this tendency in greater or lesser degree, while some others have it not at all; hence when a new fruit has been discovered equal or superior to those we already have, it does not follow necessarily that we have a valuable new variety; it has still to be tested as a tree by budding. The tree it grows on may look strong and healthy, but that proves nothing at all. All seedling trees grow strong and healthy, with favorable conditions, so far as I know, but a bud taken from a strong tree and transplanted to another tree may make a droopy, sickly growth, or may not grow at all. We do not know why. There seems to be a lack of affinity between many of the varieties. An interesting theory is that root system and bud are not matched as to rapidity of growth, it being a known fact that some varieties grow more rapidly than others. Some have thought that thick-skins should be budded on thick-skin roots and thin-skins on thin-skin roots, the idea being that the two families are too distantly related to get along well together. At present thin-skin root stock is used almost exclusively by nurserymen because of its hardiness, whereas the buds are nearly all taken from the large fruiting, thick-skin varieties.

I doubt that either of these theories correctly and completely explains the phenomenon of poor bud growth, but each furnishes an interesting working hypothesis for the experimenter.

We have noted a most interesting thing in our own top-worked orchard of some two hundred ten year old trees, formerly Harmans, which were budded three years ago to a strong growing variety and nearly all of which now have very satisfactory new tops. About ten of these trees were first budded to the Murrieta variety, and half of that number now have rather poor tops of that kind. In the others we believed the buds to be all dead, so worked the trees over again, this time to the strong growing kind of which

the main orchard is composed. It happened that in each of three or four of these trees a single Murrieta bud was still living; and, strange to say, these braced up and came right along with the rest of the top. They seemed to need the help of the strong growing variety to pull them along and are today the only satisfactory Murrieta buds we have on the place. I should have expected it to work exactly the opposite way—that is to say, I should have expected the strong buds to crowd the weak ones out, all of which proves to be a fact that which has long been suspected, to-wit: my judgment in such matters is not infallible.

I am convinced that much of the limber, droopy growth noted in many varieties is due to root cutting when the young trees are balled and moved. I have an orchard of some two hundred Lindas which were moved into place three years ago, and some fifty others of the same age which were not moved but left to grow where they were originally budded. The ones not moved have made satisfactory growth, standing upright and strong while the ones moved into the orchard were very unsatisfactory, notwithstanding we took very large balls of dirt with each of them. After the big wind of last November they were all lying prone on the ground, the trunks being too weak to support the tops. In the judgment of others as well as myself, the only sensible thing was to grub them all out, but this seemed a hard and drastic thing to do, so we finally decided to give them one more chance by a resort to severe pruning. We had noted when limbs had been broken or cut off, that the new growth was always straighter and stronger than the original. Our hope was that by making practically all the growth new we could strengthen and straighten the trees and help them to overcome the droopy, vine-like tendency so far shown. The plan worked even better than hoped for. Today they are healthy looking, the trunks have become strong, while the trees themselves, I am sure, are larger than they would have been had they not been cut back. In our pruning we left little more than the bare trunks; just a small amount of foliage here and there to keep the trees from dying.

The question of pruning has been one that the Avocado grower has approached timidly. With no experience or recognized practice to guide him he has hesitated for fear of ruining his trees, though nearly all, and especially the budded trees, have needed it badly. The one variety, in my experience, which shapes itself almost perfectly without pruning, is the Taft. I think this question has been quite satisfactorily solved, however, by Mr. P. D. Barnhart. His trees at the Danziger place, Beverly Hills, are the most perfectly shaped of any I have seen. His rule, briefly stated, is to keep the tree down, never allowing it to get taller than it is wide.

There is much more to say about pruning for which I have neither space nor qualification to speak. A paper on this subject by Mr. Barnhart would be very valuable to Avocado growers.

As a final word to amateur growers, let me warn against killing your trees with kindness. Too much water in heavy soils and over-fertilization have caused the loss of many trees. The Avocado does not need so much water, according to size, as a citrus tree, and will never tolerate standing with its roots in soggy, sour soil. Do not fertilize very young trees. They do not need it, and are oftener injured or killed in this way than benefited. Except in the poorest of soils, fruit trees in general do not require fertilization until they are bearing.