

PRUNING THE AVOCADO

C. V. Newman, President

Calavo Growers of California, at Avocado School, March 11, 1931



This industry is too young to lay down very hard and fast rules for pruning; but still there are a good many men who have some definite ideas on the fundamentals of pruning, and I think these same men are willing to admit that it is going to take a lot of time, experience and observation to prove the ultimate success of these ideas.

We are just going to talk about some of the things we *think* we know, and do as the university boys do—give you a progress report. (Laughter) I have a feeling that about twenty-five years from now, some fellow is really going to be able to tell you how to prune avocados. Then in another twenty-five years, he will tell you how he ruined his trees. However, if we are wise enough and open-minded enough, we can gradually figure the thing out.

Just to prove to you that we are too young to know much about pruning, let me illustrate by pointing to the lemon industry. Eighteen years ago I saw an extensive lemon grove, and it looked as though someone had taken a mowing machine and clipped all the tops off. Then a little later, along came an Italian and told us that if we were going to grow lemons, to cut the tops off, eliminate all strong growth, use nothing but fruit wood, and pick all the lemons without using a ladder. The men who followed this method had a definite idea of what they wanted—a low tree which they could pick without a ladder, nice big fruit, and no strong growth. They got what they wanted, but as a result had a short lived tree, and not enough fruit.

In the meantime, some people had been making observations and had noticed a man at Glendora who had never pruned his lemon grove; he had some suckers coming up through the tree six inches in diameter. His grove produced fine crops of fine lemons. When his neighbors tried to kid him about the way his orchard looked, he said: "Well, boys, if you can show me any grove around here, of the same acreage, that has produced half as much money as this grove, I will prune the orchard." He never pruned it. The University carried on some experiments. They pruned heavily; but the trees didn't

grow well. They pruned lightly, and the trees grew fast enough and produced more lemons. Then a man in Ventura County didn't cut his suckers off at all, but pulled them down and tied them without eliminating this wonderful growth. He is getting lots of fruit. Another man didn't believe in this method and only thinned his top. I think his method is just about the most logical when you get right down to the principles of growing trees and fruit. Some people may say he is wrong pretty soon.

Now, one of the things that growers should know is—what kind of a shaped tree is wanted. Another thing—what is going to be the ultimate result of any cut that is made on the tree. The thing we want is a strong tree with plenty of good fruit.

There are some things about pruning we know. We know that heavy pruning dwarfs a tree, upsets the balance between the tops and the roots, and generally is not good. We know that if you prune a tree in the Fall, it weakens it at the very time it needs all its strength and resistance; and if you do not prune at all, the tree will be wild and unsymmetrical. It looks as though the best way to conduct this so-called pruning is to moderately shape the tree during the springtime, when you can pinch off the tip of a wild, ambitious limb and thus save the use of the saw later on.

The suppression of a vigorous limb does not seem to interfere with the normal functions of a tree, whereas heavy cuts stimulate strong, wild growth and retard normal bearing.

Now let's take the Fuerte tree. It is a well-known fact that moving a tree constitutes a very heavy shock. If you take a weak tree, or even a strong tree, and abuse it—the results are about the same. If you set out a weak or even a strong tree, and do not cut off the top before planting, the tree may stay in the ground some time before it decides whether to grow or to die. During that time the sap is moving very slowly and the top begins to dwarf. It has a tendency to sunburn, and develop sunblotch, and eventually—if the tree lives—it is apt to start some growth from a lateral limb or perhaps from some lower strong bud.

I might say that there are a good many who advocate setting out trees without cutting back. I am not certain that it is not a good way for a very careful man in a very favorable location, for under these conditions I have seen some very good groves grown. Staking to maintain a tree in an upright position is common practice with some of our best growers.

On the other hand, take your tree, cut it off like this (*Illustration No. 1*). You have some small branches here, and some good strong eyes just below the cut. Now that tree will come up like this (*Illustration No. 2*) and here you will have the tree in the first year's growth. Say the limbs are more or less even, as that tree comes on, it starts out here and the branches come to the ground. It fills in nicely, and is a beautiful tree.

Question: Should these limbs be wired together?

Answer (Mr. Newman): I won't say it isn't all right. Eventually, if a ring is put in there and those four limbs are tied together in that manner, the slight weakness of the limbs will be eliminated by the wiring, and I can't see anything particularly against it. I believe you will have a tree come on quickly, that will bear quickly, and be a beautiful tree with plenty of strength, and this is probably the most economical tree to grow.

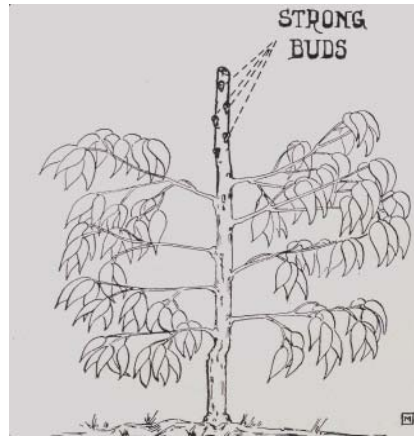


Illustration No. 1:

Young Fuerte tree set in the ground. Cut off just above group of strong buds from which tree will be formed.

Showing short limbs which were grown in the nursery. Also shows small limbs low to ground which are left on for 2 years to strengthen tree and shade ground.

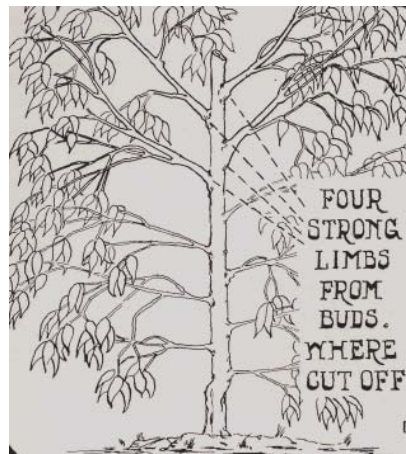


Illustration No. 2:

Showing 1-year-old Fuerte tree. Showing four rather uniform structure limbs coming out from the strong buds just below where the cut off at planting time.

We do not know that it is possible to train a tree as we want it to grow. Other things, we assume we know. We know that the lower to the ground the tree is cut off, the more vigorous is the resulting growth. And we certainly are interested in having a tree start quickly, and perhaps then—with intelligence and experience—we can train the tree to grow satisfactorily.

Now here we have a tree that has little branches close to the ground, and has strong buds below the cut. That tree came on like this (*Illustration No. 3*). One limb came up like this, a little stronger. Now, if you had wanted to make that tree like the low headed

tree above, you would have pinched it off. If you want to grow a central leader tree, as one or two of these limbs get more ambitious (*Illustration No. 4*), pinch them off, and as time goes along, this limb which is left will come along upright and strong in this manner, and will put out a shoot here and there, this limb will straighten up, this knot will disappear, and then you will have a central leader type.

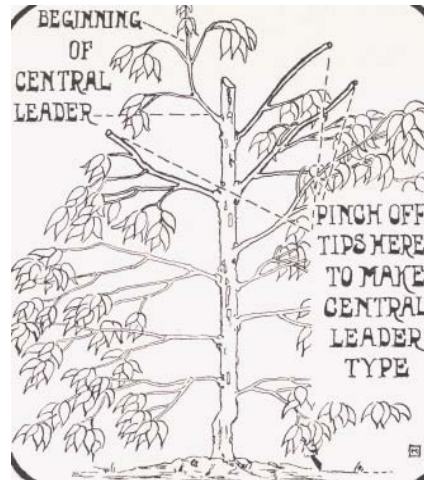


Illustration No. 3:

Showing how two or three limbs are pinched off and suppressed to develop a central leader type.



Illustration No. 4:

Showing central leader going up and producing framework limbs that will develop into structure for future trees.

In the central leader type, we have the elimination of the crotch which is a weakness. The tree will probably grow without a stake, if it comes out low enough so it starts vigorously. The limbs in the central leader type are spaced farther apart along the trunk, which gives strength; and I have a feeling that this tree will probably be long-lived and most valuable in the end.

These high framework limbs will eventually shade the ground; but I feel that these short, low limbs (though there is lots of difference of opinion) should be left during the early years of the tree, because each one of these short limbs has a kind of a knot which has a tendency to strengthen up the trunk and make it more able to develop a strong trunk. As time goes on these branches can be removed and if you will wait long enough, they will drop off themselves.

As the trees get older and cover the ground, the lower limbs can be gradually cut off and you will have an orchard where cultivation can be done easily and close to the tree trunk. I can see no disadvantage to this type of tree, and there is some advantage in having a symmetrical tree, and some advantage in having an orchard easily worked and cared for.

The location of an orchard with reference to cold, wind and topography makes a difference in pruning treatment. For instance, if we have a tree on a terrace, I think it would be a mighty fine thing to have some of these limbs hanging down on the terrace to protect the ground from baking, and in that case I would not want to see these limbs taken off.

My ideal tree would be the central leader type—a tree on which the limbs were properly spaced so as to give strength; a tree that was dense enough to protect its own limbs and its fruit from sunburn; a tree with plenty of short, low branches when young, and when eight to twelve years old pruned up high enough to allow free tillage and field operations right up to the trunk, if desired.

Either the central leader type or the low headed tree will develop into a good orchard tree. The main thing is to start out with a strong tree, know what type you want, and train it accordingly. I am not certain which is best, because I do not know; but if you do start without a central leader type, as one of these strong arms starts out laterally (these occur in the Fuerte more than in any others) check by pruning during the growing season, and endeavor at all times during the growing season to encourage the growth of the building limbs, properly spaced along the trunk. If you have a hole where a limb has broken off, or where nothing has grown, try to encourage growth. When you need to prune, do it early in the year. Use the pinching method. Don't use a saw too much.

Don't be a faddist or an extremist. I think one of the finest things that Nature ever did for us fellows who grow trees was to put the most important half of the tree under the ground, where we couldn't get at it. Otherwise we would have a lot of root-specialists telling us how to prune the roots. We have a lot of fine experts in this business. We have a fine lot of men advising us how to grow avocados—men who are conservative. The ones I am afraid of are the faddists who try to get us to upset all of our theories by telling us that our old methods are all wrong. Don't be led astray by the faddist, and always remember that Nature is a pretty good grower of trees herself; and that there have been a good many fine trees grown by Nature without very much care. Just remember the old English adage: "The good gardener carries his prunings away in his coat pocket, and the careless gardener has to haul them away in his wheelbarrow."

Question: Do you believe in letting those lower branches grow close to the ground—three, four, or five feet out?

Answer (Mr. Newman) : When the tree is young, let them grow; but if one starts out and shows that it is very vigorous and a strong sap-pulling branch and you can't hold it back, cut it off. I am talking about the little ones that come on the tree when you buy it from the nursery.

Question: Do you leave those limbs or branches that grow down from the main branch, on all the time?

Answer (Mr. Newman): Yes. We let them grow until such a time as the tops of the trees have all come together, or until such a time as the ground is all shaded. These limbs have a function. It is the natural way for a tree to grow. They protect the tree from wind and cold, and help to conserve the moisture in the mulch under the tree, and maintain a uniform temperature and moisture. Take those all off too soon, and it requires a mulch to maintain these conditions, and that is expensive.

Question: You have not touched on a subject that is quite important to many, and that is—telling us how you would handle an open-top tree. The tree you have drawn has long top limbs and very soon, when the blossoms and leaves grow, they will drop down and the first thing you know you will have an open-top tree.

Answer (Mr. Newman): You mean a tree that comes out more or less like this (*Illustration No. 5*) and then sunburns on the top of the limbs in the center. When a tree pulls down, it becomes open in the center. It should be whitewashed to prevent sunburn on exposed limbs. New upright growth will probably soon start, and fill in the center. You can hurry this new upright growth by notching the limbs where the new limbs should start. Another thing to do is to use a central ring, and wire the spread out limbs together. Now take an avocado tree and you will see along the trunk sets of strong buds—half a dozen in one group, and then another group of lateral branches, and almost always a group of buds near the top. You can cut the tree when planting, at this group or that group, or at the top, and strong, new buds will soon start to form the tree. I think the Challenge of Dickinson or Taft trees are about the easiest trees to train. They grow more or less like oaks, and with a little care they develop great uniformity, evenness, and grow surprisingly strong.

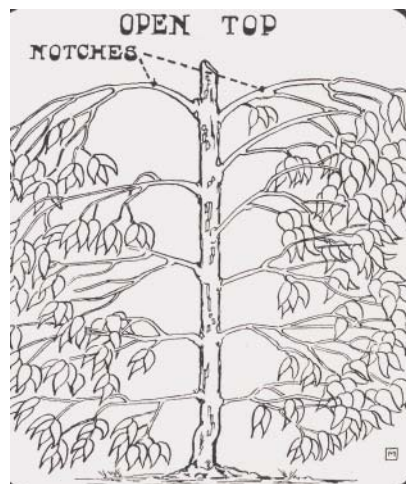


Illustration No. 5

Question: In planting a young tree, in the event there is no bud, what would you do about topping back?

Answer (Mr. Newman): I never saw a tree that did not have a group of buds, near the ground at least. I would cut it off near the ground; just about four inches above the bud, if there were no other buds on the tree.

Question: When you set the tree out, do you do this cutting?

Answer (Mr. Newman): Nurserymen know that a tree should be handled one shock at a time. Bob Teague, when he was planning to send trees across the ocean, prepared them in this manner: He cut the roots on one side, then on another side; finally, after two or three weeks, cut the taproots clear through. Then he gave it a little water and commenced cutting the top back. By giving it all of these shocks gradually and developing the tree's resistance, when he got through he could do most anything with it. We would cut the tree back a week before digging.

Question: I have a couple of trees that started out splendidly. Now a couple of those limbs have gone wild. Would you cut them all off at one time, or first one and then the other?

Answer (Mr. Newman): I would do it one at a time, if at all. Probably that tree had some trouble in the top. When it was set out, it probably hesitated about growing so long, that the top got hidebound. We had some just like that—I won't mention any varieties—they didn't grow well. It was our fault, perhaps. We leaned them over and tied them down to the ground, and whitewashed the trunk so they would not sunburn. Just above the bud union, pretty soon out came a beautiful strong bud but that grew just like a nursery tree, with fine, well-shaped limbs on each side. Those are the best trees we have of that variety. We were too far from Nature before. The trees came up fine, sap flowing freely, trees vigorous.

Question: We had some trees that were planted out and evidently those trees stayed in the ground so long before starting, that the tops got weak and the sap did not commence flowing. What was the trouble?

Answer (Mr. Newman): Maybe the ground was too wet, or too dry, or the sun too hot when planted. Maybe the tree was not cured in the lath-house long enough. We had some like that, at our ranch. A nice branch finally started to grow, just above the bud union, on some of them. These made good trees. Many were replaced with new trees.

Question: If you had some trees three years old, with the top rather dry, of good stock, with the main growth close to the ground, and here comes another branch that is bigger and stronger than the tree, and the chances are that the branch that comes out from a lateral limb higher up will outgrow the tree and have to be supported—would you cut it off?

Answer (Mr. Newman): These trees suffered in some way, otherwise they would have made strong top growth. It's a question whether or not your tree, with this weakened trunk, will ever support that strong limb coming off the lateral. This kind of a tree will come out all right if a good shoot will come out low enough on the trunk of the tree.

Mr. Barrett: I think there are two things that ought to be stressed. I notice it continually

in my practice. FIRST is that most avocado growers are afraid to use their saws and pruning shears. On the other hand, if they are not afraid to use them, they want to use them too soon and too often. The first year, it seems to me, whether you are going to top or not, if you top and the growth starts you should be very reluctant about removing the foliage as you need every bit to build back the roots. In the second season particularly, you should watch for these strong eyes that will throw out close to the bud union, and if you get one of those buds that is a good shoot and will grow continuously to the top, it should be encouraged. I don't believe, from my practice, that it is the wisest thing to cut off the top when you get one six inches or so. It is too tender to be alone, and also you need the foliage of that old top. The trouble I find with most people is that instead of using these strong shoots that are Nature's material for re-adjustments from which one can build a tree far superior to the old one, they either let the tree grow out from a low-lying lateral that will ruin their tree, or take it off altogether. It is a good plan to carry your pruning shears in your pocket, if you can; and use a little common sense in balancing these shoots, and not allow them to get too far away where you will have to cut them off.

Question: I dug a hole in a hillside and discovered water there. Fortunately, most of my ground is thirty or forty feet deep, but I dug some holes and went once a week to look at them. Each week I found my holes were full of water. I filled the holes up. I want to know what is the proper thing to do with the ground?

Comment: Sure you didn't have hardpan?

Prof. Home: From my observations of both citrus and avocado trees, I think it surely would not pay you to try to grow avocado trees in such soil.

Albert Thille: I find the avocado tree is harder to grow than citrus, and needs better drainage.

Question: If you leave a fruit hang on the tree after it is mature, will it absorb so much moisture (which has to be replaced in the ground) that it will injure the tree?

Answer (Mr. Newman): It would not particularly injure the tree; but it is not economical to hold a fruit on the tree after its proper picking-time has come. There are too many hazards, such as dropping, theft, seed-sprouting, and rancidity.

PRUNING, THINNING, GIRDLING

Pruning

November 22, 1930

Question: Is it considered good practice to prune the lower limbs off of young avocado trees—a year to a year and a half old?

Dr. Coit: There is a great deal of difference of opinion. A great many people want a tree

to grow up in the air and they cut the lower limbs off so it will push up in the air, making it look like a tree. Such a person probably came from Maine or New Hampshire and has in mind a pine tree. Personally I don't care for the ultra-modern flapper in an avocado. I like to see the lower limbs left on and if they run out too far, cut the ends back but leave them attached to the trunk. I am perfectly aware that there are a lot of you who will differ with me and I am also aware that you can go to an orchard about ten minutes' distance from here and find trees that have been pruned up and lashed to the stake making a beautiful orchard. My opinion is that it would have cost a good deal less to have produced it in the way I personally follow which is to leave the lower limbs on for the first few years to strengthen the trunk. I planted three trees, a Fuerte, a Nabal, and a Duke, two years ago in April. The lower limbs were left on and are still on. If any ran out too long, they were cut back. I cut those trees back eighteen inches to good eyes at the time they were planted. I cut the old top off. The top grew on and produced a new tree. There never has been a stake of any kind. They are now approximately four or five feet higher than my head—erect and beautiful trees. They went through the windstorm last night with no injury from breakage though for a time the tops whipped the ground. They never had strings of any sort on them.

Question: Would you leave limbs on the Fuerte one or two feet from the ground?

Dr. Coit: Yes, after the tree achieves some age, those limbs will naturally be shaded out and in time most of them will die and can be removed. But they will have achieved their usefulness in strengthening the trunk. My position is that if you prune them off and run up a straight stem, then you have to tie your tree to a stake. The more your tree is supported, the more it depends on that support.

Comment: My experience is this: I had not had satisfactory growth with my three-year-old trees until I went through the orchard and cut out all limbs from two to two and a half feet and out and up to two feet above the ground. I found many, many limbs that were as heavy as the main upright stock and many that were reaching away out to the sides. I did not think they would constitute a permanent satisfactory support for fruit at that height. I have had very satisfactory growth as a result.

Dr. Coit: The question of pruning Fuerte trees has not yet been reduced to a science and so is still a legitimate subject for discussion. Some people will get one set of results, others will get others.

Knowlton: Dr. Coit, you touched on a subject which is open to controversy. You said you would cut the tree, provided it has an eye to cut to, at the time of planting. Would it not be better practice to cut it off at the time of digging in the nursery?

Dr. Coit: From the standpoint of the prospective purchaser who wants all the tree he can get for the money, the former would be better practice. From the cultural standpoint, it would be better if the cut were made prior to digging. Some growers say never to cut the central stock down. It is my personal opinion it should be cut.

Thinning—Sunburn

November 22, 1930

Question: Where the branches of trees have become sunburnt, due to being heavily laden with fruit, what harm is done to the trees and what steps should be taken to cure the damage?

Dr. Coit: In the first place, when such a large quantity of fruit is set on an avocado limb that it bends down so as to sunburn, it ought to be thinned. You take off part of that crop and you will have better fruit and get as much money for what is left as you would have for all the inferior smaller fruits. Then the limb will not bend down so low nor sunburn so badly. However, if the limb does bend over, the only thing I know of to do to protect it from the sun is to white-wash it, using some common white water paint powder and water.

Question: Should the lower branches of four-year-old trees be pruned free of the ground?

Mr. France: They should be pruned up off the ground but not any more than that. I don't believe in pruning them up. You are going to have trouble enough getting them down to pick the fruit after a while.

Question: Is it advisable to slit the trunks of young trees to promote larger trunk growth?

Mr. France: No.

Question: What is the best time of the year to plant trees?

Mr. France: From December to June._

Pruning

November 22, 1930

Question: What shall we do about the limbs that are inclined to shoot off to one side?

Dr. Coit: I think the questioner has in mind the Fuerte variety. Mr. Newman originated a name that describes them—"strong arms." The underneath branch gets the strength of the limb and instead of growing up in the air, it brings the limb towards the ground. The way to combat these "strong-arms" is to keep clipping them off to release your limbs so they may grow up in a nice upright position.

March 10, 1931

Mr. France: There are certain other practical applications we might make or use in connection with this sort of a talk. This matter of injury to a tree. The tree is trying to maintain a balance. When you either prune a tree, its tops or roots, you are injuring the tree. This injury may be a little less than the benefit derived from the pruning. This matter of photosynthesis and root absorption is essentially fundamental in considering the effects of pruning. The tree attempts to maintain a balance between the raw materials deep in the ground and the leaves. Anything you do to upset that balance will make the tree get busy to try to reestablish it. The heavy pruning of a tree induces a lot of new sappy growth taken out of those parts of the tree that have stored up these plant foods and necessarily reduces the vitality of the tree somewhat. However, we do know

that occasionally it is necessary to prune trees. It is more of a practical and aesthetic consideration than a truly scientific one. It is better to use the shears and take off a limb here and there neatly than to take them off with the tractor! It is desirable to help shape up your tree to make it more satisfactory to you from the aesthetic standpoint, making a nice-looking strong tree. Pruning of that kind is desirable. Occasionally trees and plants grow wild and we have to bring them back down to where we live, so occasionally we have to abuse them with heavy pruning to get them down to where we can take care of them. I think that may be our problem in the avocado industry with all this good soil we have in San Diego County.

Question: Where an avocado tree has been girdled, is it not a fact it usually blooms profusely and puts on plenty of fruit but after a while when the fruit becomes as large as hens eggs, it all drops off. Isn't it true that it all drops off due to the fact there is no sap to maintain it?

Mr. France: No, there is probably plenty of sap but the roots begin to suffer. You see, here is the sap coming up on the inside of the stem and the plant food goes down on the outside. Now the roots can't make any plant food, these foods are manufactured in the leaves and these starches, sugars, proteins, and fats are then carried down to the roots for their nourishment and growth. As soon as you have this girdle on the outside of the tree, it will eventually die of root starvation because the roots do not function and so the rest of the tree suffers and does not function with it. By bridging over that girdle, you can reestablish it. Some trees won't stand it at all, others quite a while. A citrus tree may last a couple of years before it passes out completely.

Question: May I ask this question which is a little bit off what you have been talking about? After a tree had bloomed and the fruit was just set, if the tree had been cut in some way and the sap was released so it was bleeding all over the limbs, this being followed by a drop of fruit all over the tree, would you think the cutting had anything to do with that tree's losing its fruit?

Mr. France: It might or it might not. Remember this heavy bleeding at times is pretty nearly all water, not plant food. If the plant has an abundant supply of water at the time, apparently it doesn't wilt even though it may bleed badly. You can cut a grape vine off and it may bleed badly but it will not wilt. A heavy pruning might easily produce a shock to a tree that would make it drop its fruit aside from the amount of sap lost.

Question: When avocado sap is released, as at a wound, it oxidizes as a powdery white substance. This tree I speak of has dropped a considerable amount of fruit. You release the sap and you see it oxidized. If you saw this condition, would you think that had anything to do with the dropping of the fruit?

Mr. France: I think it might but I would not be at all convinced it would necessarily.

Question: What about cutting the feeding roots?«

Mr. France: That is different.1

Question: What about girdling for fruit production?1

Mr. France: I don't think there is much to it myself.

Question: Why is it that young trees in San Diego County seem to" throw out so much

more bloom than we have here at La Habra?

Mr. France: Maybe, just because they are so happy to be there. But seriously, any plant in a sickly condition is apt to first indicate it by an excess of bloom or apparent over-productiveness. Trees badly afflicted are quite apt to do just that. It is a plant's last stand—the endeavor to reproduce itself by throwing out a very heavy bloom.

Question: You were talking about pruning a tree. A while ago there was a great difference of opinion as to how low you ought to leave the branches on the tree. A week ago I was talking to some other people regarding this. They say if you plant a budded tree, as the branches grow out low down, you had better take them off so that the tree will get its stature above. That if you don't the day will come when the tree will suffer.

Mr. France: Remember now that the plant uses sugars, starches, fats, and proteins. These are manufactured by the leaf and every leaf is an advantage to the tree. The young trees not pruned will make greater growth than those pruned. You may be up against the lesser of two evils, however. You can prune intelligently and sensibly without pruning too much. I don't know that it has yet been developed, but in the future we will undoubtedly find certain diseases to which the avocado is susceptible, that are soil borne and are transmitted to the tree from the foliage and fruit dragging on the ground. My recommendation would be to keep your avocado tree up high enough so they are not touching the ground but take off as few leaves as possible—do not prune them up too high.

See Wahlberg's article, page 131.

McCulloch's article, page 125.

T. U. Barber's article, page 123.