

Joint Meeting and Open Forum of the California Avocado Association and Avocado Departments of County Farm Bureaus

Whittier, May 7, 1937

A. W. Christie, Chairman: Our program tonight is very informal. We have two friends to call on first, after which we will discuss anything you may be interested in from the standpoint of avocado culture. I see before me all the experts on avocado culture and I don't think there should be any questions left unanswered tonight.

This is the Avocado Department of the Los Angeles County Farm Bureau. We also have a state and national Farm Bureau. We are happy that we are part of that great state organization because through it we can derive much help, particularly in economic matters such as are brought about through the State Legislature and Congress in Washington—such matters as adequate laws to protect against theft, adequate tariff protection against cheap Cuban avocados, and other matters.

The Farm Bureau has been, and continues to be an immense benefit to avocado growers in securing those things which they feel should be theirs. They are continually working toward the betterment of agricultural conditions throughout the country because, after all, in California we are producing a luxury fruit—it costs more to pack it and costs more to transport it across the country. The result is that when avocados appear in stores in the east they cost money, and unless the people of the United States have purchasing power they can't buy enough avocados to return a reasonable profit to producers.

THE "FARMERS' VOICE"—SUPPORT IT!

The Farm Bureau has been, and is doing a great deal to improve conditions for agriculturalists all over the country in order to have better purchasing power and, therefore, this work will benefit all other classes of the population. Therefore, the avocado growers are directly interested with what the National Farm Bureau is doing in cooperation with the government, in improving the purchasing power of consumers. It is a pleasure this evening to have with us the President of the California Farm Bureau Federation, a representative of the board of directors of the National Farm Bureau Federation. I will ask him to say a few words about what the Farm Bureau is doing for agriculture, and the need of the Farm Bureau for more adequate representation of farmers, because its strength finally must lie in its membership. We will hear at this time from President Blackburn. (See page 242.)

That was a fine talk; it reminds me of a story I heard the other day. There was a young fellow who was taking a course in navigation. He wanted to follow the sea. After studying some time and having had some experience he came up before the examiners. Among the examiners was an old sea captain who fixed his eye on this lad

and said, "Young man, suppose you were in command of a ship lying off shore and suddenly a storm came up and the wind was blowing at 30 miles an hour. What would you do?" "I would drop an anchor, sir." "Suppose the wind started to blow at 40 miles an hour? What would you do?" "I would drop another anchor, sir." "Suppose the storm got even worse and the wind started to blow at 56 miles an hour? What would you do?" "I would drop another anchor, sir." "Hmmm! Young man, where would you get all these anchors?" "Well, sir, where would you get all that wind?" (Laughter)

It seems to me there is much wind blowing around the country—everywhere from the halls of Congress to here. But I can't help but think that the Farm Bureau represents the strongest anchor that we have, and we should stand by it. The Farm Bureau in this country is engaged in a necessary and worthwhile membership drive and what the Farm Bureau needs is your membership, whether you belong in this or any other county. So don't wait for membership solicitors to have to spend their time and gasoline to call on you, but send in your membership. The \$5 that it costs is money well spent, as you can see from Blackburn's remarks. These things just won't do themselves. There are a lot of men willing to carry this burden but they can't do it entirely out of their own pockets.

THE AVOCADO COMMITTEE—JUDGE F. D. HALM

The California Farm Bureau Federation started a number of years ago to be subdivided into certain departments. There are departments for citrus, livestock and other commodities. Just a couple of years ago, some of the avocado growers realized that the avocado industry is growing up and getting to be bigger and bigger, and that we should have a department of our own in the Farm Bureau. There were a number of us who thought well about the idea but didn't do anything about it. But we have one fellow in this neighborhood who battled for it until he got it. He finally got the State Farm Bureau Federation to organize an Avocado Committee in the State Farm Bureau. It represents every avocado grower in California.

We have a marketing organization, Calavo Growers of California. Some growers choose not to belong to it, but most of them do. We have the cultural association which has a limited membership, and unfortunately many growers don't belong to it. This Statewide Avocado Committee of the Farm Bureau represents all avocado growers in the state. We have with us this evening the man who had persistence enough to get this Committee for us. We will now hear from Judge F. D. Halm of La Habra.

Judge Halm—Mr. Chairman, Ladies and Gentlemen: You could hardly expect one of my age to make a speech. Also, whenever this fellow is up before any audience they expect him to talk about avocados. I will disappoint you tonight in that respect. It is true that what I have in mind has a bearing upon the avocado industry. It has been my effort to help every avocado grower, organized or unorganized, in his problem, and have those matters discussed by the people who are familiar with and are equipped to take care of the question which you or I, in our poor way, are unable to solve.

Some fifteen years ago I came to this country from a steel business in the east, a manufacturing business. I came here and put a few dollars in an avocado grove and it wasn't very long before I found out what I didn't know about avocados was a whole

library; and the more I discussed the points that I couldn't understand, the more I discovered that there was such a diversity of opinion that it was like a disagreeing jury.

Next I found out that there was an association—the California Avocado Association. I became interested in that and some of the most pleasant moments of my life have been in attending many of the meetings which were sponsored by this Association. I also began to see that there were problems which were almost beyond the power of an organization as small as the California Avocado Association, and that there must be some means whereby we could get support from some other source.

INTERESTS FARM BUREAU IN AVOCADOS

It was my pleasure and good luck to be interested in and to help form the first avocado department in any County Farm Bureau. That was the beginning of the interest of the Farm Bureau membership and individuals in avocados. Soon afterwards we encouraged the formation of similar organizations throughout the state, and finally we had five counties with avocado departments in the Farm Bureau.

The next thing, we looked around to find out who, among the Farm Bureau officers and in the experiment stations and elsewhere, were very much interested in avocados. We had to look them up and find them and we made the authorities believe us that there was more interest in avocados than any of them thought there was, and that the major questions were still unsolved because we weren't sufficiently organized. As your Chairman explained, there was a Department forum consisting of the members of several counties which had Farm Bureau Avocado Departments, who insisted upon having representation in the State Farm Bureau Federation. That is how, and perhaps why, the avocado industry has a representation on the Board of Directors of the California Farm Bureau Federation.

We soon found out, however, that there were matters which had to be solved and given consideration by the Federal authorities in Washington. The California Avocado Association was unable to reach them in such power or strength as to get very far, and the individual counties with their avocado departments were also unable to get very far. So it was only through representation in the Federation that we were able to get them interested to take up our troubles and help fight our battles. The interest that has been taken has been great. We believe we solidified a great deal of the interest of the avocado industry in such matters as the Cuban Reciprocity Bill which we couldn't do anything with alone because it had to go to Washington. The Farm Bureau Federation, in their directors' committee, took this fight up with the authorities in Washington, and are today working on that problem. The Secretary of State has decided to hold it over for four years more. The fight is still on, however. That is one of the things the Farm Bureau is doing for the avocado industry.

Some laws are being presented in our own legislature, which are just as much of interest to the avocado grower as to any other type of agriculture, and we are doing our very best in helping solve these problems and force our opinions upon the legislators to see that justice is done—justice to all.

I wish I were able to discuss this problem and this situation with you in the same

manner and with the same effect that President Blackburn has done. You all must see the necessity of coordinated cooperation in all branches. Not we for ourselves alone, but we will have to help the other fellow because we are one large family. I wonder how many here tonight this year are members of the Farm Bureau? Please raise your hands. That's a very good showing. All of you should be members of the Farm Bureau and should support the actions of the Farm Bureau because they are not only working directly for the agricultural group, but also indirectly.

COMMENDS U. C. AND FARM BUREAU

I want to commend at this time the officials of the organization which has done the experimental work in avocados. They have done wonderful things for us in avocados. They have solved some of the questions and are still working on others that are unsolved. I am sure the officials of your Farm Bureau and Avocado Departments in all of the counties are just as much interested in these unsolved problems as they can be. We are all your servants; we are doing that which you would have us do. We want to have your cooperation. We like to have your attendance at all our meetings. We would like to have you do some of the talking and not let the officials do it all.

Now, how can we know what your wishes may be and what your problems may be unless you voice them in some way or another? We are not mind readers. After we find out what is required, what is the demand, we will certainly take action whenever it is possible so to do.

Tomorrow is the twenty-second meeting of the California Avocado Association. It has done a wonderful work. The Yearbook published each year is the result of twelve months of study by some members of that organization who have given their time faithfully and gratuitously, to assemble the material and put it in a form so that you can understand and enjoy it. That book is a standard book which is in great demand by libraries throughout the whole world. We have demand for copies from far-off Australia. We have memberships in China, New Zealand, Palestine, South Africa, Peru, Hawaii and other countries. So we are known all over the world. That book is an authority. This Association invites you to attend their meeting tomorrow and be a part of us and help where you can, but most of all I would ask you all to support the officials of the Farm Bureau Federation in your own county, in your own state, and just be reminded that this work by your officials is largely a work of love. (Applause)

DR. WEBBER—DESCRIBES FLORIDA

Mr. Christie: As I announced earlier in the evening, we have other speakers especially invited to talk to us this evening. We will now have a few words from a dear friend of ours whom we always like to hear. He has just returned from a trip through Florida, which is the other state producing avocados in commercial quantities. Florida seems to be even worse hit by the Cuban tariff situation than we are. We will now hear from Dr. H. J. Webber.

Dr. Webber—Friends of the Farm Bureau: After listening to this wonderful address presented by Blackburn and followed by the interesting statements of the last speaker, I

feel it almost impossible for me to say anything of added value. I must say that while I have visited many Farm Bureau meetings, and listened to many addresses, I don't believe I have ever heard a better statement than that given by Blackburn tonight; and if that idea of his could be understood generally by business men and others, it seems to me the organization would have more influence than it has at the present time.

I am acquainted with Ellsworth, who is employed as the tax expert. I visited him at his home and know something of his work. I never realized the freedom given him by his Farm Bureau; and the fact that a man is left absolutely free indicates the view that is followed by this organization, and that is scarcely understood. I don't believe the membership of the Farm Bureau itself realizes the breadth of the view held by this organization. If we could have it better understood by the farmers of the State as to what we represent, we would have no difficulty in extending the membership.

Regarding the avocados, on my trip to Florida, I didn't see many avocados in Florida. As far as that goes, I haven't seen as many as usual in California (laughter) since the difficulty of last winter. Apparently we are not producing any more avocados than the country can utilize. Perhaps we haven't realized the requirements of all of the different sections of the country. After the experience of last winter, one of our problems is that of immediately finding a Mexican avocado that is more hardy and better suited to our conditions. I am wondering if the breeding of a Mexican avocado has not jumped into prominence as one of the major problems at the present time. That is what we need—the development of a hardier type of Mexican avocado that would be better suited to our climatic conditions.

I was interested in the viewpoint of the Florida avocado people. We have in Florida a great horticultural society. We have no such society in California. Of course, we have our California Avocado Association which is a wonderful organization and is comparable almost with the State Horticultural Society of Florida. I don't believe our own Avocado Association people —of which I happen to be one—realize what a tremendous organization we really have, or how it corresponds with the great horticultural societies of the world. It is a great organization; the enthusiasm we have can't be beat. We are like the poultrymen—we can crow at all times, even after the freeze. After all, enthusiasm is what carries the world forward.

FLORIDA-CALIFORNIA COMPETITION

The avocado crop of Florida up to the present time is comparatively small but capable of tremendous increase. Our California crops are also capable of tremendous expansion but they are limited in their capacity for extension because of the water situation. That is not true in Florida because there it is the natural rainfall which supports the crops. We are competing here mainly with a state of cheap lands, of cheap labor and of natural rainfall. The only possible way for us to maintain our place in the light is by the most intensive study for improving our product, by saving at every point and increasing our crops by the very best methods possible. We can't let down for a moment because the competition would be prohibitive unless we can keep ahead of the game.

We pay more attention, in general, to the study of these problems and the reason is not

hard to see. It is because only by using the best possible methods and continually improving our fruit that we can keep going. So I will simply say, be not tired of what you are doing; you must be constantly increasing your knowledge of the citrus, the walnut, the avocado and other interests because only by this intensive preparation, only by using the best methods can we possibly hope to survive.

Mr. Christie: I have blundered along as Chairman of the local county group for no good reason at all, but I think I pulled a smart one tonight when I saw Dr. Webber and enlisted his services. He has one of those things in his personality—one of those things that you take home with you and think about, again and again. It is remarkable how these grand old men of the industry retain this enthusiasm, this snappy judgment and clear thinking. When the rest of us fellows get to that age, I hesitate to say what we will be; but I hope we can retain some of that enthusiasm.

Dr. Coit: I would like to ask Dr. Webber to give us his opinion as to why Florida has such a great horticultural society and why California, with all its many fruit industries, has no comparable State Horticultural Society.

WHY NO CALIFORNIA STATE SOCIETY

Dr. Webber: The reason is that we have a substitute. The reason is that we have organized cooperatives, and cooperatives do take the place, in large measure, of state organizations. With the citrus industry having the meetings of the Exchange, and having the annual meetings of your local organizations makes a horticultural society, in a large measure, superfluous. Because of the newness of the avocado industry, you have had a reason for an avocado association entirely aside from the cooperative. But in a general way all of our horticultural organizations which are based on the science of an industry, fail I think because of the cooperatives. For instance, I felt the necessity for the state having an institution for citrus and so, a few years ago, I assisted others in stimulating the formation of a citrus institute in connection with the National Orange Show at San Bernardino. We published two volumes of the reports. There seemed to be little request for them and the thing finally drifted into nothing but a short meeting for presentation of papers—and there were no further publications. I am not so sure that this answers your question but I feel it is fundamentally because the cooperatives largely take the place of horticultural societies that there is really no necessity for an organization in this state such as they have in Florida and some other states.

Judge Halm: It is known that Florida is one of the few states which has no Farm Bureau Federation. In your travels, have you gained any ideas or reasons for that?

Dr. Webber: The people of Florida are different from the people of California. They are individualists. The Florida Horticultural Association was organized in 1887 and has been going strong ever since and they have just celebrated their fiftieth anniversary with a wonderful meeting, and they seem to be growing right along. They publish an annual report. If you were searching for information on any subject of subtropical horticulture, you would find papers in the Florida reports worth reading. Their association has been a strong association and yet they have had periods, during these fifty years, of great difficulty to keep up the membership—and still they have no Farm Bureau.

Dr. Coit: What is the nature of the Krome Memorial Institute?

Dr. Webber: Krome worked at Homestead, about 70 miles south of Miami. He was a keen man; very intelligent. He had a very capable assistant in the person of his wife. I don't know what led to the formation of the Krome Institute but as near as I could find out it is an attempt on the part of the horticulturists to honor Krome by having a portion of their society programs devoted to subtropical horticulture and designated as the Krome Institute. So, for one day, the program that is given is in honor of Krome. Young Dr. Wolf, who is working on diseases in Florida, was their Chairman this year. He is a fine chap.

CALIFORNIA TOO DIVERSIFIED

Mr. Christie: Dr. Coit, I was just thinking what a difficult task we would have here in California in organizing a horticultural society. When you stop to consider the many eastern and middlewestern states that have state horticultural societies it seems strange that we shouldn't have one, too.

But the horticulture of those states is much smaller than our horticultural industry, so far as the total volume produced and the number of growers interested is concerned. But more than that, their horticulture is confined to a few deciduous fruits and berries, whereas in California we grow every kind of fruit that is grown in any state in the Union, with the exception of cranberries. We even grow all the different kinds of nuts—those on trees and those that walk around (Laughter). We grow all the subtropical fruits that can be grown anywhere in the United States. So it would be difficult to have a state horticultural society to give good service to all those different interests. However, the chairman was supposed to let the meeting have it own way. Does anyone have a question? I would like a little help from the audience.

A. J. Schrepfer: How about the cooperative contest being staged in Puente?

Mr. Christie: It's simply this. It is more or less along the line of what Dr. Webber has said about the necessity for plugging along at these problems of the industry and the fact that we need more knowledge and more education. In the long run it doesn't apply alone to us in the present generation, but there is another generation growing up in our schools.

COOPERATIVE MARKETING ESSAY CONTEST

It occurred to Capt. L. L. Bucklew, who started the idea, that there might be a golden opportunity to acquaint the younger generation coming up in our high schools, particularly in agricultural communities, with the problems of marketing, and that we ought to do something about it. Mr. Hodgkin called on me, representing walnuts, and on one of the men from the citrus and from the poultry industry, and from the Challenge Cream & Butter Assn., and this self-appointed committee got together and worked out a scheme for an essay contest in which high school students would compete for cash prizes by writing essays on the cooperative marketing of the various commodities which were important in their district.

This was something new. So we put our heads together and decided that the safe thing to do would be to have a small beginning, to give it a trial in a limited way. We cast around and finally selected the Puente High School because in that area there are many walnut, avocado, citrus, dairy and poultry ranches.

These five co-ops have donated a few dollars apiece to provide cash prizes and at the present time there is a contest going on among the students of the Puente Union High School in which each one of the students who are entered in this contest chooses one of the five products, to write an essay on the marketing phase of the product he chooses. The essay is not to exceed one thousand words. The five products represented are walnuts, citrus, avocados, poultry and dairy. In each one of those five sections there will be a first, second and third prize award. On May 20 the contest closes and the judges will judge these essays not only on the basis of their expression in English and choice of language used, but also from the standpoint of accuracy and presentation of the subject matter involved.

There will be a "Sweepstakes" in which the winners of the first prizes in the five different commodities will compete for a grand prize. Probably the presentation of the prizes will be made at the Commencement exercises of the Puente Union High School and some of the best papers will be presented to the audience at that time.

We are highly enthusiastic about it—to see just how it will work out. If it does work out, it can be enlarged to a much greater area. Seventy-one students have entered this contest. The various associations have furnished them with all the bulletins and material of that kind, which they need as references; and the instructors in the school are also helping the students in obtaining the material necessary and in the presentation.

It is a good thing that we are thinking about the rising generation and giving them an opportunity to learn about these problems and to express themselves well in writing on these subjects.

The contest is open to all classes in the High School. If we should continue this, we probably would have to limit it to seniors because otherwise we might be swamped with registrations.

Mr. Christie: I would like to ask Jean Miller if he has some interesting observations to make on the relationship of the heavy rainfall we have had, toward some of these trees that are badly frozen.

Jean Miller: It is a pleasure to come up to Los Angeles County, and to a meeting of this size. We have some interesting meetings in San Diego County, too. We will be glad to have you come down to our meetings. We meet on the second Monday of each month. Russell Millar, the Chairman, is here with us tonight. We meet in the city of San Diego, as a rule.

DAMAGED ROOTS—LACK OF AIR

This matter of damaged roots, I thought, was one of my particular pets, but in reading the Yearbook for last year, and some of the past Yearbooks, I find that it is also one of Carter's pets. We recognized this trouble several years ago and last year, in the

Assembly here, the question came up and it was explained more or less in detail. As far as my own personal knowledge in the matter is concerned, it originated about nine years ago. Dr. Matzen had some citrus trees that were going bad on him and he wondered what was happening to them. Upon investigation it was thought that the dead root condition, or the rotted root condition, results from too much water—by a more careful application of water they were able to eliminate some of that poor tree's condition.

Then in 1931-32 you had a period of perhaps six weeks that the soil was saturated, and following that year, in some of our more poorly drained areas, I found many avocado trees becoming denuded and in many cases they did not live the summer through. We blamed it on many things. In the case of avocados we blamed it on poor drainage and improper water management. In the case of lemons, I heard many explanations for the problem. It was usually blamed onto the variety, or onto the rootstock, or a number of things except water management, and of course you don't have much opportunity to manage the rainfall condition but you can manage the irrigation to lessen the damage, and hurry the recovery of the trees. This year we have had perhaps four months of saturated soils. It presents quite a problem. I don't know just what has happened; I don't know just what happens in the case of a tree that is damaged by too much water. Dr. Schofield of the U. S. Department of Agriculture, when the problem was presented to him, said that it is impossible for water, excess water in the soil to damage roots. I cannot conceive of such a thing because roots need moisture.

It might be explained in this way—when you form a water table under a tree, within two or three feet of the surface, there is a capillary movement of water from that water table which goes up through the soil, filling it with water and crowding out the air with the result that the soil gets too little air, which is an important element for root growth. Something in addition to that happens and causes rotting. It is the absence of air that encourages the bacteria to attack the roots, but someone who knows a great deal more about chemistry than I will have to work out the answer to this problem, for you do have a real problem there; and probably this year, in another month or two, we will be able to see the effect of that long period of wet soil.

PRUNING RECOMMENDED

A heavy pruning has been recommended to hurry the recovery of such damaged trees. The freeze has pruned many of these trees and insofar as it has balanced the top of the tree with the roots, you may have had a beneficial effect from the freeze.

While you have given me this opportunity to talk, I would like to refer to some of the talks that have come before. They brought to my mind one particular analogy between today's agriculture and the agriculture that I knew in Kansas. Things are certainly speeding up; things are happening right along. If you will recall the first automobile you saw—it was a three-seater Buick to me, a 1903 model. My job was patching tires. I knew a good deal about patching tires but I didn't know anything about running the car.

Now, in thinking of what has been said tonight, it reminds me of the comparison of the tire of that day. It was pretty good—it was guaranteed for three thousand miles, as

compared with the tires on your Cadillac, Packard, and so on, that are now guaranteed for many more miles.

The times have certainly speeded up the requirements for organization, for information, for management to an intense pitch today, and the thought that Dr. Webber has brought to you tonight, the need for keeping abreast of the situation so that you can compete with the other states, the other counties, the other areas, is more intense today than ever before. And it is along that line that we will be able to maintain ourselves in a profitable agriculture, a profitable production of avocados—by being able to keep up with the times.

Mr. Christie: I judge from the remarks that have been made tonight about the moisture that it is unusually important this year, in starting to irrigate, that you had better find out what the moisture content of your soil is, before irrigating.

Jean Miller: Let the soil answer that question; use a soil auger.

Griswold: I read an interesting article in the Citrograph. There are other means of getting oxygen to the roots. With calcium nitrate fertilizer the roots were able to get the same beneficial results that they got from the air. If that is the case, it would be a good idea to get nitrates on your soil to offset the damage to the roots. Possibly Dr. Webber could advise us on that point.

Mr. Christie: You are referring now to the possibility of supplying some additional oxygen in the soil as a result of breaking down of calcium nitrate as a fertilizer?

Dr. Webber: Professor Horne has studied the influence of excess water on avocados. He may have some suggestions.

Mr. Christie: I was puzzled about one thing when Jean was talking, and I hesitated to say it. How do you explain the fact that the native home of most avocados is in the highly humid districts of the world, where the soil is more or less saturated all the year 'round?

AVOCADOS IN MEXICO—AND EXCESS WATER

Jean Miller: In the first place, I have never been down where avocados are grown in these humid plantings. Unfortunately, when the people introduced avocados into California, they brought that idea with them. It should be discounted, to some extent. In the talk that Mr. France gave last year, he said that he went to an area in Mexico where thousands of trees were dying and rotting away from some unusual disease. He diagnosed it as excessive water. That wasn't very satisfactory to them but on questioning, he found that they had had three times as much rain that previous year as they had ever had before. It is true that avocados are growing in soils that have considerable depths of water, but the avocado tree is like every other tree; it has to adjust itself to a given condition. If it has shallow soil, the roots will adjust themselves to a very shallow soil; but if the water level changes during the year, they will die or suffer from drought, as the case may be.

Professor Horne: We don't yet know very much about this water relationship to avocados in an accurate way, but we have made some observations. I haven't been in

Mexico or Guatemala or Central America, but I suspect that where avocado trees grow in their native home, they have good, well-drained soils. I did see avocados growing in Cuba, and here is an interesting situation. In the western part of the island, a good deal of the land is what they call "Sabana." It grows palm trees and a little brush. That land is Sabana because they have long periods on which the soil is saturated and they have a close, hard subsoil. That is what makes it Sabana.

In that country, where they grow finely flavored tobacco, they don't, have many avocado trees. When the people plant avocado trees, they get along all right until they have an extra wet season; and I find, after the wet season is over, the avocado trees die. The avocado trees in Cuba that are doing the best grow in their red lands. The red lands are a perfectly drained soil. It is a soil that overlies a limestone and the water goes down nicely and you can't waterlog that soil. There the avocado trees grow fine. If anybody wants to grow avocados, that is a good place to grow them.

ROOTS NEED OXYGEN

We have had some interesting things said in connection with water injury of avocados. I had a valuable demonstration on some trees that I had in pots. If you set the roots under water they will die, but the roots remaining above water may survive. Dr. Haas had one of the prettiest experiments that I have seen anywhere. He had avocado trees growing in water. They will grow if you put them in a basin of water. He had these growing and had a beautiful plant with heavy leaves in a dishpan with a culture solution, and they were getting along fine. He had some trouble with aeration of the water and he rigged up an apparatus to bubble air through the water in the pan. Something went wrong with the bubbling apparatus and he called me in to see that tree. It was all wilted down because the artificial bubbling of air had stopped. He got the air started through bubbling again, against the roots of this plant and it recovered. So the avocado is a plant that likes to have plenty of oxygen in contact with its roots.

The first hard problem I had in Cuba years ago had to do with this subject. Our avocados were on some heavy black land, underlaid with a close type of hard pan. It had rained more that season than usual and some of the avocado trees had started to die. They were good sized trees—perhaps twenty years old. They asked me to look at these trees. They were in soil that wasn't well drained—very heavy sub-soil. Undoubtedly their dying condition was due to too much water. The avocado is perhaps the most particular of all trees we have about having plenty of air around its roots; it wants plenty of ventilation of its roots.

Mr. Christie: While you were speaking about conditions in Cuba, I recall an observation I made in Jamaica last summer that checks very closely. While Jamaica is not a commercial producer of avocados, yet they have avocados there; they grow wild there. To the best of my knowledge, all of the avocado trees I saw in Jamaica were always located on a well-drained soil of a gravelly nature, or else up on the side of the hill somewhere, where the contour of the land was such that it would drain satisfactorily. Of course, most parts of Jamaica have a very heavy rainfall. Evidently, there is much truth in these practical observations as to the behavior of the avocado under saturated soil conditions.

Dr. Coit: For the information of Jean, my paper for tomorrow is already written, in regard to the effects of the freeze on avocados. I have these effects classified as beneficial and injurious. One of the beneficial effects was the prevention of such widespread losses in this unusually wet weather.

SUDDEN CHANGES DISASTROUS

Dr. Webber: Dr. Coit expresses the same opinions that I had expressed at that time. In the first class in citriculture that I had, I had the boys examine roots under a microscope, to find root hairs. Of course, I knew they wouldn't find them but pretty soon one fellow called me over and he had found a root hair on citrus. Later on, one of the men brought up the question of why and under what conditions root hairs developed in citrus. You would expect that root hairs would develop more commonly in dry than in wet soil. They seem to be more or less related to the question of air absorption rather than water absorption. No other fruit requires as high a quantity of oxygen as the avocado. The plant adjusts itself to its environment, if it has an opportunity to adjust itself. If, therefore, you adjust the water culture, the plant will adapt itself to the condition of water that you have; but if you change the environment, as Miller explains, the results are disastrous.

Mr. Christie: We have with us tonight Mr. Gardner, Chairman of the Avocado Department of Orange County.

Mr. Gardner: I haven't anything to say tonight. I thought I would just come in and have a good time.

Mr. Christie: Then I will call on Mr. Millar.

Mr. Millar: You can't learn anything from me except that I want to bring greetings from the boys down in San Diego and tell you that we are having about the best year we have ever had in our Farm Bureau Department. I am glad to be here with you tonight and tomorrow.

Mr. Gardner: In former years I have had trees apparently killed by too much water. A few of them died clear back and started shoots near the bottom and made a good tree. This year I had some young trees planted out that were frozen badly. Some of them were frozen close to the bud. They have started out now and I will follow Jean's suggestion and will let them stay in. They have gone far enough now to where they have started some good shoots just above the bud union. Some are 18 inches to 2 feet long, now.

Question: Can someone clear up the idea as to whether suckers should be removed?

Mr. Russell: This spring I consulted different tree grafters and got some different ideas from some of them as to whether or not it was best to cut off these big trees entirely or whether it was best to leave some portion of that tree to support the graft. If you cut the tree off entirely, a portion of your roots will die. It has been demonstrated that they will die if you do that kind of serious tree surgery on those trees. I would like to have some of these experts enlighten me on this.

SHOOTS PREFERRED TO NEW TREES

Mr. Barrett: I haven't seen any reason for serious disagreement. There are one or two points I will touch on. The first one is the last question of thinning the shoots. My experience in the past has been that it would be far wiser to leave those shoots entirely alone during this present year, except possibly some light support that might be necessary to keep them from going into a horizontal position. They grow rapidly and they are soft and are apt to get out of a vertical position. I would lean to the Scotch side, not so much from the standpoint of economy as I would from the viewpoint, as I have often expressed it in both my written and verbal views, that to rebuild a tree with well established roots, you're far better off than to start a nursery tree. Now, I haven't anything against the nurserymen, but I do think that in many cases where the stock perhaps hasn't been too good to start with, and also where the care hasn't been too good, that much of that original head that came on the tree from the nursery will eventually have to be removed if you are going to get a good head on your trees. I would prefer any of these shoots if the trees are frozen to the ground, that are of good Mexican stock in preference to any new nursery tree that I could put in at any time. I have about two dozen trees on the ranch at San Fernando, and some eight or ten of those were tender varieties—Prince and Princess—and they did not freeze below the bud union but they did get a severe jolt. I took the opportunity to cut them off below the bud union and will be grafting them to other varieties later on.

I think anybody who had a vigorous tree before the freeze would be foolish to replace with nursery stock, at any time. I am not in favor of cutting the tree off at the ground. However, I will say frankly that some operators are doing that and showing good results. I still don't believe in it, however.

Mr. Christie: When you have this crop of new shoots coming up, low down, do you recommend that, as early as possible in the spring, you select one of those that you think from the standpoint of its vigor and position will be the new tree, and then cut the other ones back?

Mr. Barrett: I wouldn't do it too soon.

Christie: I meant in the summer time.

Barrett: I think you will find that nature will take care of part of that question, herself, because one of those shoots will take the lead. Then you can encourage that particular shoot by pinching the terminals out of the others. I also believe it is going to be a question that is going to come before a good many growers where their trees are coming out with shoots all over the trunks, like hair on a dog's back, as to whether or not they should thin some of them out. I think the more the trees are left alone this year, the better off they will be.

James Hoffman: Anybody have any opportunity of working all those shoots over into your strongest shoot? In other words, if shoots are coming out all over the tree, to work them into one shoot. I mean, would you continue the growth all around or cut them all off?

Jean Miller: Your statement is that where there are limbs coming out all around, that if you rub off some of those sprouts early . . . (interrupted by Hoffman)

Hoffman: Take the strongest of the buds and graft them together into one strong shoot by inarching?

TIMES TO GRAFT—AND "SQUEEGEE"

Dr. Coit: Before I speak on that question I would like to say something on the freeze question—as to whether or not a large tree, more or less frozen, which is desirable to graft over, should be cut off suddenly near the ground. My opinion is that it depends altogether on the tree, the time of the year, and the condition it is in. There are many cases where avocado groves with hundreds of large avocado trees have been cut off close to the ground without question, and grafts have grown up into fine groves today. There are other cases where I would not think of doing that. In fact, I would be very careful to allow for the free flow of sap. In other words, it is in the winter time when you should do your grafting, when the tree is dormant. But if it is in the summer time, or at any time when the growth of the tree is in the flush or the sap is active, then considerable care should be used in suddenly cutting it off. The effect of cutting it off suddenly, when the sap is active, is to develop in your grafts a condition we call "squeegee." I think Carter will recognize that term. The grafts get very thick and red and in a condition which is not satisfactory. Those grafts finally straighten themselves out, but not nearly so well as when they develop under proper controlled sap supply and do not go through the "squeegee."

Harry Marsh: This morning I hauled six trees to replace frozen trees that the owner said were beyond recall. I got into his orchard and found from three to five nice shoots just above the bud union, so I decided to take my trees back home. There is one thing that hasn't been brought out tonight. That is, a condition which occurs very often where perhaps just the top of the tree is frozen. Now the question is, where to start the new tree again. It has been my experience that a trunk that has been damaged at all, the nearer you can go back to the bud union, the more satisfactory the new growth is likely to be.

Barrett: Most growers, and particularly people around the city, where they are not so familiar with these freeze problems, are altogether too impatient about these things. Nearly all of our plants and trees, with the exception of exceedingly tender plants, will come back and make a good showing. I will admit I was almost on the point of pulling out a nice group of cherimoyas at the ranch. But only now I can see definite signs of growth coming along on those trees. I thought that those trees were gone, yet at least four out of six are coming through very nicely.

Question: How about uniting these shoots to make a common trunk? Have you any assurance that those shoots will ever combine into a trunk, or will they always remain separate individuals?

INARCHING SHOOTS

Dr. Coit: If properly inarched they would unite but I feel such a tree would be somewhat weak in resisting a windstorm and might buckle and fall over.

Barrett: It would depend a little bit on how many shoots were put together.

Hoffman: My theory is that it would strengthen the tree, more than anything else.

Marvin Rounds: I want to say that on the Alta Mira Ranch we had a demonstration by several grafters and budders. There is a tree there now which was operated on by Dailey in that manner—that tree is now about ten feet high. It would appear that these parts that were inarched are going to grow together and make a satisfactory tree. It has been four or five years since that tree was operated on.

I want to make a statement about this water situation. It has been interesting to me to read about a symposium on irrigation in the 1917 Yearbook. Many years ago, according to the experience of some old timers, it was necessary to keep water running on the roots all the time. Some others got up at this symposium and said, "If you do that, it will kill the trees." Also, in that same report of 1917, referring to the avocados growing in Central America, I find a report there of bringing in various Guatemalan varieties by Wilson Popenoe. He mentions that while he was in the Valley of Antigua he found most of the trees from which he obtained buds. These were in a soil which was very well drained and was made up of volcanic material. Therefore it wasn't a very heavy soil. He seemed to find more growing in that particular valley, indicating that a heavy soil is not so good for avocados and well drained soil is much better.

Christie: The chairman feels it is about time to adjourn the meeting. I have three reasons for this. The first reason is that we have had a good time. The second reason is that some of my good friends cannot contain themselves for a smoke; and the third reason is that we are meeting again tomorrow and will have ample time to listen to some more experts.