

Reflections, Reminiscences, and Observations

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President Griswold, Ladies and Gentlemen of the California Avocado Society:

They have me billed here as an old timer, and I might as well accent it. I guess. In fact, I have had to do so for some years now. About ten years ago I was going over to Haiti on a steamer, and late in the evening we gathered on the afterdeck—one of those convivial little affairs, you know—and I sang a few Spanish ditties for the edification of the tourists. The next morning one of them asked my roommate, "Who was the old man singing those songs last night?" And only yesterday, here in Santa Ana, I met one of my old classmates. Later he said to his wife: "That was Wilson Popenoe, one of my classmates." She replied, "Why, he can't be; he has gray hair."

Anyway, to go back: About 1913, I published a paper on the future of the avocado industry in California. I ventured the prediction, without too much confidence, of course, that a quarter of a century would see the avocado rival the orange in importance. I guess I'll have to beg for a little more time; but the avocado industry certainly is coming along.

I don't see many of the old guard here today, though over at that table is William Hertrich, who was working with avocados just about as early as any of us—earlier than most. It makes me feel sad to realize that there are so few of the old timers left. I don't know, but I imagine very few of you who are here today, had much contact with the beginnings of the avocado industry. But you have read all about those early days. Most of the story is in Bob Hodgson's remarkably fine bulletin which I hold here in my hand; it has recently come off the press, I believe. This bulletin makes me feel very humble because I realize how far you have gone since those days of the early 1900's when we

first began to talk about the avocado as a commercial possibility in California.

I haven't had the pleasure of being with you for nearly fourteen years. In fact, so far as I can recall, I have only attended three of these annual meetings. The last one was at Whittier about 1927. One was in San Diego, and one was at Riverside just after I had come back from Guatemala, about 1920. I had been down in that republic more than a year and a half, hunting avocados to test here in California, and I guess I had lost quite a bit of weight; for after I finished telling about my travels on horseback all through that country, an old fellow in the back of the hall rose to his feet and said, "Mr. Speaker, could I ask one question?" I assured him, of course, that he could. "About how many of them alligator pears do you think you have et down there in Guatemala?" I didn't remember, of course, but I had sampled a great many of them trying to decide which ones were worthy of introduction and trial here, so I replied, "Oh, probably over a thousand." He sat down, shaking his head, and I heard him say, "My God, they claim that fruit's fattening."

Well, it has been a great treat for me to go around with your President these past few days, and see what is taking place in California. I had no idea there were so many avocado groves here. To one who has been away so long, it is a very impressive sight. Of course, it gave me immense pleasure to stand in Mr. Anthony's grove near Fallbrook, and realize that it is composed almost wholly of two varieties which I had a hand in establishing here. For I budded the first Fuerte tree, using the buds Carl Schmidt sent up from Atlixco; and Nabal is one of the varieties I selected in Guatemala and sent up to Washington. All of you know the history of Fuerte. The parent tree of Nabal was growing in a small coffee plantation at Antigua. It was a young tree, but it was producing a tremendous crop of fruit, so I gave it the name "Nabal", which in the Indian language means "abundant, bountiful producer"—every third year!

Before speaking further of the early days, I want to ask if you realize what your Society has done for the industry. I think its record is unique in the history of horticulture. The Founding Fathers profited by experience in other lines, they foresaw your needs, and they left no stone unturned to see that you got off to a good start. For instance it was fifty years after the navel orange was brought to California, before anyone went back to its native home to see if we had the best strain, or had overlooked any important points in connection with its culture. I had the pleasure of taking part in that first horticultural pilgrimage to Bahia, Brazil. Our leader was A. D. Shamel, who has done so much for the citrus industry in California, and the other member was P. H. Dorsett of the United States Department of Agriculture. We went down in 1913, on the same steamer which took Theodore Roosevelt to the River of Doubt.

The avocado got off to a better start. Only a few years after we first began to think of avocados in California, we began to reach out. We knew we only had a few trees here; there were lots of them in tropical America, and we figured there must be plenty which were superior to those originated here up to that time—the Chappelow, the Harman, the Ganter, and so on. Carl Schmidt was sent to Mexico by the West India Gardens. He visited the two biggest centers of avocado growing in that country, Queretaro and Atlixco, and he got the Fuerte. I was telling Harlan yesterday, "You know Fuerte cost the West Indian Gardens five thousand dollars." He came back at me quickly, "It cost the avocado growers of California a lot more than that!"

It has been a source of disappointment to me that Fuerte has not behaved as well everywhere as it did in Mr. Whedon's first little grove at Yorba Linda. I don't know why; in fact I don't know anything about modern avocado growing. Bob Hodgson's bulletin has brought this home to me. So I shall not enter into any polemics about sunblotch or tree decline. I will stick to my story of the early days, where nobody can trip me up.

We do not have a very clear record of early introductions of the avocado in California. I have always felt the Franciscan friars must have brought it from Mexico, when they came to establish the first Missions. They brought the grapes, the fig, and even the white sapote and the capulin cherry—and if they brought these latter two they certainly would not have passed up so good a fruit as the avocado. But if they brought it, we seem to have no record of it, and we do not know that any trees survived to our day. Probably they wouldn't anyway, especially if they were planted in heavy soil.

The earliest introductions, of which we know anything, seem to have been made after 1850. In my time there were still a few old trees about, but the oldest one known to our generation was that planted at Santa Barbara about 1870 by Judge Ord. It was gone when I first visited that town about 1908, but Dr. Franceschi had a photograph of it which I published in the Pomona College Journal of Economic Botany, if I recall correctly.

Even before 1900, a few enthusiasts were already thinking of avocados J. C. Harvey, Juan Murrieta, and Ernest Braunton at Los Angeles, and I believe Jacob Miller down in Hollywood, were planting seeds from Mexico. I believe Juan Murrieta got seeds from Atlixco—and there could have been no better place. C. P. Taft was getting interested at Orange, only slightly later, and old Billy Chappelow at Monrovia had his Mexican seedlings which attracted much attention but are now forgotten. Up around Santa Barbara, Kinton Stevens and Judge White and others had planted a few trees, but we never got any promising varieties out of them—I believe they were all seedlings of the Mexican race. It was the material from Atlixco, grown in the vicinity of Los Angeles, which really gave us our start on the road to an avocado industry.

We are hearing today about another trip to Atlixco—I believe it is scheduled for some time next year. Those of you who haven't seen that Mecca of all avocado enthusiasts ought to seize this opportunity to do so. In all my travels, from California to Chile, I have seen no other place which has so many interesting avocado seedlings.

In recent years I have asked myself, when was the first avocado tree budded in California, and by whom? I don't know why we didn't make a record of this at the time, which must have been somewhere around 1906 or 1907. Previously, George B. Cellon at Miami, Florida—and I would like to say that Mr. Cellon, who died only a year or two ago, was really the father of modern avocado culture—had picked out a couple of seedlings at Coconut Grove, named them Trapp and Pollock, after the owners, and had propagated them by budding. This was in 1901. Horticulturists in California, such men as C. P. Taft, must have known of this, and perhaps they were commencing to experiment with budding by 1905. Mr. Taft could have told us; it is regrettable that we did not get the story from him before he died. When I first knew him, about 1907 or 1908, he had some budded trees; and William Hertrich was budding about that same time. We started budding at Altadena about 1908 or 1909, in a small way, and with very

indifferent success; I believe D. W. Coolidge of Pasadena, a great avocado enthusiast, gave us the idea.

Everybody who had a seedling tree producing fruit in those days thought it was the world's finest, and all of us who were in the nursery business, or went into it at that time, propagated these trees and tried to outdo each other lying about them. Fantastic claims were made regarding the profits to be derived from avocado culture—Mr. Walker's pet tree in Hollywood bore 2000 fruits per year, they sold in the Los Angeles market at 50 cents apiece and you could put 80 trees on an acre of land, so just figure it out for yourself. Mr. Ganter down at Whittier insured his tree for \$20,000, I believe it was—another thing calculated to impress the public. Budded trees were sold by nurserymen at \$3.50 to \$5.00 each, which sounded mighty high in those days but doesn't sound so high now.

I imagine about the only place you can find these early native sons is in Dr. Condit's check list. The importance of this list, by the way, can hardly be overestimated; for it contains the names, histories and descriptions of not only all varieties which have been propagated in California since the beginning, but most of those grown in other parts of the world as well. It is one of the outstanding contributions which have been made to the avocado industry.

Another feature of this industry is the remarkable series of Yearbooks. We cannot adequately express our gratitude to Dr. J. Eliot Coit for having brought together the material and edited this series without a break, down to the present day. I do not believe there is another horticultural industry in all the world which has been so completely documented from its inception. Thumbing over these volumes, one gets an interesting picture of the rise and fall of varieties, of developments in cultural practice, of the appearance and solution of new problems (some of them not yet solved!) and of progressive advances in the marketing of the product.

You have been wise, and perhaps fortunate also, in having your Variety Committee, which from year to year has given you the best possible advice regarding varieties to plant and where to plant them. The members of this Committee, past and present, deserve a great deal of credit. In the early days we did not realize that the variety problem would so long remain a difficult one. We thought we would get avocados as generally satisfactory under a wide range of conditions, as are the Washington Navel and Valencia oranges in the citrus industry, Failure to do so has been, to me, one of the few disappointments. When Fuerte did so well the first few years, we did not dream that it was limited in its climatic adaptations. We thought there was only one climate in the avocado belt; we thought the only limiting factors were frost, on the one hand, and the desert climate on the other.

Search for Varieties in Tropical America

The whole problem of finding satisfactory commercial varieties has been the one which has most interested me from the start, and I regret that I have not been able to do better by you. At the instigation of your Society. David Fairchild of the United States Department of Agriculture secured funds to finance ten years' search for good varieties in tropical America. I had the pleasure of carrying out most of this work, and we thought

we had covered the ground fairly well; but apparently we never secured anything as good as Fuerte. One trouble seems to have been this: we thought the industry needed fruits a pound or so in weight, and we looked mainly for the big ones: and now the boys tell me the ideal size is not much more than half that! What a lot of good ones we must have passed by!

But to go back to the early days: We plugged along, trying to grow and sell avocado trees at prices which we thought were very good, but which, as I have said, do not look so good now. Frost took most of our profits—when there were any profits. I remember the year we had about 8000 budded trees at the West India Gardens, all sold on advance orders for delivery in March, with one-fourth the price paid in advance, and in February we were frozen out. We could not refund the money we had received, so I went to Honduras. You know at that time there were no extradition laws in Honduras. The West India Gardens folded up: we never knew how much money we had lost, but we had accomplished a few things: we had introduced Fuerte, and we had started several men on their careers as avocado growers. T. U. Barber was one of them, and Carter Barrett another. Knowles Ryerson, now Dean of your College of Agriculture at Davis, worked with us for a while, as also did Ralph D. Cornell, one of your leading Landscape Architects.

And my father, F. O. Popenoe, who had founded the West India Gardens, was able to end his life happily, sitting under one of the original Fuerte trees at Altadena—for we had left several in the nursery rows where we had put in the buds Carl Schmidt sent from Atlixco. It was always a great satisfaction to him to watch the progress of the young industry in the development of which he had played a part.

What Name for the New Industry?

In the early days, nearly everybody called this fruit alligator pear, although a few people who had been in Mexico called it aguacate. The name avocado had been officially recognized by the American Pomological Society—the arbiter in such matters—and all of us thought this name was preferable to alligator pear, and easier to pronounce than aguacate. So when the Society was first formed, it was the California Avocado Association. Then a year or two later, Doctor Franceschi of Santa Barbara, the dean of California plants-men, urged that the name be changed to California Ahuacate Association and he wanted to spell it with an “h”, instead of a “g”, as being more in line with the authentic Spanish form. This was tried, but did not stick; avocado was so much easier, and most of us were willing to accept anything which would do away with alligator pear. I am happy to think that you rarely hear this name in the United States these days, though it is still much used in the British West Indies.

You know, the early colonists in tropical America, British and Spanish, thought all the new fruits looked like something they had at home, so they called most of them apples, plums or pears—usually adding a qualifying word to make it clear they were not talking about the northern species. Thus we got such names as golden apple and hog plum and star apple and alligator pear. Strange as it may seem, the word alligator was not given because of any connection with that animal; it came about in this way: when the British took Jamaica away from the Spaniards in 1657, they found aguacate growing on

the island. They had been brought there from the mainland. The fruit was usually pear shaped, and naturally they couldn't pronounce aguacate, so they evolved a series of corruptions—albecato, avogato, and finally alligator, which was much easier to remember. You can trace all this in the early literature.

Origin of the Pictograph

We have just seen two distinguished members of this Society receive the Award of Honor, a beautiful gold emblem decorated with the Aztec pictograph which means Ahuacatlan, "the place of the avocado trees". Perhaps you may be interested in the story behind the use of this pictograph here in California. Many years ago—it must have been about 1910—we received at the West India Gardens a letter from a man in Mexico, a lumberman, named Riordan. He was interested in the avocado, and he told us that a Jesuit priest in his neighborhood—I remember the name of this priest; it was Camillus Crivelli—had shown him an Aztec pictograph which he thought was very interesting. He sent us a rough sketch of it. A few years later, when I was in Mexico, I got into one of the old libraries and found a book, which contained this pictograph and a lot of others. They were, in the main, taken from one of the "tribute rolls" of the Emperor Montezuma, found at the time of the Conquest. It appears that Montezuma kept a record of what the inhabitants had to send annually in tribute—the inhabitants of towns, which had been conquered by warriors of his tribe. The names of the towns were represented by pictographs, and under each one there were pictures of the expected tribute—so many bags of cacao beans, so many rabbit skins, and so on. The town Ahuacatlan was represented by this conventional figure of a tree with three branches, and the little ellipsoidal fruits on it mean that in this particular case it was not just any kind of tree, but a special sort; an ahuate tree, though the fruits may not look much like ahuate to us. The teeth in the trunk of the tree constitute the conventional sign for "place where", so altogether we have the name Ahuacatlan, place where ahuate grow. There could be a lot of towns in California with that name, couldn't there?

Twenty-Three Varieties from Guatemala

Probably, this is enough about the background of the avocado industry. I dropped out of the local picture pretty early, for in 1912, I left for Arabia with my brother Paul, to bring back some date palms for the Coachella and Imperial Valleys; and then I joined Dr. Pairchild's staff in the Department of Agriculture at Washington. I have already mentioned that he sent me first to Brazil with Shamel and Dorsett; and then in 1916, I commenced the long series of avocado explorations in tropical America. After spending a year and a half in Guatemala, where I picked out 23 varieties for introduction into the United States—unfortunately none of which has lived up to my expectations—I went on down to Costa Rica, where I didn't find any varieties of interest, and then into Colombia, where I found nothing but seedlings of the West Indian race, and then into Ecuador where I found an interesting group of seedlings in the Chota valley, not far from the Colombian border. Somebody had brought the Mexican race into this valley, probably in very early times, as well as the West Indian, and I got some varieties which looked like hybrids, and which I hoped, because of their Mexican blood, might do well in California. Unfortunately, they have not proved of any value here, which is regrettable because

some of them were of fine quality and just about the right size.

I found little of interest in Peru, and in Chile only a lot of Mexican seedlings, not as good as some we already had in California. On the trip with Shamel and Dorsett I had been able to get a pretty good look at the avocados of Brazil, which are West Indian seedlings, and in later years I went through the West Indies, and Venezuela. So all in all, I have seen just about every part of tropical America where avocados are grown abundantly, and the upshot is that Mexico and Guatemala have practically a monopoly on forms which are interesting to us here in California. It is my feeling that any good varieties which may be introduced in the future will probably come from one of these two countries.

The Search for Better Rootstocks

However, the day of new varieties from abroad seems to be past. Dr. Colt and others tell me they have more hope for varieties of local origin, and there is enough good material in this State already to furnish a background for the production of good local seedlings. You are developing such things as the Hass, which may prove better than anything we could get by going back to Guatemala. Interest now seems to have turned toward wild avocados which may prove valuable as rootstocks. If we could find a wild form, either an avocado or one of its relatives, which would give us a congenial rootstock resistant to what you call tree decline, we would really have something. Your President, Harlan Griswold, Carl Crawford, and Dr. Schroeder of UCLA are working actively on this problem, as well as others, and it seems to me there is a strong probability that they may turn up something worthwhile. We hope to give them some help from the tropical end.

Classification of Races of Avocado Still a Puzzle

Incidentally, the projected study of wild avocados may clear up a matter, which has been perplexing me for many years. This is the classification of avocados. Is more than one species involved, and what is the origin of the horticultural races? We still have a lot to learn. For example, we have always felt that the anise-like odor of the leaves is a characteristic of the thin-skinned Mexican race; but in Honduras and Costa Rica I have found wild trees which produce fruits with shells as hard as any Guatemalan, and which at the same time have the anise-odor in the leaves, to an even greater extent than most of the Mexicans. And again, we are finding it harder and harder to distinguish the Guatemalans and the West Indians by any characteristic except the length of time between flowering and maturity of the fruit. In the West Indian, it is only about six months; while in the Guatemalan it is twelve to fourteen. In Guatemala, last year's crop is still hanging on the tree when the flowering for the new crop takes place; and this is probably what accounts for that regrettable habit of alternate bearing. A tree in full production has not accumulated enough reserves at the time the next flowering season comes around—for it is still maturing a crop; and you just simply don't get any fruit that year. Oftentimes the trees do not even flower every year—they skip one.

So I believe this wild avocado survey, which is starting, will prove highly interesting, and in five years more we ought to know a great deal more about avocados than we do today. Someone has mentioned the possibility of getting hardier varieties. Personally I

don't hope for much along this line. In Guatemala I tried to get hardy varieties by going to the highest elevations at which avocados are cultivated—about 7500 feet—and I don't think these varieties have proved any hardier than the ones from 5000 feet, even though they get pretty sharp frosts at 7500. If we can find a wild form growing at ten or twelve thousand feet, we might have something to hope for; the plant breeders might be able to instill hardiness into some of our good varieties by crossing, but so far, I have never seen a wild avocado above 9300 feet. There are plenty of wild trees in Guatemala at that elevation; they look like the Guatemalan race, for they have no anise-odor, and the fruits are small and hard-shelled. In fact, I suspect that the horticultural varieties of the Guatemalan race have been derived from these wild trees through centuries of cultivation and selection. It will be worth while trying some seedlings of this wild form in California to see if they prove hardy.

The Intriguing Quest for Hybrids

Speaking of hybrids or crosses, I still feel pretty hopeful regarding the possibility of finding or developing new and valuable crosses between the Guatemalan and Mexican races. As you know, we have always considered that Fuerte is such a hybrid; but the investigations of Professor Hodgson and others have made us wonder if it is a recent cross, or whether it represents a group which may have originated through hybridization of the two races along time ago. When we got the Fuerte we thought it was a first-generation natural hybrid and that we had something unique; but later visits to Atlixco indicate that there are a good many other seedling trees in that neighborhood which are similar to Fuerte. I have even gone so far as to say, in one of the Yearbooks, that Fuerte may represent a distinct race. I still think we ought to look into this possibility, and as a matter of fact we plan to do so. Maybe there are some other seedlings at Atlixco which produce fruits which look like Fuerte, and which will grow in regions where that variety has not been successful. I realize that not many members of this audience will share my enthusiasm over this possibility; but it is hard for a man who has spent a good part of his life hunting for new avocados in tropical America, to realize that he has outlived his usefulness.

Good Commercial Mexican Variety Still Sought For

Another point to which I don't believe we have given enough attention is this: good varieties of the Mexican race. Just because Mexican avocados are small, and do not ship so well as Guatemalans, we passed them by in the early days, and all went after what we thought were ideal commercial varieties. But anyone who knows the Mexican avocados well, knows that they are, or can be, mighty fine eating. They are hardy. They have a different season from the Guatemalans and they are more reliable bearers. If only for home use and local markets, it seems to me a Mexican of good oval form, about 10 ounces in weight, and with a small seed, would be something very much worth while. I have seen such fruits in the markets of Mexico, but I was never able to find one of the trees. It is pretty hard to track a fruit from the market back to its source; most commonly, the people who sell it (especially in the larger cities) bought it from someone who bought it from somebody else who grew it. I doubt that we will find anything very choice at Queretaro, even though the famous Canada near that city probably has more Mexican seedlings than any other area of its size in the republic.

Now, I would like to talk a little while about a very different subject. For the past five years I have been assisting in the development of an agricultural school down in Honduras, a school which seems to us rather different from others; and some of my friends here have urged me to tell you about it. I am glad to have the opportunity to do so.

Educated Farmers Needed in Tropical America

Agricultural education in tropical America is mainly along professional lines. Of course we need some professional men—soil chemists and agricultural engineers and pathologists and physiologists; but for every one of these, we need at least a thousand good farmers, and there have not been many places where boys could get good sound training in modern farming. The United Fruit Company—which I believe is considered the biggest farmer in the world, for it farms more than a hundred thousand acres in bananas, a hundred thousand in sugar cane, thirty thousand in cacao or chocolate, and considerable areas in new crops—thought it would be a good idea to build a school for tropical farmers, a school where boys could learn how to farm the modern way, under their own condition of climate and soil. The Company thought such a school could well form one of its contributions to the welfare and development of the countries in which it operates, so it was decided that boys who came to the school would not have to spend a cent; they would, of course, be chosen carefully, and in the main they would be boys who could not afford to go abroad for education; but they would have to be boys of rather unusual ability, so that they could profit fully by the opportunity given them.

I was busy studying problems of banana growing, and working on new crops which the Company wanted to establish in tropical America, when I was called to Boston in 1941 for a talk with our President, Samuel Zemurray, who had spent much of his life in Central America and who has a practical outlook and a sound philosophy which to me has been a great inspiration. He told me, "We are going to build an agricultural school and you are going to run it." That sort of took me off my feet, but I pulled myself together; after all, it had been a desire of mine for years, to teach tropical horticulture; I had even hoped that some day I might be invited to come back to California and do it. But this was even better.

Founding the New School for Farmers

So I said "Sure, when do we start?" Mr. Zemurray explained what kind of school he had in mind; and then he ended up, "We have put five hundred thousand dollars in the bank to your credit; go back to Honduras and build the school and make sure it is a good one."

We picked out a pretty valley in the highlands of Honduras—just high enough so the climate would be agreeable but not too high for such tropical crops as sugar cane and mangos and avocados. We were lucky to find the spot; it was called to our attention by the President of Honduras, General Carias, who was keen to have the school in his country. The government owned the property, in fact; it consisted of about 3000 acres, of which more than a thousand was good valley land, suitable for crops and stock raising, and the rest was mountainsides, covered with pine forest. We found a fine supply of water for domestic use, and another for hydroelectric power and irrigation. It

seemed almost too good to be true. Your President Harlan Griswold and one of your distinguished members, Carl Crawford, visited the place last year and they can tell you whether I am lying about it or not.

I asked for the help of a couple of my old buddies in the Fruit Company, one an engineer and the other a horticulturist. We started in to build a school for 160 boys. We didn't have any architect—some folks say it looks like it— but we stuck to simple tropical construction and we almost built the place out of the ground; for we used stone cut on our own property, we made our own brick and tile, and the timber was cut on the mountains within sight of the school.

We ran into only one snag. When we came to design the main building, we finally had to ask the folks in the home office to help out. They sent down some plans which we didn't like, and we were still worrying over the matter when a young Honduran who had just come back from the States, where he had studied architecture at the University of Southern California, called me up and said, "I've got it. Come over and see." I went to his office and he pulled out a magazine with a picture of the Los Angeles Union Station. We used it, and everyone says it is a great success. So, you see, California has contributed something to our school.

Boys all over Central America were hearing about the project, and writing to us for scholarships, so we picked out 72 in the summer of 1943 and opened our doors—and there weren't many of them at that time, for we had only half finished the job. The boys came from eleven countries, all the way from Mexico to Ecuador.

Strong Emphasis on Practical Training

We put the emphasis on practical training rather than classroom work, but every afternoon we have classes in such things as English (which all the boys want to learn), and biology, and mathematics, and physical sciences, and tropical crops, and animal husbandry, and rural engineering. We drew our teaching staff from everywhere—the United States, Guatemala, Honduras, Costa Rica and Columbia.

Some folks thought Latin American boys wouldn't take to hard manual labor; but they do, for two reasons. In the first place, they realize that they won't make good farm managers unless they have learned by practice to do the job themselves, and in the second, we all get out and work with them; there are no white collars on the place, and you only see a necktie on rare occasions. We try to take good care of the boys; we have an excellent medical department, and they get all the good wholesome grub they can eat. We give everything—clothing, food, and even haircuts every three weeks. Many of them do not get a cent from home, during the whole three years they are with us. We turn them out with diplomas but no professional degree or title. We think this may help to keep them on the land.

We have already turned out something over a hundred graduates. Many of them have gone back to their own farms. Others are doing extension work. A few are managing farm properties; one of them has under his charge the best farm owned by ex-President Somosa of Nicaragua—and this really means something. They tell an amusing story down there. Some years ago, President Somosa was driving through the countryside when he passed a particularly fine coffee plantation. "Wait a minute," he said to his

chauffeur. "I want to look at this farm." He got out and looked around, and then asked for the superintendent. "Say, I like this farm. I want to buy it. Who is the owner?" The superintendent replied without hesitation, "It belongs to President Somosa."

To make it democratic, we take in boys of all classes, though as I have said, we favor the unusually bright but poor ones. And the fact that we have boys from so many countries builds for a genuine Pan Americanism. They discover that they are all just about alike, and they are inclined to forget the petty differences which have at times caused friction between their various countries. They must enter between the ages of 17 and 20, for we want them to be ready to accept responsible jobs when they come out. Some of them have had only common school education; others may have been through high school. It doesn't make much difference, for very few of them have had much previous preparation in the subjects we give them, and no one has had the sort of practical training we provide; four hours of field work each morning except Sundays and holidays, the first year in horticulture, the second in field crops, and the third in animal husbandry.

We get a lot of fun out of the job, and we have some amusing experiences. One day I asked a boy in my class: "What is the longest day of the year in Peru? I have just told you that the longest day here in Honduras is the 21st of June." He replied, "How would I know, I came from Panama." Which reminds me of the remark made by an Indian who worked with me on my first trip to Guatemala, way back in 1916. We used to travel on mule back—nowadays you do it by airplane—and we always got up early in the morning to hit the trail. One morning we had been riding almost two hours before we saw the sun coming up, so I turned in my saddle and said to Jose, "At this time of the year the nights are long, aren't they?" He replied, "Yes, indeed, and so are the days."

If I don't stop talking, you will be saying the same thing. I thank you. (Applause).

President Griswold: I don't think we ought to let Dr. Popenoe get away that easily. He certainly knows a lot that he hasn't told us today. Wouldn't you folks like to ask him a few questions? I am sure we can get him up here to answer them.

A Member: Where was Dr. Popenoe born?

A Member: Will you tell us something of cultural practices on the avocado plantations, I suppose you call them, in Central America?

Dr. Popenoe: I will answer the first question first. I was born in Kansas, and don't you dare laugh, either. But I grew up in Pasadena.

About the cultivation of avocados in Central America. There really are no plantations. This is true of practically all fruits, with the exception of Citrus, and there are not many Citrus orchards either. Avocado trees are grown in dooryards, and sometimes in coffee plantations, as shade trees for the coffee bushes—for coffee is a delicate plant and in many climates cannot stand the open sun. Budded avocado trees are almost unknown in general cultivation. The trees are all seedlings, and no two alike; that is why it has been such a job to find the best ones, and at the same time, why we have had such an opportunity, in searching for new varieties. Incidentally, I want to tell you about the history of a tree of the Nimlioh variety which is growing near my home in Antigua. I sent budwood of that variety from Antigua to Washington almost thirty years ago. From

Washington young budded trees were sent to Florida. From Florida we got some budwood and grew a few trees at Tela, Honduras. From Tela I took a budded tree over to Antigua and planted it within a few blocks of the spot where the parent tree had grown. The parent disappeared, years ago.

Outside of Central America, a few orchards are beginning to appear, in Mexico and Cuba especially. Guatemala, the country where you would expect to find orchards, because the avocado is such an important article of everyday diet probably has no orchards because there is no export trade in this fruit and local prices are so low that orchards would hardly be profitable. I used to buy avocados in Antigua, for seed, at 12 cents a hundred; but they have gone up in recent years; they sell as high as two cents apiece nowadays. They are seedlings, of course, but they are oftentimes fine large fruits—like this Nabal I have here.

A Member: Are there many groves in Cuba, or are most of the fruits just gathered wild?

Dr. Popenoe: There are a few groves, rarely over a few acres in size, around Havana, but most of the fruits come from seedling trees which grow singly or in small groups around the homes of the country people. About twenty years ago a few enthusiasts, among them Fausto Menocal, who was President of Cuba, started seriously to plant orchards, using some varieties they had propagated locally, others they obtained from Florida and California. There were also a few groves started in Puerto Rico .

And now I am going to tread on dangerous ground, and I hope Bob Hodgson won't trip me up. I promised myself I wouldn't touch on this tree decline business. But the majority of those early groves in Cuba and Puerto Rico failed, and they failed from some cause which certainly suggests what you call tree decline. They were on heavy soil in most instances, and the trees after a few years commenced to die back, and kept dying. I saw quite a few of them.

In Cuba you find avocados flourishing on the shallow limestone soils. When you go East of Matanzas, out into the sugar cane lands, you don't see any more avocados. And in Puerto Rico, you don't see many avocados on the heavy cane lands around the coast. You see some on the soft and porous limestone soils toward the southwest corner of the island. These limestone soils are something like the soils of the Miami region in southern Florida—and we don't hear much talk about tree decline in that region, so far as I know.

Again, in Jamaica, you find avocados principally in the region of porous limestone soils. You don't see them on the heavy cane lands along the coast. And in Honduras, we have been growing avocados for twenty years now, and we have had lots of trouble on heavy soils, or lands which were subject to flooding once in a while—even if they were only flooded for a few days.

Soil Types and Avocado Decline

At our school near Tegucigalpa, we planted an orchard four years ago. It included about a dozen varieties—Simmonds and Pollock and Winslowson and others from Florida, and a few Guatemalans. Mr. Griswold and Mr. Crawford saw the remains of this orchard and they can tell you what a sorry sight it was. When we dug the holes to plant the

trees, I realized that we had made a mistake in choosing the site for the orchard. The top soil was good clay loam, but in parts there was heavy clay at a foot or two in depth. The trees started off well, but the first year after planting they began to die. There were two strips of soil through the orchard where there was not so much clay, and it is only on these strips that the trees are alive today.

Yet, we never have a permanent water table in this orchard. There is coarse gravel and stone at two or three feet in depth. But the clay just simply holds water when we get our heavy rains in summer time. I don't know whether or not we have **Phytophthora cinnamomi** at our place—we hope to send up some diseased avocado roots so your pathologists can tell us—but we should have learned by this time not to plant avocados on soil which does not have perfect drainage

A question was asked regarding the acidity of the land in question.

Dr. Popenoe: It is around pH 6.2 at the school, and down on the coast where we planted our orchards, and where we lost them through flooding, it is about 6.0. I have seen a lot of avocado trees killed down there by floods of just two or three days' duration.

A Member: Dr. Popenoe, have you any recollection as to the number of Fuerte bud sticks that Carl Schmidt sent up here, and later the number of buds that you saved from that shipment, and whether or not there was any budding previous—any budding of No. 15 previous to the time you sold trees of the variety (Fuerte) to Mr. Whedon, and whether or not there were sales to any other people besides Mr. Whedon?

Dr. Popenoe: That was a long time ago, and naturally I am a bit hazy about some of the details, particularly the sales of budded trees, but here is the way I remember it. We had recently started the West India Gardens at Altadena, and Carl Schmidt was sent to Mexico to hunt for good varieties he selected, and bundles of budwood of each variety. He started at Santa Maria del Rio, then went to Guanajuato, then to Queretaro, then to Atlixco. These were all places which we had heard about, as being centers of avocado production. In 1915, I copied from his original notes, which were still at Altadena, all his descriptions, and the sketches showing the locations of the original trees. I still have this book of notes down in Honduras and would like to file it some time at the Experiment Station at Riverside, for it may in the future throw light on the history of some of the early introductions.

I remember when his budwood of No. 15 arrived, and I am morally certain that there had been no previous introduction of this variety in California. I believe, however, we did get some more budwood from the tree after that first shipment. However, I believe it was from this first batch that we grew the trees we sold to Mr. Whedon. I should think there might have been 20 or 25 bud sticks in the first lot, and they "took" very well, much better than most of Carl's varieties.

We had sold a lot of Carl Schmidt's varieties, as well as other varieties, on advance orders, and when the time came to deliver we could not give Mr. Whedon trees of all the varieties he had ordered. We persuaded him—against his wishes—to take Fuertes to fill out the order; but I do not think he took all of the Fuertes we had on hand. I feel pretty sure a few of that lot went to others; and we left two or three standing in the nursery at

Altadena, where one of them remains to this day.

A question was asked regarding the shipping of avocados by the United Fruit Company.

Dr. Popenoe: I have tried several times to interest the Company in this, but there is no regular supply in sufficient quantity to be worth their while, nor is the product uniform because there are so few budded trees anywhere in tropical America. Private growers in Santa Marta, Colombia, made shipments by Company steamers to New York some years ago, and the fruit did not carry well, and was more of a nuisance to the Company than anything else. I suppose they would still receive shipments from private growers at any of the ports where their steamers call, but so far as their going into the business themselves is concerned, I am pretty sure they are not the least bit interested at present. We talked one time about trying shipments from Guatemala, but production in that country is not organized and the quality would be uncertain. The company has little land of its own suitable for avocados— the banana lands of the coast are not the right thing in general.

President Griswold: Thank you, Wilson. (Applause).