

## **Looking Forward**

### **Wilson Popenoe**

Two years ago, at the instigation of some of my old friends in California, I set down my reminiscences of the early days of commercial avocado growing in an article for the Yearbook entitled "Looking Back". It made me feel old, to talk of things which happened more than a quarter of a century ago; and before the ink was dry I found myself saying, "This won't do; we've got to look forward, not back. The industry is still young. There is lots more to be done".

With this good resolution made, my conscience ceased to trouble me. The ensuing days brought banana problems to occupy my thoughts. Then came word that the brethren were descending upon Atlixco, to place a tablet at the foot of the parent Fuerte tree. There would be speeches, and mutual back-slapping, and Archie Shamel would probably have a fresh stock of funny stories. I was in Guatemala, and the trip would be expensive; but I simply couldn't miss an opportunity like that.

So I flew up to Mexico. A few days later, as I rode along in a big touring car on one of those jaunts which made the Atlixco affair such a huge success, I fell to talking seriously about the avocado industry with Doctor Webber and Professor Home and Archie Shamel. "There is still much to be done", I remarked sententiously.

Obviously this statement required an explanation. It left things in the air, as it were. My mind skipped back across the years, to the days when I had travelled the trails of tropical America, hunting for avocados which might prove useful to the young but growing industry. "There are still many fine varieties awaiting discovery in this part of the world", I said. "Varieties which will some day have a place in California. The field is by no means exhausted. We have been depending too heavily upon Fuerte. Of course it is a grand aguacate; naturally I would be one of the last to deny that. But after all, it isn't enough."

### **PLANT BREEDERS ON THE JOB**

And then they told me that the Plant Breeders were on the job; that utilizing the germ plasm now available in California, they could turn out almost anything you wanted—though I think they felt just a bit shaky about the amount of time it might take.

To me, this was a new way of looking at the problem. I was still living in the horse and buggy days of avocado growing, when, if we decided that we wanted a later variety, or one which was of better quality, we bought a ticket for somewhere and went out to hunt for it.

Their program was attractive. No more hard days in the saddle, no more fleas, no more

rice and beans. Three advantages, decidedly. But the more I turned the matter over in my mind, the more I wondered: "Have we exhausted the possibilities of tropical America? Aren't there any chance seedlings left in this part of the world which would prove to be short-cuts, so to speak, if transplanted to California?" For it will take quite a while, even with all the good germ plasm now at the disposal of the plant breeders, to meet all needs.

Even granting that the industry of the future lies in the hands of the breeders, are we certain that they have the best material with which to work? How about the wild relatives of our cultivated avocados, which can only be found in tropical America? Surely, I argued, the breeders would want these, eventually. Archie Shamel was definitely inclined to side with me.

### **WILD VARIETIES NOT YET EXHAUSTED**

The Atlixco celebration finished, I went back to Guatemala with my mind made up. "Our folks may think, right now, that they have all the avocados from tropical America that they want. But one of these days the breeders are going to wake up and find that they are interested in wild forms; or they are going to decide that they need some more Guatemalan blood; or perhaps—I said it, even to myself, with hesitation—perhaps the folks in California are going to get in a hurry and decide that the place which produced Fuerte might have something else to offer, something which could be had merely for the cost of a trip to Mexico. Maybe it would help others, when that time comes, if I set down a few observations regarding the avocados of the various countries I have visited in tropical America. Think how much better it would be if the head of the Experiment Station at Riverside—if he is the one on whom the decision rests—could review the field at long range, and say to his explorer: 'Head for Mexico. The sort of thing we want right now is more likely to be found there than anywhere else,' or perhaps it would be: 'Buy a ticket for Guatemala. We want those hard-shelled wild avocados from the mountains above Tecpan. They may give new vigor to our commercial varieties.' Or again: 'Fly down to Ecuador, and go to that town near the Colombian border where Wilson Popenoe fell in love with the little girl who kept the shop on the corner of the plaza. Get some of those Mexican-West Indian crosses which grow in the Chota valley'."

With these few words by way of introduction, I offer the following brief comments on the avocados of tropical America.

### **MEXICO**

First in geographical sequence, as we turn our gaze southward from California, Mexico is also first in importance from the standpoint of this review of future possibilities. For I have no hesitation in asserting that there are more interesting avocados in Mexico than in any other country in the world. We have, of course, tapped the possibilities of this region already; but we have scarcely done more than that. Let us consider briefly what has been done and what remains to be done.

So far as I know, the first really serious and extensive exploration of Mexico for avocados likely to prove valuable in California was that made by Carl B. Schmidt, under

under the auspices of the West India Gardens of Altadena, in 1911. We have recently had occasion to recall this work, in connection with the pilgrimage to Atlixco in April 1938, where we met Carl Schmidt in person.

Schmidt worked the Atlixco region pretty thoroughly. At first thought, therefore, one might ask "Why go there again? How can we expect to get anything new from a region already worked thoroughly?" But when we ask this, we forget that a whole new generation of avocado trees has come into bearing since Schmidt's visit in 1911. A. D. Shamel has combed Atlixco in recent years, and has sent a number of varieties for trial in California. But I know he would be the last to say that the possibilities of that region are exhausted.

### **FURTHER POSSIBILITIES OF ATLIXCO UNIQUE**

Frankly, I consider Atlixco unique in the avocado world. I believe that region possesses more varieties of interest to California than any other in tropical America, and I am sure we would make no mistake in looking over its seedlings every ten years or so. New and promising forms are likely to show up at any time, for in Atlixco we have large numbers of trees of the Guatemalan race growing in close proximity to trees of the Mexican race, and natural crosses between those two are certain to appear. I do not think there can be much doubt that Fuerte is one such cross. And in my opinion it is this combination of Mexican and Guatemalan blood which will continue to give us our best avocados for California conditions. I can't see anything to be gained by adding West Indian blood to the combination. I know of no single characteristic which the West Indian race can advantageously contribute. It is not a frost-resistant race; so far as I know it is not a disease-resistant race; it is not more productive than the Mexican race; and the fruit certainly is not of better quality.

The Mexican race can give us, and has given us, hardiness, productiveness and regular bearing habits; it also gives us high oil content and quality of fruit. The Guatemalan race gives us size of fruit and good commercial characteristics, but is slightly lacking in hardiness and productiveness.

I am thinking now of California, of course. Florida needs West Indian blood, to temper the Guatemalan. As a general thing, pure-blood varieties of the Guatemalan race have not done too well in Florida. Crosses between this race and the West Indian have provided a good combination: the adaptability to Florida climate, and the good bearing habits, of the West Indian, plus the good commercial characteristics, including late ripening, of the Guatemalan. A dash of Mexican blood may not go badly in Central Florida; Gottfried is a variety which has it—though rather more than a dash—and this avocado has always seemed to me of peculiar interest. It leaves much to be desired, but it suggests that the Mexican race can contribute something worth while not alone to varieties for cultivation in California, but also in Florida and more tropical regions.

But to return to Mexico. I have mentioned the early work of Carl Schmidt, who explored not only the region of Atlixco, but visited also San Luis Potosi, Querétaro, Monterrey, and a few other avocado centers. At the moment, we thought these places promising because they were northward from Mexico City, at fairly high elevations, and likely to

yield hardy varieties. Later experience showed that we could expect little of value from them. Schmidt did not get into the western part of Mexico, nor did he visit Oaxaca.

At about this time, Frank Furnivall and Roberto Johnston, both residents of Mexico, were grub-staked by the West India Gardens to do a little exploring, but not much came of either's work. A few Californians brought or otherwise obtained several promising varieties from Mexico but, so far as I know, none of these is of importance to-day. Fuerte and Puebla, both from Atlixco, constitute the great contribution of Mexico to California avocado culture if we measure the contribution in terms of present-day commercial importance. Perhaps this is not the broadest way to view the matter: perhaps other Mexican varieties which are taking part, or will take part, in the formation of the major commercial avocados of the future, ultimately will be looked upon as Mexico's greatest contribution.

### **PATZCUARO AND URUAPAN IMPORTANT**

What remains to be done in Mexico? As I have mentioned above, a periodic visit to Atlixco would almost certainly pay dividends. A. D. Shamel, who has covered some parts of the country which I have never seen, writes me (24th April 1939) that he thinks further investigations should be made in the states of Vera Cruz, Oaxaca, Michoacan, Jalisco, Sinaloa, and Coahuila. He was particularly impressed by the possibilities around Patzcuaro and Uruapan in Michoacan. He also had hearsay evidence that the regions of Monterrey and Saltillo might prove worth while.

These last two I question; my own observation has been that the northern regions have nothing but straight Mexicans, that is, small fruited varieties of the Mexican race whose only merit, from our point of view, is hardiness. I would be inclined to pick Michoacan and Oaxaca as the best bets, after Atlixco.

### **WILD MEXICANS ON SLOPES OF MT. ORIZABA**

There is one point which has never been investigated, and which would be interesting though perhaps not of direct value in connection with avocado growing in the United States. I have for years possessed evidence in the form of communications from the eminent botanist C. A. Purpus that the Mexican race occurs in purely wild or native condition on the slopes of the volcano Orizaba in the state of Vera Cruz. When I was in Mexico in 1918, Dr. Purpus was living near Huatusco, in this very region, and assured me that he would show me wild trees in abundance if I would visit him. I made several efforts to do so, but every time was deterred by stories of banditry in that region. Around the town of Orizaba, where I spent several days, I saw many primitive forms of the Mexican race, and am of the opinion that a week or two devoted to an exploration of the hinterland would clear up, once and for all, the few remaining doubts regarding the native home of this race of avocados.

### **GUATEMALA**

Admittedly Mexico has played the major role to date in the development of the California

avocado industry. But she has done this, partly, with avocados of mixed Mexican and Guatemalan blood; and, as time goes on I suspect the Guatemalan influence may grow stronger.

California has received during the past quarter of a century a considerable number of varieties direct from Guatemala. None of them has become of major importance, though several are commercially grown. I doubt that any variety introduced from Guatemala to date will achieve great commercial importance in the United States. Nor do I feel confident that we shall obtain direct from Guatemala any varieties which will do so in the future. But I do believe that these choice Guatemalan forms will contribute some very fine things, either through crossing or through their chance seedlings.

I have spent sufficient time in Guatemala to speak with some confidence about the avocados of that country. Among them are some which are not excelled in quality by those of any other country which I have visited, though there has always been in the back of my mind a suspicion that I prefer the flavor of the thin-skinned Mexican sorts grown at such places as Monterrey and Queretaro to that of all other avocados in the world. But perhaps the preference is due in part to the fact that the Mexicans prepare their avocados in such delectable form. When it comes to the culinary arts the Mexicans are just about the last word, anyway, and the avocado being one of their most important fruits since Aztec days, they have had time to develop a pretty skillful technique in preparing it for the table. The Maya Indians of Guatemala have been content to eat their avocados with nothing more than the addition of a little salt; the Aztecs glorify them with chile and onion and even a little mole—that rich brown sauce for which Puebla is famous—in such fashion that the weakness of the avocado, its lack of strongly distinctive flavour, is completely forgotten.

But this is not a dissertation on the culinary arts: let us return to the argument, which is, that Guatemala can still furnish valuable contributions to avocado growing in the United States. When I spent two years hunting for the best varieties in that country, back in 1916-20, I thought I had done a fairly thorough job, though I do not suppose I actually saw more than ten percent of the trees which were then growing in the republic. Just as has happened at Atlixco, there is to-day in Guatemala a whole new generation of avocado trees which have not yet been examined by anyone interested in picking out promising things for California and Florida. Practically all the trees from which I obtained bud-wood in 1916-17 and 1919-20 are now gone. This is not because Guatemalan avocados are naturally short-lived; it is because most of these trees were in coffee plantations, where the necessary adjustment of the shade relation from year to year means that few large trees escape indefinitely.

## **GUATEMALANS ALTERNATE BEARERS**

The Guatemalan avocados have, in my judgment, two weaknesses from the standpoint of commercial cultivation in the United States. In the first place, they are not as frost-resistant as the Mexicans, and in the second, I dislike the habit of bearing heavy crops in alternate years which is noticeable to anyone who watches the old seedling trees in any part of the Guatemalan highlands. This characteristic is far more marked in the Guatemalan race than it is in either the Mexican or the West Indian. From time to time I

have heard or read comments on this subject from California, but I am so far from there, and have been home so rarely, that I do not know all the facts. It would not surprise me to learn, ultimately, that certain Guatemalan varieties which are otherwise quite satisfactory have to be discarded on this account. I have always blamed this defect on the fact that Guatemalan varieties in the tropical American highlands carry each crop over into the following year, and must blossom for the succeeding crop before the fruit is off the tree. Thus, after yielding heavily, the tree has no opportunity to store up nutrient reserves with which to produce fruit again without skipping one season. This does not occur with either the Mexican or the West Indian race, both of which blossom in spring and mature their crops by autumn, thus giving themselves a chance to rest until the following spring when blossoming again takes place. I would like to know what has been found out regarding this matter in California: with the horticultural training and technique available in that state it should be a simple matter to clear up this whole situation, if it has not already been done.

### **NEW GENERATIONS OFFER OPPORTUNITIES**

Guatemala is, and will remain, an excellent source for further superior seedlings of the Guatemalan race if they are desired in the United States in future development of the avocado industry. And there is one more thing which Guatemala can offer: wild avocados of the Guatemalan race, which, in line with the present-day interest in wild forms of cultivated fruits for breeding purposes, may eventually be wanted by plant breeders.

These wild avocados have been described and figured by me in a previous issue of the Yearbook. They can be found in the forests of the Chichoy range, not far from the town of Tecpan. I have personally seen a number of trees in that region growing at elevations between 8,000 and 9,000 feet, which, incidentally, is considerably higher than cultivated varieties of the Guatemalan race, are usually to be found. These wild trees produce fruits of small size—rarely as large as a tennis ball—with extremely hard, woody rind and large seeds. They are of little value for eating; in fact, I do not believe they are used by the inhabitants of the region in which they grow. But certainly they are of interest to us botanically, because they represent the wild prototype of the Guatemalan race; and also because it may eventually be found that they have characteristics of value to those engaged in avocado breeding.

The Mexican race is practically non-existent in Guatemala. In all the time I have spent in that country I have not seen half a dozen trees with the exception of the budded varieties we have introduced from California. The West Indian is cultivated in the coastal lowlands, and up to elevations of approximately 3,000 feet, but I doubt that there are varieties in Guatemala which are worthy of horticultural attention. I have seen better ones in Mexico, and in several other tropical American countries.

### **HONDURAS**

This republic has very little to offer. On the Atlantic side seedlings of the West Indian race are occasionally to be seen; in the highlands Guatemalans are sometimes grown.

But I have never seen anything worthy of note, and do not believe the country merits further exploration with a view to obtaining varieties promising for introduction into other regions.

There is, however, one thing of considerable interest in this country—the occurrence of a true wild avocado in the mountains of the north coast. This I have described in previous issues of the Yearbook, hence there is no need to enter into details here. Whether or not it will ever have any importance in connection with the breeding of good horticultural varieties, or whether it might be of value at a rootstock, I do not know. I am not even clear as to its botanical connection with the horticultural races of the avocado. The tree is more like that of the Guatemalan race than any other, but the leaves have the strong anise-like odor which is characteristic of the Mexican. The fruit suggests in appearance an extreme form of the Guatemalan race; it is round, very thick and hard shelled, with a somewhat rough dark green surface. I have never seen purple ones. The flesh is scanty, somewhat gritty in texture, and strongly anise-flavoured.

When detailed botanical studies of the wild and cultivated avocados are undertaken—as they most certainly will be some day, after avocado growing has become an industry of great importance in California and Florida—it will be necessary for someone to investigate this wild type, and learn more about it than I have picked up during the years I lived in Honduras.

As far as I can see, this is the same thing botanically as the wild avocado of Costa Rica, which Oton Jimenez and I called to the attention of the horticultural public about 1920. I have never been able to determine the range of this tree; I have seen it only in the mountains of central Costa Rica, and the north coast of Honduras, from sea level (in the latter country) up to 5,000 feet or so (in the former). Presumably it occurs in the territory between the two regions mentioned. I have never found any trace of it in Guatemala, nor have I seen it in Colombia.

## **SALVADOR**

When a country possesses unusually fine avocados it generally becomes a matter of common knowledge extending, in Latin America, even to near-by republics. For example, one cannot travel long in this part of the world, talking avocados with every chance acquaintance, without hearing of the fine avocados of Atlixco, of Guatemala, of Cuba, of Tumaco in Colombia, and so on. Of course, one gets a good many wild accounts from citizens over-desirous of extolling the virtues of the avocados of their own particular valleys, villages or mountainsides; and it takes a lot of time, if one is out to hunt avocados for introduction into some other region, to run these tales to earth. But in a general way one can afford to take a serious interest in any region which has a widespread reputation as a producer of fine avocados.

And conversely, one usually needs to give little attention to a region which does not have such a reputation. During my travels in Central America in search of good avocados for introduction into the United States I heard little about the avocados of El Salvador. In later years I have visited that republic, and had occasion to see something of its avocados. Those of the coastal region are just an ordinary lot of West Indians, not

good, not bad. They possess no interest to California since that State does not grow avocados of the West Indian race, and they possess no interest to Florida because Cuba has already supplied better ones.

I know little about the presence of the Guatemalan race in Salvador. I have always taken it for granted that examples of this race could be found in the highland regions, especially those adjacent to Guatemala, but I have seen practically nothing of them.

## **NICARAGUA**

When I first started for Central America, my friend William R. Maxon of the U. S. National Museum told me of the magnificent avocados of the Chinandega valley, between Corinto and Managua; and on many subsequent occasions he roundly took me to task for having failed to investigate that region. My excuse for not doing so is that these avocados are of the West Indian race. I have seen photographs of some of them, and have heard them praised very highly by others than Mr. Maxon. I have always hoped I might happen to be in Nicaragua again at the proper season to see them in fruit, to satisfy my curiosity if nothing else. If anyone should undertake an exploration of tropical America with a view to bringing to light good West Indian varieties, this region should probably be on his itinerary.

Aside from the Chinandega valley I have never had reason to believe that Nicaragua offers much of interest from the standpoint of avocado culture.

## **COSTA RICA**

During my 1919-21 exploration of Central and South America I spent several months in Costa Rica, and came away somewhat disappointed so far as avocados were concerned, though charmed with the attractiveness of the country and the people. That grand old savant, Henri Pittier, had spent many years in Costa Rica and had mentioned various species of *Persea* in his writings. Especially had he aroused my interest in the yas, *Persea schiedeana*, which I had already seen in Guatemala where it is known as coyo, chuete, and the like, and in southern Mexico where I knew it under the name of chinini. So far as I have been able to discover this species does not occur to the southward of Panama, and I have never seen it north of the state of Vera Cruz in Mexico. Usually a rather unattractive, not-too-palatable fruit, it can at times achieve heights which place it in the same class with some of the best avocados, from which it differs, however, by having a distinctly coconut-like flavor

The yas grows fairly commonly on the mountainsides above the city of San Jose de Costa Rica, but I did not see in that republic any varieties of horticultural merit. The best ones I ever saw were in Guatemala where I several times tried to ship budwood and seeds to the States without much success. A few trees were finally established in Florida where they have never amounted to much. Nevertheless, I commend the yas, coyo, chuete or chinini to the attention of future generations of avocado fanciers. But don't play around with the poor ones; they are what the old Spanish chroniclers would term "melancholy nourishment". If you want the best go to Guatemala, and more particularly, go to the Alta Verapaz. There, in the small town of Tactic, you will put up at



Matias Acevedo's little inn, and you will ask Catalina the house maid to go to Padre Rivera's garden and get you some fruits from the tree which grows there, the one from which the gringo aguacatero who rode the white horse and was accompanied by that scamp of an Indian, Jose Cabnal, got budwood in 1917.

To return to Costa Rica: I found an abundance of seedlings of the West Indian race on the Pacific coast, but nothing of moment; and in the capital (San Jose) a few trees which seemed to be of the Guatemalan race, though the fruits were not as thick-skinned nor as rough as many of the latter are accustomed to be in Guatemala and Mexico. I did not know quite what to make of them. They were not fully ripe at the time of my visit, so I know little about their quality. I doubt that they are worth further investigation, but there is always the possibility. In general, my feeling is that there is not much of value to be had in Costa Rica, so far as avocados are concerned.

## **PANAMA**

Down around the Canal there is nothing of interest—just the usual run of West Indian seedlings. But up toward the Costa Rican border, on the slopes of the Volcan Chiriqui, I have a suspicion that there is a wild form which should be run to earth, if only for the sake of satisfying our curiosity and supplying a few more genes for the breeders.

If the Monniche family still lives at the Finca Lerida, on the slopes of the volcano not far from the town of Boquete, the explorer who goes in search of this wild avocado will be sure of a soft bed to sleep in and some mighty good meals when he gets back from the forest. Tollef Monniche once took me out to look for this tree, but the season was over and we found only a few seeds on the ground. It was not the anise-scented wild avocado of Costa Rica, but seemed to be more like the West Indian race in general character. We did not see a sufficient number of trees to convince me that it was a true wild species instead of an escape; but I am pretty hard to convince after having seen so many "wild" avocados in tropical America these past twenty-five years.

## **COLOMBIA**

This country has two areas famous for fine seedlings of the West Indian race: these are Santa Marta, on the Caribbean coast not far east of Barranquilla, and Tumaco, on the Pacific coast not far north of the Ecuadorian boundary. In both these places there are some really splendid varieties—fine large fruits of good quality. If one were going after summer-fruiting varieties for Florida, he would not want to overlook these two bets; but ever since I have been in the avocado business—nigh onto thirty-five years—Florida has been fighting shy of summer-bearing varieties, and trying mighty hard to get really good winter-bearing ones.

Throughout the interior of Colombia, in the valleys of moderate climate which lie between the high ranges of the Andes, West Indian seedlings are grown, but I have never seen anything worthy of note among them. I have always cherished a secret hope that I might some day run onto a new race of avocados in one of these remote Andine valleys—something hardy, winter-bearing, with fine oily fruits about twelve ounces in weight, and never missing a crop. But I guess it is another case of the Black Tulip.

In some of my writings I have discussed the "wild" avocados of Santa Marta. After having visited that region at least half a dozen times they are still something of an enigma to me. The story, briefly, is this:

Immediately back of the port of Santa Marta (near which, by the way, the avocado was first seen by European eyes) on the lower slopes of the Sierra Nevada, seedlings of the West Indian race grow abundantly in what appears to be a truly wild state. I have seen them so numerous in some places as to form small groves, almost solid stands an acre or so in extent. We know that avocados were grown here before the Conquest. We have good reason to believe that the West Indian race may be native somewhere in this region. We know even better that it did not reach the West Indies, where it acquired the name we give it, until after the Conquest. Several times I have convinced myself that these trees of the Sierra Nevada de Santa Marta are true wild avocados of the West Indian race; and an equal number of times I have lost my faith when I stopped to reflect that there is a very considerable degree of variation among the fruits of these wild trees, a variation which strongly suggests that they are escapes from cultivation. Generations yet unborn may ponder this problem: I, for one, am not yet wholly persuaded that we know the West Indian race of avocados in its wild state, though I believe the contrary to be true of the Guatemalan and Mexican.

## **ECUADOR**

This republic has, I believe, more interesting avocados than any other in South America. Even so, nothing that I obtained on either of my two visits has proved of any particular value in the United States. But if this document should fall into the hands of anyone starting out on an avocado exploration, be it ten, fifty, or a hundred years from now, hear me when I urge you to include Ecuador in your itinerary, even if you have to perjure your soul to do it. I claim to have seen quite a bit of Latin America, and I claim to have seen very few more attractive and interesting regions than the Ecuadorian Andes. Go, even if you are disappointed in the avocados: go, even if only to see the Indians on those high Andine plateaux, tending their flocks with the snow-capped volcanos in the background. Peru is more magnificent, on a grander scale; but it is harsh and dry compared with the soft green beauty of such places as the lovely vale of Imbabura and the slopes of Cotopaxi.

There are some fine avocados of the West Indian race at Esmeraldas, on the coast near the Colombian boundary. But the main interest which Ecuador possesses—so far as avocados are concerned—lies in the Chota valley, a region north of Quito. This valley (which I described in detail in one of the early Yearbooks) has a hot, dry climate: the West Indian race of avocados grows here, and at some far-distant day the Mexican was brought in. I found what I believed to be a number of West Indian-Mexican crosses among the numerous seedlings in this valley; also some pretty fair fruits of straight Mexican blood. The crosses impressed me as of great interest and I sent budwood of several to Washington. I believe it would be worth while to comb the region again with the idea of getting varieties of particular interest for central Florida.

I would like to have the job: anything to get back to Ecuador!

## **PERU**

When you get into Peru you are getting off the native heath of the avocado: the tree was carried to that region from Ecuador by the Inca conquerors shortly before the Spaniards came along and took over the conquering business. The relatively short time it has been in Peru—only a matter of four hundred years or so—in comparison with the time this fruit has been grown in Mexico and Guatemala, means that there is not such a great range of variation to be found. As far as I have been able to ascertain there is nothing in Peru but a rather ordinary lot of West Indian seedlings. I suspect one might find some trees of the Mexican race if one looked far enough, for the old Spanish padres had the very laudable habit of tucking a few seeds under their cassocks when they moved from one mission to another. Thus was the cherimoya carried from South to North America, and most likely the Mexican avocado in the reverse direction.

## **CHILE**

This country was underscored on my itinerary when I left Washington on my avocado exploration of South America, because (1) David Fairchild, my beloved Chief, had been there many years before and had seen interesting avocados, and (2) because by the time you reach Chile you are pretty far south and I figured you ought to begin to find frost-resistant varieties.

Quillota, on the railway between Valparaiso and Santiago, I found to be the major center of avocado culture; and much to my regret, I found that all the trees appeared to be Mexican seedlings, or just about the kind you find in the Canada at Queretaro, Mexico—perhaps not quite so good. I was not there at the best time of year, but I formed the impression that we could not expect much in the way of varieties promising for cultivation in California, and I was not long in heading north again. This to my regret, for a Californian pretty nearly thinks he is at home when he reaches Chile. Don Salvador Izquierdo, dean of South American nurserymen and horticulturists, took me through fruit orchards which made me think I was back in the Santa Clara Valley; while the gardens of Santiago and Vina del Mar were full of plants with which I had been familiar in Pasadena since childhood.

## **VENEZUELA**

It took me a long time to reach Venezuela. It was not included in the avocado explorations carried out for the U. S. Department of Agriculture; and it was not until 1937 that I chanced to visit it in connection with my work for the United Fruit Company.

Originally I had left it out of my avocado program because I did not think it possessed much interest. Then Henri Pittier described a curious avocado which came from the mountains near Caracas and which he thought might be a new species. It was called aguacate veranero, and was said to ripen at the opposite season of the year from the general run of the West Indian seedlings which grow in Venezuela.

When I talked with Dr. Pittier in the autumn of 1937 I found that he had long since decided that this avocado did not represent a new species. In fact, he had decided that

it was of very little interest, either botanically or horticulturally. The seedlings of the West Indian race which I found in the markets of Caracas, or which I saw on that trip and a subsequent one in the summer of 1939, impressed me as differing in no important respect from those of Colombia or the Antillean region in general.

Venezuela therefore impresses me as having little to contribute, now or in the future. I was glad at last to have seen the country, because it was one of the few lacking to complete a general survey of avocado growing in all the Americas—North, South and Central.

At the time of the Discovery—that is to say, at the end of the fifteenth century—I doubt that avocados were grown in northern South America east of the region now occupied by this Republic. As far as I have been able to ascertain from the historical records and other evidence the situation at the time of the Conquest was about as follows: the avocado was more abundantly grown in Mexico and Guatemala than in other regions. In the first-named country its cultivation extended as far towards the north as the climate would permit, i.e., almost to the line which now divides the United States and Mexico on the eastern side of the continent, probably not quite so far northward on the west.

It was cultivated and semi-cultivated throughout Central America, where, as one proceeded from north to south, the thick-skinned Guatemalan seedlings gave way to those of the West Indian race, the thin-skinned, anise-scented Mexican varieties having been left behind in the country of their origin. These West Indian seedlings were fairly common in parts of the territory which is to-day occupied by the Republic of Colombia. They ranged to the eastward through the coastal mountains of Venezuela, but did not pass the Orinoco. To the southward they were cultivated in Ecuador, and from there carried to Peru between 1450 and 1500.

The main point which I think history makes clear is that avocados were not grown in the West Indies prior to the Conquest, in spite of many modern statements to the contrary.

## **BRAZIL**

This is a large country and I have seen only parts of it. But so far as avocado exploration is concerned I do not believe there is a great deal left to be done.

Prom Venezuela eastward through the Guianas, West Indian seedlings are grown here and there. This is a low, in many parts wet, region of little importance horticulturally. French Guiana has an interesting history as having been the scene of several efforts at colonization, and more recently, as the seat of a penal colony which North American journalism has capitalized rather more heavily than the facts warrant. I have spent several weeks in Cayenne and do not believe the avocados of the region are worth further attention.

Northern and Central Brazil grow the West Indian race, plus, in a few places, grafted varieties which have been introduced from the United States on a small scale. During the explorations of 1913-14 made by Dorsett, Shamel and myself, we saw nothing which appeared promising even for Florida. As I have pointed out above, I do not believe that Brazil grew avocados in pre-Columbian days; and those which have reached the country since the Conquest are of the same general character as the

seedlings to be found in the West Indies and the northwestern part of South America.

I have never visited Argentina, Uruguay or Paraguay. These countries and Bolivia, which I have visited but not mentioned above, do not seem to require attention in connection with the search for avocados which might prove valuable in the United States.

## **THE WEST INDIES**

This region may properly be considered as a whole—though I shall mention some of the islands individually—because it offers nothing but seedlings of the West Indian race, of more or less the same general character throughout. It is my opinion that this race was introduced into the islands from northern South America—probably from the region which is now Colombia—shortly after the Conquest. As late as the middle of the seventeenth century we learn that avocados were still something of a luxury in Jamaica. Perhaps they were not as popular among the Spaniards, who occupied the islands up to that time, as were many other fruits, especially the orange which they had brought from Spain.

In colonizing new countries it seems to be true that the first thing the colonists want is not the products of the land, but the fruits and other foodstuffs to which they were accustomed in their native homes.

## **HOW ABOUT CUBA?**

I think it probable that Cuba received the avocado as early as any island in the Antilles, unless perhaps it was taken first to Hispaniola, now Santo Domingo. In any case, the tree has found a congenial home in Cuba, and I think today it is of greater importance in that island than in any other. This may be due in part to the circumstance that the limestone soils which abound in certain parts of the island are good avocado soils.

My interest in Cuban avocados was first aroused by Professor Charles Puller Baker of Pomona College in 1910. At that time, Professor Baker had recently come from Cuba, where he had taken part in developing the agricultural experiment station established during the American intervention. We were then just beginning to think of avocados in California, and we did not have many good varieties locally. Professor Baker believed some of the fine Cuban sorts worth trying in our State; and he also talked at length of winter-bearing Cuban seedlings which might be of value in Florida. We tried some of the Cuban varieties—obtained from Florida—with what results every California avocado grower now knows. But we have never carried out a systematic search for unusual varieties worthy of cultivation in Florida.

The Cubans themselves, however, have taken stock of their avocado assets and have probably brought to light the best material which the island affords.

It is to be understood, of course, that the named varieties of the West Indian race which have been cultivated in Florida these past forty years, including the Trapp and the Pollock, are mainly of Cuban origin, directly or indirectly. It is my feeling, after having traveled rather widely over Cuba on several occasions that this island offers more good

seedlings of the West Indian race than any other area in tropical America.

Further study of Cuban avocados might prove of advantage to Florida. At the moment, however, it seems probable that the future of the avocado industry in Florida lies more with the West Indian-Guatemalan and West Indian-Mexican crosses than it does with selected varieties of pure West Indian blood.

## **JAMAICA AND PUERTO RICO**

Jamaica offers much the same sort of material as Cuba, though I doubt if so many choice seedlings are to be found here. I happen to be writing this paper in Kingston, at the end of the avocado season. During the past two months many avocados have been on our table: not one of them has been bad, very few have been poor, and many have been really good fruits—all seedlings, of course, brought into the Kingston market from various parts of the Island. There are many avocado trees in Jamaica. As in Cuba, limestone soils favor the development of this tree.

Regarding the ancient island of Hispaniola, now divided between the republics of Haiti and Santo Domingo, I know but little. Personally I have never traveled widely in this island. I have never seen or heard anything, however, to make me believe that it offers avocados distinctly different from those to be found in Cuba and Jamaica.

Puerto Rico is of still less interest. Unfortunately for the inhabitants of this island, avocado culture has not proved widely successful. Except in a limited area on the southern side, between Ponce and Mayaguez, one rarely sees old avocado trees when traveling over the island. During the past quarter of a century numerous efforts to establish Guatemalan and Guatemalan-West Indian grafted varieties from Florida have been made: so far as I am aware they have not been successful in the main.

Under these circumstances, Puerto Rico would naturally be one of the last places to explore for seedlings which might prove of value in the United States. In my own travels in the island I have seen very few which were up to the standard of Cuba or Jamaica.

As for the Lesser Antilles and Trinidad, I believe the situation is just about the same as in the islands described above. In recent years the British have done some work in Trinidad, looking toward improvement of avocado cultivation. Regarding their native seedlings, however, we have no evidence that they are different from, nor better than, those of Jamaica. I doubt that they average as good, for the soils of Jamaica, particularly the western two-thirds of the island, are avocado soils.

## **IN CONCLUSION**

The above running comments on avocados as I have observed them during the past quarter of a century in Tropical America do not profess to exhaust the subject by any means. I have seen only a small percentage of the seedling avocado trees in this vast territory; and it must be remembered that new ones are coming into bearing every year. I have given my observations for what they may be worth to those horticulturists of the future who look to the southward for new avocado material, whether to introduce direct in the form of new varieties (and I reiterate that I believe this field still holds much

promise for California especially) or whether to introduce for the purpose of providing breeding material, to be placed in the hands of technicians who will shape it nearer to our hearts' desire.