

Avocado Explorations in Tropical America

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The manifold problems which are faced by Florida avocado growers can only be solved by concerted effort on the part of all those interested in the development of this new industry. The United States Department of Agriculture, desirous of doing its share of this work, has, during the past five or six years, conducted a rather exhaustive survey of the principal avocado-growing regions in tropical America, where the avocado is native and has been cultivated since prehistoric times. The objects of this survey have been several: First, it was desired to bring to light and introduce into the United States, the most promising varieties which could be found; secondly, it was thought that a study of the avocado in its native home might yield knowledge concerning the requirements of the tree which would be useful in connection with its proper cultivation in the United States; and thirdly, it was desired to find, if possible, the wild prototypes of the cultivated avocados, and to study the wild relatives of the avocado, with a view to utilizing such of them as seemed valuable in the work of breeding new forms, or perhaps as stock-plants on which to graft the avocado itself. Not knowing exactly how far we would be able to carry this work, we thought it best to commence with the most promising field, rather than to pursue a geographical sequence. Thus it was that in the late summer of 1916 I sailed for Guatemala, where I spent sixteen months, and whence I sent twenty-three selected varieties of avocados to the United States for trial. Some of these have already borne fruit in California and Florida; several are now offered by the nurserymen in both states. In addition to the introduction of these varieties, several wild relatives of the avocado were obtained and introduced for trial—notably the coyo, *Persea schiedeana*, and the anay, *Hufelandia anay*; nearly a thousand photographs and many observations on avocado culture were secured; twenty-five thousand avocado seeds were packed and shipped to Washington, for use in growing stock-plants on which to bud the superior varieties; and seeds or roots of a number of promising economic plants, likely to be of value in the southern-most United States, were secured.

The results of this first expedition have been made known through several publications, notably Bulletin 743 of the Department of Agriculture, entitled "The Avocado in Guatemala," and a lengthy paper published in the Annual Report of the California Avocado Association for 1917. Our next undertaking was a detailed survey of the more important avocado-growing regions of Mexico, most of which had already received attention at the hands of Californians in search of desirable varieties for culture in that State. Mexico and Guatemala have, in fact, supplied practically all of the avocados which have been planted in California up to the present time.

In November of 1919 I sailed from the United States upon the third voyage of avocado exploration, this time with the intention of covering all the important territory which had

not yet been touched, and thus completing the survey. I should mention, at this point, that the exploration of eastern Brazil carried out in 1913 and 1914 by Messrs. A. D. Shamel, P. H. Dorsett and myself, while primarily undertaken for the purpose of studying the navel orange in its native home, served also to give us a sufficient knowledge of the avocados of that part of South America, and to show us that there was nothing of great interest there, so far as desirable varieties were concerned. Later, in 1914 and 1915, I was able to visit Cuba and Porto Rico, and to study the avocados of these two islands. We therefore had left before us, when I started upon this last voyage, the Central American countries south of Guatemala, and the western part of South America; certain portions of the latter region, in particular, were *terra incognita* so far as avocados were concerned, and I looked forward to an interesting, though somewhat long journey.

My first stop was in Guatemala, which could scarcely be passed by, since we were in need of a further stock of seedling plants, and there was no better place to secure the necessary seeds. I had completed my work, and was about to proceed southward when I was overtaken by an accident and laid up in the hospital for a month, during which time a revolution broke out. Things finally quieted down so that I was able to pick up my baggage, which I had stored in Guatemala City when I was sent to the hospital, and go through Salvador, which seemed to have nothing to offer in the way of valuable avocados, to Costa Rica, where I thought I might find something of interest. I was not disappointed, for on the slopes of the volcano Irazu, Oton Jibenez and I discovered a wild avocado which we believe may be the prototype of our cultivated West Indian and Guatemalan varieties.

This question of the wild avocado has always interested me greatly. I have seen the wild Mexican avocado growing on the slopes of the volcano Orizaba in Mexico, and I have occasionally run across it in the mountains of Guatemala, where it may not, however, be indigenous; but I have never felt that the West Indian and Guatemalan varieties could have been derived from this small, thin-skinned, Mexican species. When we found the wild avocado of Irazu, therefore, I was altogether delighted, for this species may be not only the wild prototype of the cultivated sorts, but also—and this of more practical importance—a vigorous stock-plant on which to graft some of the more delicate avocados, and a wild species for use in breeding. In recent years, plant-breeders have come to place much emphasis on the value of the wild relatives of our cultivated plants, some of which have been utilized in breeding with excellent results. The wild avocado may, therefore, prove extremely useful, even though its fruit is not worth eating.

This wild avocado of Costa Rica— *aguacate de anis*, or anise-scented avocado, it is locally called—grows in small ravines and on moist slopes at elevations between 4,000 and 6,000 feet. The tree much resembles that of some of the Guatemalan varieties, except that the leaves are thicker and stiffer, and strongly anise-scented when crushed. In this latter respect they resemble the Mexican race of avocados, and it may appear at first glance that the Guatemalan and West Indian varieties, which do not possess any of the anise-like odor, can not have been derived from this wild species. But all studies of cultivated avocados have shown that this odor is not a definite character; it varies in amount, and it is altogether possible that long cultivation has entirely eliminated it from

the cultivated forms. The fruits are about the size of a baseball, quite round in form, dark green on the surface, and extremely hard-shelled. The seed is large, and is surrounded by a small quantity of yellow, rather gritty pulp, which is oily, rather dry, and has, in addition to the typical avocado flavor, a large amount of anise, so that it is scarcely eatable.

Seeds of this wild species were sent to the United States, as also budwood, but the latter failed to reach Washington alive. Further supplies of both will be obtained through Sr. Jimenez, a young botanist of San Jose de Costa Rica, who has collaborated with us very generously.

Aside from the wild avocado, two or three of the best cultivated varieties were obtained from the region about San Jose, and have been established in this country. These seem to be of the West Indian race, and are worthy of trial in southern Florida, since they may prove to ripen at a different season than the sorts now cultivated in this State. In quality I do not believe they are quite as good as several of our present commercial sorts.

From Costa Rica I went down to the Canal Zone, and then shipped for Santa Marta, Colombia. Before leaving the States on this last trip, I had talked with Mr. Krome of Homestead, and he had emphasized the importance of securing an early-ripening variety of the West Indian race, for cultivation in southern Florida. He had mentioned the fact that avocados reach New York from Santa Marta, Colombia, in the month of June, and he suggested that I might there find unusually early-ripening sorts. I had also heard that avocados grew wild in the mountains back of Santa Marta, forming small forests. I was therefore, keen to see this region.

It proved something of a disappointment. The cultivated trees are of the West Indian race, and shipments to New York during the month of June are possible because, firstly, the climate of Santa Marta is extremely hot and the fruits mature more quickly than in Florida, and secondly, the natives gather them before they are fully mature. I found, however, that there were some very choice seedlings in this region, and I selected one of the best and sent budwood to Washington. This variety we have named Fernandez, in honor of Sr. Fernandez, who was local manager of the United Fruit Company at the time of my visit, and who has since died of one of those malarial fevers which desolate the tropical American sea-coast.

As to the wild avocados of Santa Marta, I found that they are escapes, and of the West Indian race. Such a lot of inferior West Indian seedlings I had never seen! In some places the mountain-side was covered with the trees, which formed veritable forests, and the fruits lay upon the ground in thousands. The quality of these fruits is scarcely good enough, save in exceptional instances, to warrant shipping them to New York.

From Santa Marta I went up the Magdalena river, and across the Andes to Bogota, the capital of Colombia, where I headquartered for several months. The avocados of this region proved to be inferior West Indians, and there was nothing of value to be had; so I finally left Bogota, after collecting some very interesting and remarkable blackberries, and a number of other things, and rode across the Andes to the Pacific coast, where I shipped for Guayaquil, Ecuador, and went thence by rail to Quito, a fascinating old Spanish city which lies high up in the Andes, only twelve miles from the equator. Here I headquartered for eight months, during which time I covered the Andean region of

Ecuador from one end to the other.

While in the northern part of the country, I spent a few days in the town of Ibarra, and here, in the market-place, I came across some avocados which immediately commanded my enthusiastic attention. They appeared to be of the Mexican race, but were larger and finer than any I had ever seen in Mexico, or in California. I was told that they came from the valley of the Rio Chota, half a day's ride north of Ibarra. Immediately I made my plans to visit this valley, and I was just about to depart when I was unceremoniously grabbed by the police and whisked off to jail. Ordinarily I do not mind a thing of this sort—I had become quite accustomed to it in Guatemala—but just at this moment, when I had some new and remarkable avocados almost within my grasp, I found it decidedly annoying. The chief of police refused to tell me the nature of my crime, but informed me that he was familiar with my past. This, of course, explained my arrest; in fact, I often wondered that I had so long been allowed to remain at liberty. I argued; I entreated; I attempted to bluff a little, in a half-hearted manner, but all to no avail. I was to be held until orders came from Quito.

Realizing that a mistake had doubtless been made, I telegraphed the American Minister, and before morning received his reply, which read: "Have presented your case to the Minister of Foreign Affairs. Orders for your release will be issued tonight by the Minister of the Interior." This brought joy to my troubled heart, and I again saw the avocados of the Chota valley within my grasp. In the morning I was allowed to depart, after learning that I had been mistaken for a German who was reported to be escaping from Colombia with stolen property, and I was soon in the hottest and driest spot I had seen in many a month—the Chota valley of northern Ecuador.

This remarkable region contains several thousand avocado trees, most of them belonging to the Mexican race. There are a few West Indians, and perhaps a few hybrids. The Mexicans were probably carried there by Spanish monks, who owned and operated a large Hacienda in the valley for two centuries or more.

For the following three months I was occupied in getting out bud-wood from this valley, and shipping it home to Washington. It was about the most difficult job of this sort which I have ever tackled. First of all, the trees were dirty and in bad condition, which made it impossible to secure first-class bud-wood, and secondly, I had to cut it, carry it on muleback to Quito, a journey of three days, then pack it and ship it down to Guayaquil, whence it was carried by steamer to New York. It took a full month to land the bud-wood in Washington, counting from the day I cut it in the Chota valley, and out of three shipments which I made, we saved only a few buds of five varieties. The most promising of these I have named Tamayo, in honor of my excellent friend, Jose Felix Tamayo, a young Ecuadorean who gave me all possible assistance during the time I was in northern Ecuador, and without whose good offices it would have been well-nigh impossible to secure the Chota avocados. Tamayo is, as far as can be judged from its appearance, a Mexican avocado; but it weighs eighteen ounces, has a small seed, and the flesh is free from fiber and of excellent quality. The four other varieties which have been successfully introduced are slightly smaller than Tamayo, but all of good size and quality. If these avocados are true Mexicans, they ought to prove as hardy in the United States as other varieties of the Mexican race, and in this case they will be extremely valuable; for everyone is learning that it does not pay to plant any but the hardiest

avocados in most parts of California and Florida. At least, there is a frost-hazard which is sufficiently serious to merit consideration.

Outside of the Chota valley, I found nothing of interest in Ecuador, so far as avocados were concerned, though I got some very interesting blackberries and raspberries, a remarkable cherry, and several other promising fruits. I went down to Peru, and looked over the avocados in the vicinity of Lima, but they proved to be ordinary West Indians, inferior to the best varieties of southern Florida, so I did not tarry, but proceeded to central Chile, where I knew there were many avocados of the Mexican race. In the vicinity of Ouillota, between Valparaiso and Santiago, I found several thousand trees, but from all I could learn, they are small-fruited and not likely to be of much value to us. I therefore filled a huge trunk with strawberry plants, native varieties of apples, peaches and plums, and a few trees of a remarkable dwarf orange which was given me by Salvador Izquierdo, one of Chile's best known horticulturists, and then climbed on board a direct steamer for New York, which port I reached after twenty days, just two years from the time I had embarked for the tropics.