Hunt Institute for Botanical Documentation
5th Floor, Hunt Library
Carnegie Mellon University
4909 Frew Street
Pittsburgh, PA 15213-3890
Contact: Archives
Telephone: 412-268-2434
Email: huntinst@andrew.cmu.edu
Web site: www.huntbotanical.org

About the Institute
The Hunt Institute for Botanical Documentation, a research division of Carnegie Mellon University, specializes in the history of botany and all aspects of plant science and serves the international scientific community through research and documentation. To this end, the Institute acquires and maintains authoritative collections of books, plant images, manuscripts, portraits and data files, and provides publications and other modes of information service. The Institute meets the reference needs of botanists, biologists, historians, conservationists, librarians, bibliographers and the public at large, especially those concerned with any aspect of the North American flora.

Hunt Institute was dedicated in 1961 as the Rachel McMasters Miller Hunt Botanical Library, an international center for bibliographical research and service in the interests of botany and horticulture, as well as a center for the study of all aspects of the history of the plant sciences. By 1971 the Library's activities had so diversified that the name was changed to Hunt Institute for Botanical Documentation. Growth in collections and research projects led to the establishment of four programmatic departments: Archives, Art, Bibliography and the Library.

ESCUELA AGRICOLA PANAMERICANA

APARTADO 93

TEGUCIGALPA, HONDURAS
CENTRO AMERICA

Dear Folks.

I know you are having and hope you are having a wonderful trip. As for myself, I really miss you though at the same time I hope you have the time of your lives.

Things here are about the same as when you left. Everyone seems to be doing their best until your return. Ive been making it a practice to look in on your patio etc about every other day. Jose is really working on the garden spade in back of your home for he wants to impress you with his good work, when you return.

The weather has been very dry and irrigation has been going ahead every day since you left.

Marion, I have an answer to your letter almost edited and will try to mail it tomorrow. Glad to hear that you are having such a swell time.

Mrs. Popenoe, I received the first package containing the Andwood on aug 30th and all of the material came through in perfect condition. The second package arrived on Sept 3rd, also in fine condition. I have planted your seed and also the begonia. The palms were put in seperate 3" pots making 15 in all I believe. So far, though its too early to know for sure, every plant seems to be in good condition. I, as

yet have not received the third package though it probably will come along in the next day or two.

Doc, you probably are anxious to know just what was done with the bud material so here goes - I knew you had 25 of Doc W's herbarium numbers with you so I made allowance for at least this number of selections in both the young rootstock nursery (Valenguey) and down below in the older material (old Vinera). When the first group arrived we budded 8 plants of each selection in the young material in sequence and then went to the old vinera and budded 10 plants of each in sequence. any material that was over, we went back and starting again budded this into the old material until all of the material fit for use was used. Every plant budded was labled at once by the person budding thus trying to eliminate any mix-up or confusion. As the weather has been quite dry all of the plants were then given a good irrigation and another will be given tomorrow (Sept 7th). all seed received was placed in peats or flats and covered either with moss (small seeds) or sawdust (large seed).

The following is a list of the varieties and where the material has been planted.

Variety	No. Budded on young rootstocks	no. on old rootstocks	total
14361	8	18	26
14362	8	19	27

14363	8	14	22
14364	8	12	20
14365	7	16	23
14366	8	9	17
14368	8	15	23
14369	8	16	24
14370	8	10	18
14371	8	12	20
14372	8	10	18
14373	8	10	18
14374	8	10	18
14375	8	15	23
14376	8	12	20
14377	8	10	18
14378	8	15	23
14379	7	10	17
14380	8	20	28
14381 (Broad leaf. Mex)	8	11	19
14382	8	17	25
14383	8	33	41
14384	8	11	19
14385	8	21	29
Wild ava. from aguila State Veracruz	20	11	33
	210	356	TOTAL - 566

I hope that this will be satisfactory Doc and that the results will be worth your effort. By the way if you get a chance don't you think it a good idea to bring from California number 13523 to complete our collection?

We have all of the last group of avocado seeds planted in the new nursery and covered with grass. Yesterday (Sept 6) we started to transplant the sour orange seedlings to the field. They really are a beautiful group of plants. I am seperating them into groups as to size and straightness of stem. This work should be completed by Friday. I am pushing the production of vegetables quite hard and almost have the galera full. In fact I had to have 50 more flats made to hold our production. I will cut this production somewhat, of course, when the fields start to fill up for we are now producing more than Hymie will have room for.

Mr. Hogaboom forwarded a letter to me from Mr. Graham Quate stating that aid was needed in the beautification of the Patio at the U.S. Embassy. I went in and talked with Mrs. Buckley telling her that it would be best to consult you before going too far in changing things for you had more experience etc. with Patios. She was so insistant for an immediate change that to pacify her I said I would undertake a small deal. Although I would put some Perma and Begonias

that we have potted here in the bed and fix it up. This, I hope, will hold her till you get here and add your ideas. Then things may be changed in this and the other beds to conform to a single general plan. She had an idea of planting roses and such in there. I don't believe that there is enough sunlight for them and really I have had no experience in patio designing so I feel it would be best if you did the advising. If you have any ideas of things that I may start propagating make it would speed up matters if I started before your return.

We also had a visit from two men Mr. Carlos Montes M. and Mr Luis Ulloa interested in planting ornamentals at the Stadium. They asked for many things, of course, and I thought it a good chance to clean out on varieties that we are over propagated in. I therefore took it upon myself to give them many of the plants with the understanding that all pots must be returned. They were agreeable and infact I received a letter from them today (they have not as yet taken the plants as they had no trucks the other day) saying that they were sending some wooden boxes in which to pack the plants so that the pots would not be broken en transit. We are also going, as we find time start some other things that they would like that are not now

propagated.

Alvaro and the fellows from Huntington have left for Florida. Carlos Francisco has taken over the ecuadillero work.

I guess I've told about all the excitement I know of so will close wishing each and every one of you my very best. Remember Doc to get in a little rest for a change for you know you can't come back to work and expect to do it.

With deepest regards,

Don

P.S. if there is anything else I can help with from this end, please let me know.

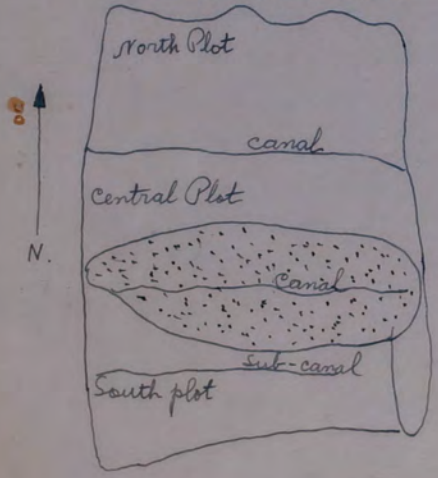
TRANSCRIPT OF THE ORIGINAL NOTES ON AVOCADO VARIETIES OF WHICH BUDWOOD WAS OBTAINED

Mexican Explorations of October 1947
and August 1948

NOTES FROM DR WILLIAMS ON AVOCADO EXPLORATION Oct. 19th, 1947

October 19th. Went out to the Hacienda Xahuentla belonging to Henry Gilly. This Hacienda is 3 or 4 miles from Atlixco. His interest in Avocados was and is still stimulated by Carl Crawford and some new plantations are being put in. There is nothing bearing there at present. Contiguous to this Hacienda is Hacienda San Diego belonging to the heirs of Adolfo Rodiles. The latter selected a large number of varieties of probable local avocados and began planting them. The plantation is apparently from seed selected of material secured in one way or another, possibly mainly from the market. There are said to be some six thousand trees in this plantation. Probably there are not so many.

The Rodiles plantation consists of three plots which are on land simulating three terraces. The central and oldest plantation at the time we visited it contained the best fruits and the trees seemed to be bearing better. The south plot is apparently next oldest and contains some fine things and we took budwood from several. The north plot is apparently youngest and poorest. We found nothing of interest in fruit in this plot.



The best trees of the China type were found in the ares shown in stipples. Also some of the biggest fruited trees were in the area. Those of Pahua type and Mexican types were scattered but the most in central plot. These Mexicans were mostly out of fruit or late fruit or two hanging. The trees at this date could mostly be quickly spotted by the setting flower buds or some few of the trees were in flower.

To see the variation in the Mexican fruits would be wise to return to the plantation in late June or July.

The soil in the entire plantation is poor and mostly pretty rocky. The best

soil with best drainage is probably in the center plot in the area shown in stipples on map but that is not too good.

Irrigation system on the plantation is not much. The rainfall of the area is said by Henry Gilly and Carl Crawford to be about 33 inches. Vegetation in uncultivated lands around the valley would indicat this to be about right.

The composition of no tree in the plantation is known. They are classified in three ways by Dr Popenoe and Harlan Griswold: 1, Pahua, 2, de China, 3, Mexican.

Pahuas. are predominantly large fruited, with the fruit tending to be round. The leaves have no anise odor and the petiole is relatively short. The flesh is said to be quite watery and light in color and the oil content low.

Aguacates de China, (a local name because good things come from China and the area was near the old royal road from the orient to Spain) are predominantly with pyriform, medium sized fruits, leaves tending to have anise odor, but this apparently sometimes lacking and petioles relatively short. This and the Pahuas mostly with immature fruits now but these in various stages of development. The flesh is more nearly a butter yellow and said to contain more oil.

Mexicans predominantly have oblong-oval, black or purple tinged fruits; leaves mostly with strong anise odor and with relatively long petioles. Very few fruits hanging now (October 20th) but trees beginning to show flowers.

It seems possible that all, or nearly all of the things to be seen in this orchard are of hybrid origin (putative parents P. americana and P. drymifolia) and that segregation has occurred in a way that these trees are somewhere between the two extremes of the putative parents. Probably none or but few of the trees are F_1 and may

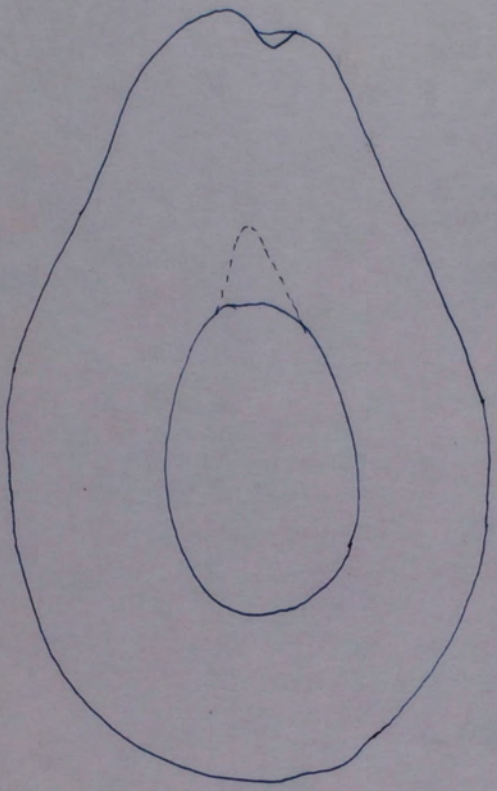
represent crosses and back crosses for a long period of time. Seedling progeny of any tree may be expected in time to give all the variations now found in the orchard, perhaps with some new ones. There is little reason to believe that the characters used to separate the types are any more than indications of trends or that all them do or should occur in any particular tree of one of the types.

Members of this Exploration:

Harlan Griswold,
Carl Crawford,
Wilson Popenoe,
Louis O. Williams.

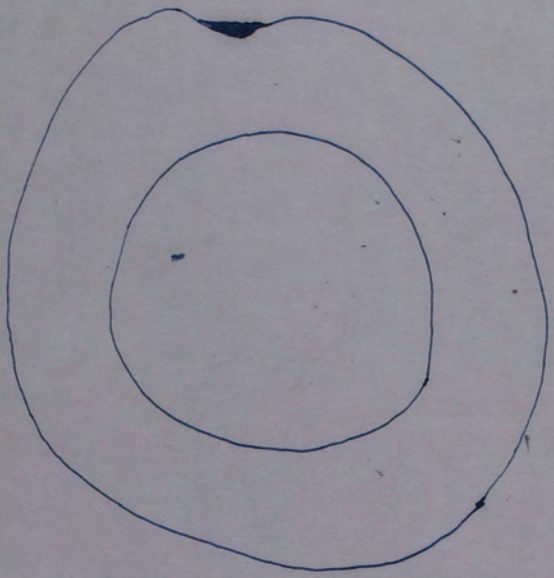
1947 Selections from Rodiles Grove, Atlixco, Puebla, México.
(The serial numbers are those of Dr. Williams' herbarium)

13515



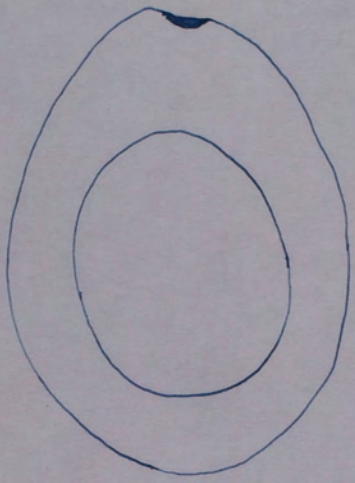
13515."Rodiles No. 1", Fruit stalk 5 ins. long. Skin moss green and rather thick. Flesh cream yellow, changing to pale green near skin. Probably mature in December.

13516



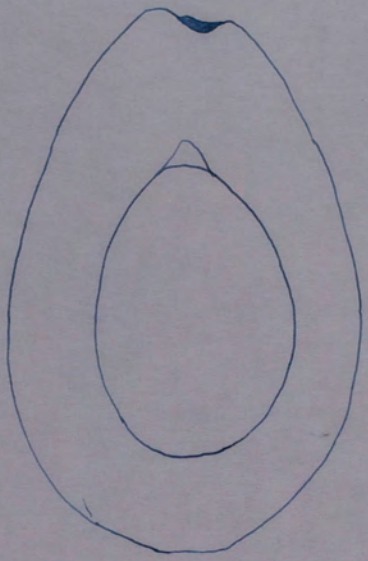
13516. "Rodiles No.2" Fruit stalk 6 ins. long, slender. Pale yellowish green with conspicuous lenticels. Flesh pale cream colored, greenish near skin. Probably rather early in season - perhaps November

13517



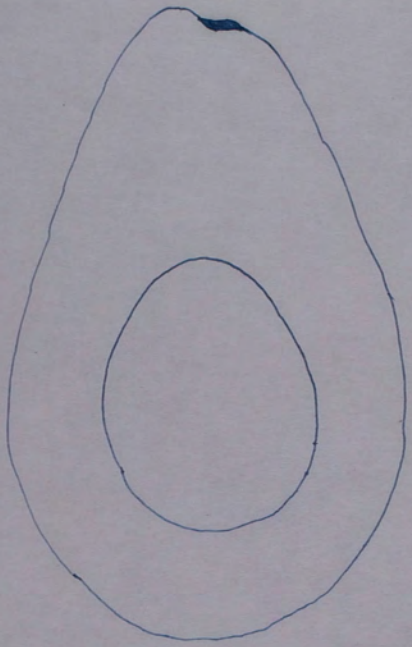
13517. Fruit stalk 4 to 5 ins. long, slender. Color dark purple. Flesh cream colored, changing to pale green near skin. Probably early in season - perhaps October as this specimen seems mature.

13518



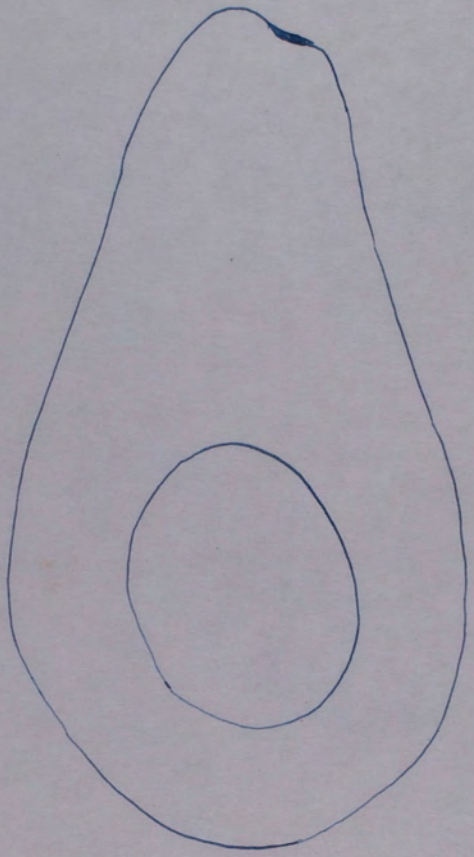
13518. Fruit stalk 6 ins. long, rather slender. Fruit immature; only a few on the tree which is in bad condition. Surface like that of Fuerte. Color when ripe? Probably mature about December 1st.

13519



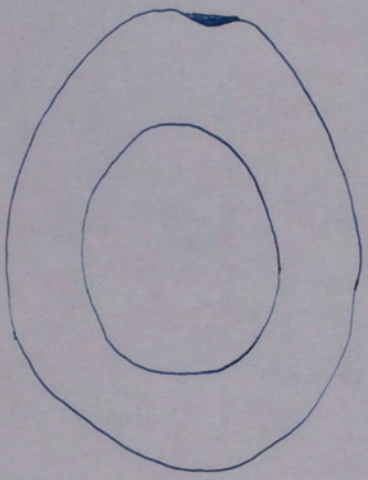
13519. Surface smooth, pale yellowish green, attractive. Flesh pale cream colored. Season? Probably not early; Perhaps December.

13520



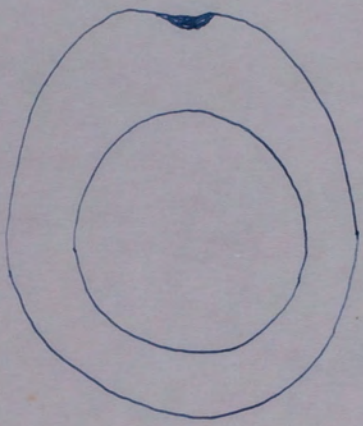
13520. Not mature end of October; season perhaps late Nov. Moss green, flesh yellowish cream colored. This fruit is very similar in general character to Rodiles No. 1.

13521



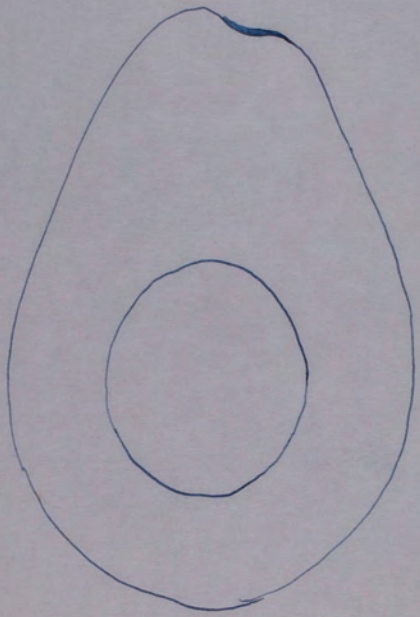
13521. Fruit stalk 2 ins. long, stout. Surface pale yellowish green, flesh cream colored, pale greenish near skin. Mature at end of October.

13522



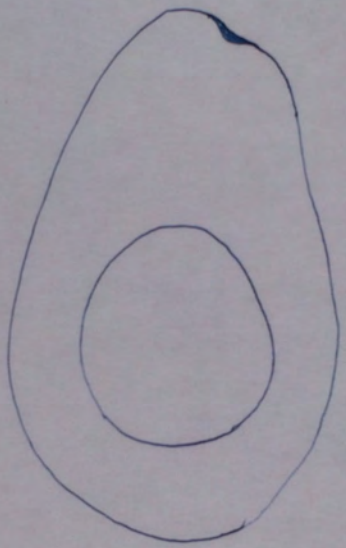
13522. Chosen because it was carrying a tremendous crop. Color moss green, glossy. Skin thin. Flesh greenish cream color. Fruit probably mature in November.

13523



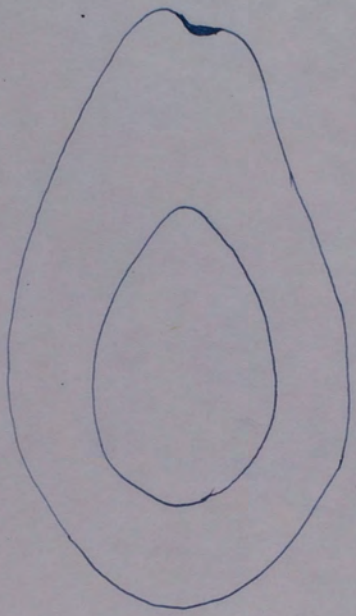
13523. Color light green. Flesh yellowish cream color. Fruit probably mature in December.

13524

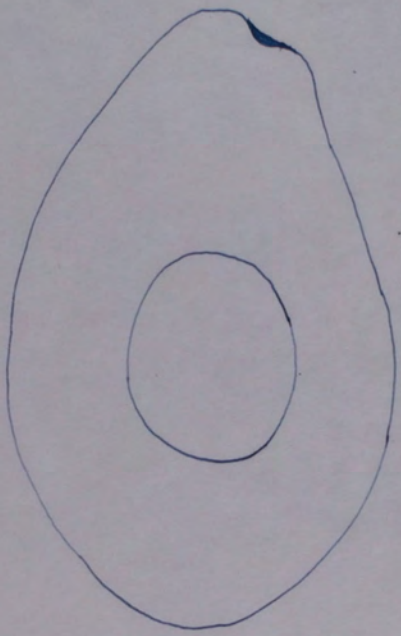


13524. Fruit stalk 3 ins. long, slender. Fruit pale yellowish green, surface smooth. Flesh yellowish cream color. Mature in November.

13525

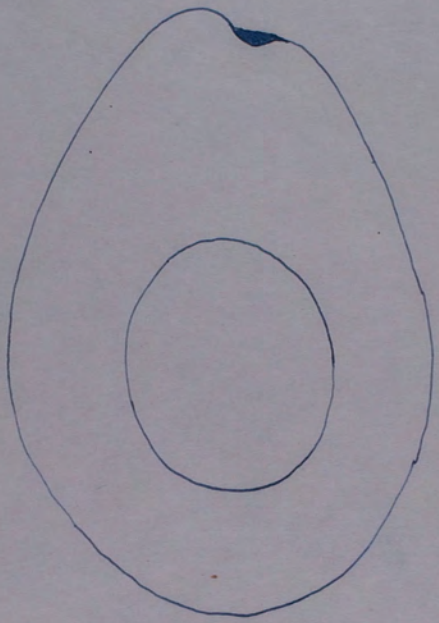


13525. Surface smooth, pale green. Flesh greenish cream color
Fruit mature at end of October.- probably an early variety.



13526. Color dark purple. Flesh cream color in the immature fruit. Probably ripens in December.

13527



13527. Color dark purple. Flesh yellowish cream color. Probably matures in December.

AVOCADO VARIETIES

OF WHICH BUDWOOD WAS COLLECTED AT THE HACIENDA SAN DIEGO NEAR ATLIXCO, ESTADO PUEBLA, MEXICO, 23 AUGUST, 1948. AND OF WHICH ONE LOT WAS TAKEN TO CALIFORNIA (WITH A FEW EXCEPTIONS) BY DR C A SCHROEDER; ONE LOT WAS TAKEN TO TEXAS BY DRS CINERON AND COOPER; AND ONE LOT WAS SENT TO HONDURAS BY WILSON POPENOE.

THE NUMBERS ARE THOSE OF THE HERBARIUM OF DR LOUIS O. WILLIAMS.

Present in Atlixco, August 22-23 when trees were examined in the Rodiles grove in 1948:

Dr. J. Eliot Coit of California

Mr. Carl Crawford of California

Dean K. A. Ryerson of California

Dr. C. A. Schroeder of California

Dr. Rafael Cintron of Texas

Dr. William Cooper of Texas

Mr. Padgett of Texas

Dr. L. O. Williams of Honduras

Mr. Wilson Popenoe of Honduras

We discussed an appropriate name for the trees which appear to be Guatemalan x Mexican hybrids. There were suggested:

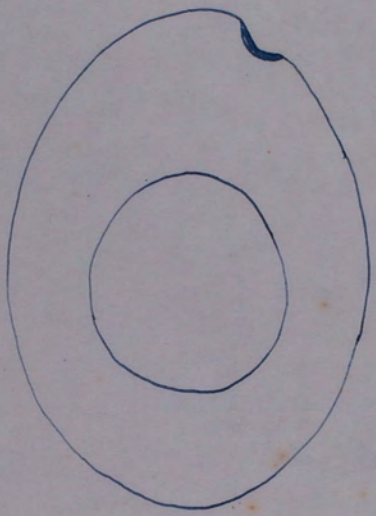
Atlixco hybrids

Fuerte-like hybrids

Aguacates de China

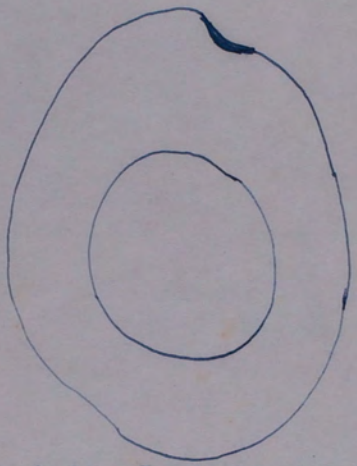
The majority of those present seemed to feel that the best ter is "de China." There are hybrids of this parentage in places other than Atlixco and they are not all Fuerte-like. While the term "de China" is applied in Atlixco to some varieties which do not appear to be hybrids its use in horticulture for Guatemalan x Mexican hybrids should not result in any confusion and its use in this sense has already become established to a limited degree.

14361.



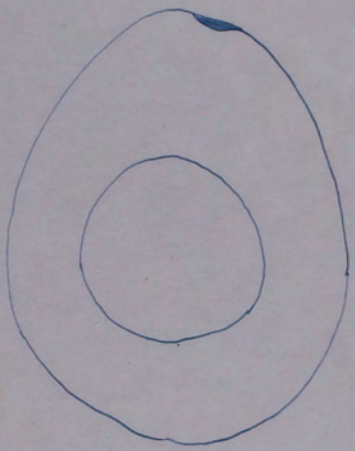
14361. Fuerte-like hybrid. Not yet mature. Leaves moderately anise-scented. Surface of ruit now light green, glossy. Lenticels abundant and pronounced. Flesh shows no signs of fibro-vascular bundles. An attractive little fruit - Purple when ripe.

14362



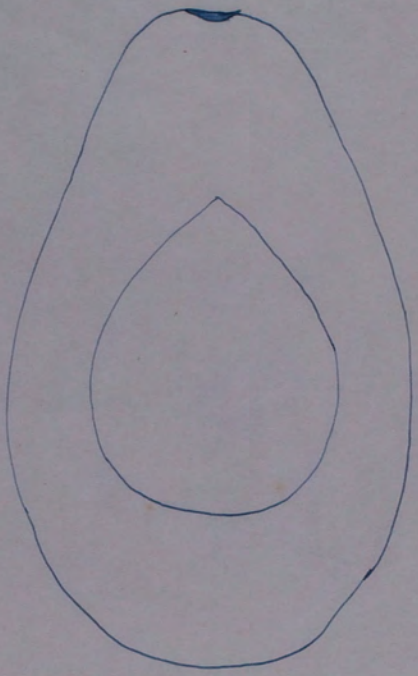
14362. Appears to be a Fuerte-like hybrid, not yet mature. Leaves rather strongly anise-scented. Fruit at present green in color. Smooth on the surface, rather glossy, with prominent lenticals. Perhaps ripe in November? Looks like a nice little avocado.

14363



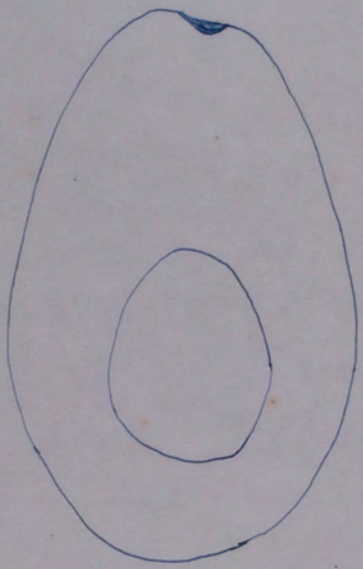
14363. Appears to be a Fuerte-like hybrid, of perhaps the same season. Leaves rather strongly anise-scented. Fruit with a smooth rather glossy surface. Now light green. Lenticels prominent, skin thickness like that of Fuerte. Looks like a nice little fruit.

14364



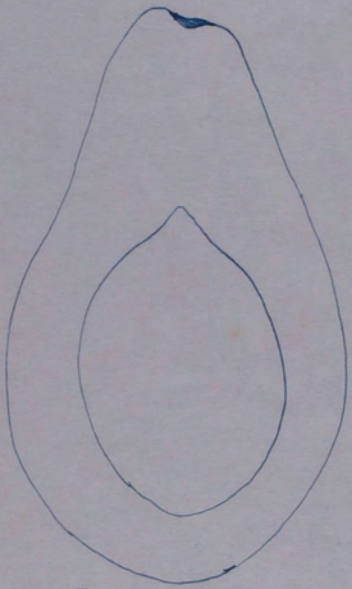
14364. Another Fuerte-like hybrid, of about the same size as Fuerte. Anise scent of leaves faint. Fruit almost mature - probably ripe in October. Skin thickness like that of Fuerte; surface now moss green. Lenticels scattered to abundant, conspicuous. Looks like a good Fuerte-like avocado.

14365



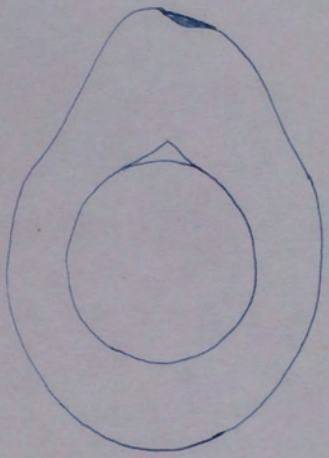
14365. Another Fuerte-like hybrid and looks like a very nice fruit. Not yet mature - probably October. Surface smooth and glossy. Skin thickness like that of Fuerte. Flesh seems free of fiber even in this immature stage. Seed very small.

14366



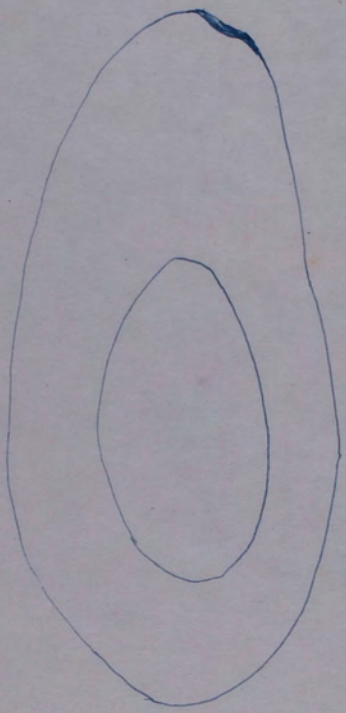
14366. Another Fuerte-like hybrid, with a rather large seed. Foliage almost withbut anise-odor. Surface now bright green with rather small lenticels. Fruit almost mature. No fiber apparent in flesh.

14367



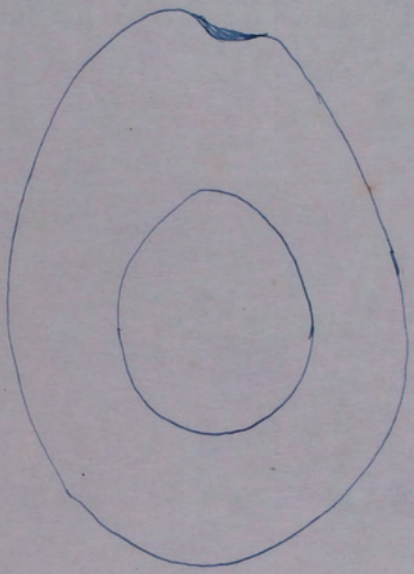
14367. A Fuerte-like hybrid. Plenty of anise-odor in leaves. Probably a small fruit and rather late. Now green in color with abundant rather small lenticels. Skin seems to be rather thick.

14368



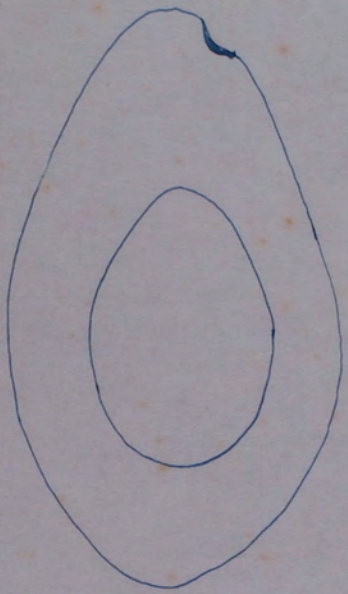
14368. Apparently a Fuerte-like hybrid. Leaves have the anise-odor about like Fuerte. Season perhaps about that of the latter. Surface smooth and glossy, lenticels scattered and relatively few, but large. Proportion of seed to flesh about like that of Fuerte. Some of the fruits more obovate in form that that traced overleaf.

14369



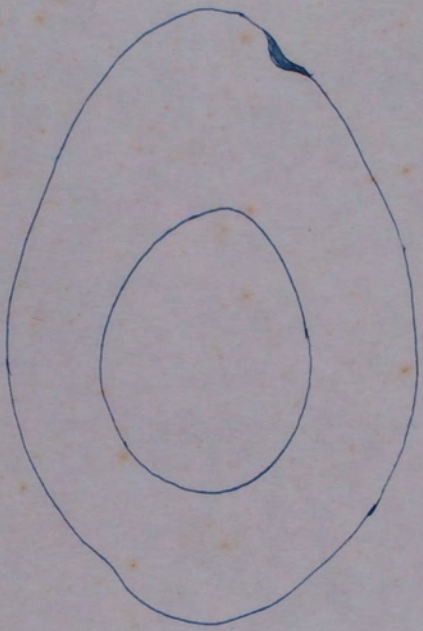
14369. Another good-looking Fuerte like hybrid. Anise-odor in the leaves about like that of Fuerte. Surface of fruit smooth, light green at present, with lenticels about as in Fuerte. Skin looks to be rather thin. Flesh free from fiber streaks. Season probably about the same as that of Fuerte.

14370



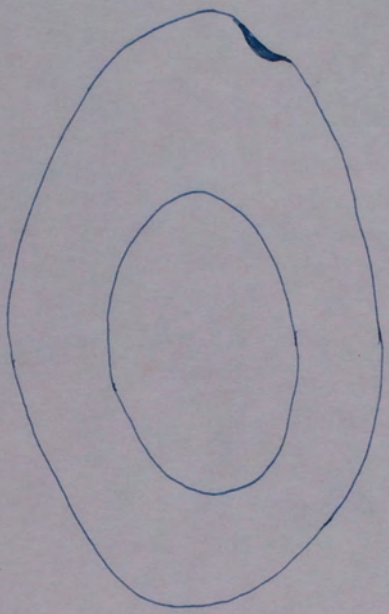
14370. Another Fuerte-like hybrid. The anise-like odor in the leaves is not very strong. The surface of the fruit is smooth and glossy. Lenticels about as in Fuerte. Skin looks somewhat thicker than that of Fuerte, an important point. Season probably about November here. A nice-looking fruit.

14371



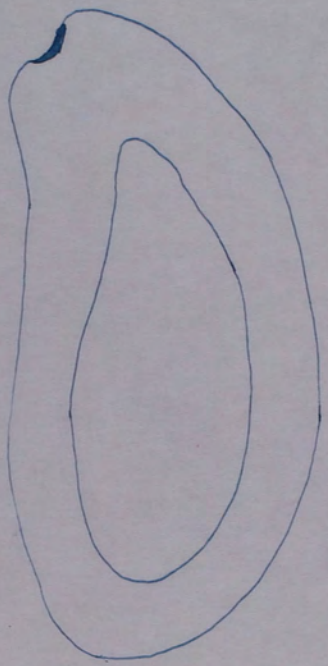
14371. A fine large Fuerte-like hybrid. The leaves have a pronounced anise odor. Fruit now green, glossy, with abundant large lenticels. Skin not very thick. Flesh looks like that of Fuerte. Ripening season probably about November here.

14372



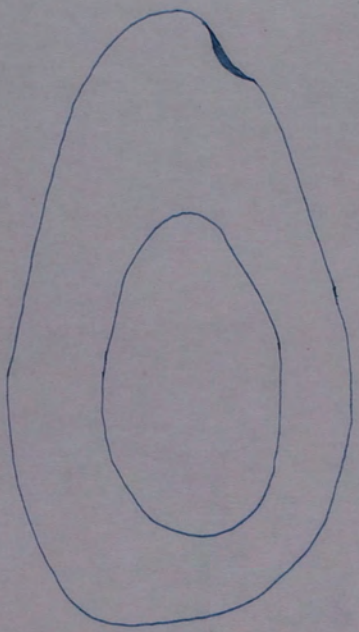
14372. A good-sized Fuerte-like hybrid. Anise odor of leaves not very pronounced. Surface smooth and glossy; lenticels as in Fuerte. Color probably green at maturity. Skin about as thick as in Fuerte. Flesh probably free from fiber. Ripening season here probably from October onwards, judging by present stage of development of the fruit.

14373



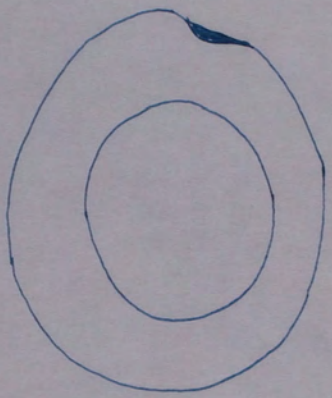
lean 14373. Either a late and large-fruited Mexican or a hybrid leaning strongly toward the Mexican side. Now fully ripe, and the tree coming into bloom. Anise odor of leaves not really strong. Surface smooth, glossy dark purple with lenticels not showing. Seed cavity large; flesh pale yellow-green, fiber not prominent. An interesting fruit for home use because of the season and Mexican race.

14374



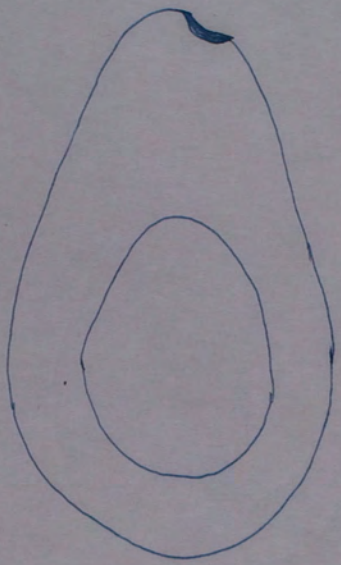
14374. A Fuerte-like hybrid which seems to lean toward the Guatemalan side and therefore may be rather late in season. Anise odor not very pronounced but present. Surface slightly pebbled, now bright ~~plase~~ green, lenticels as in Fuerte; skin thickness about as in the latter. Flesh shows no fiber streaks.

14375



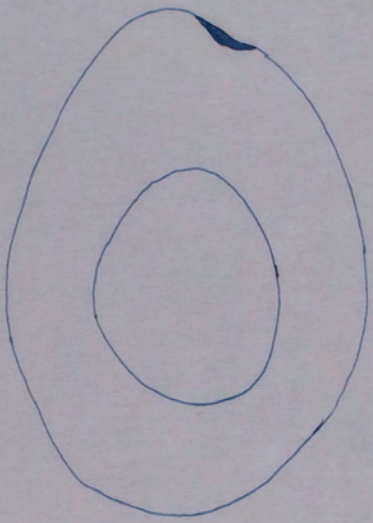
14375. Looks like a hybrid which leans toward the Mexican side but the leaves are not strongly anise-scented, and season is probably not earlier than October - November. Surface of fruit smooth and glossy. Now light green, with small and rather few lenticels. Skin thinner than that of Fuerte.

14376



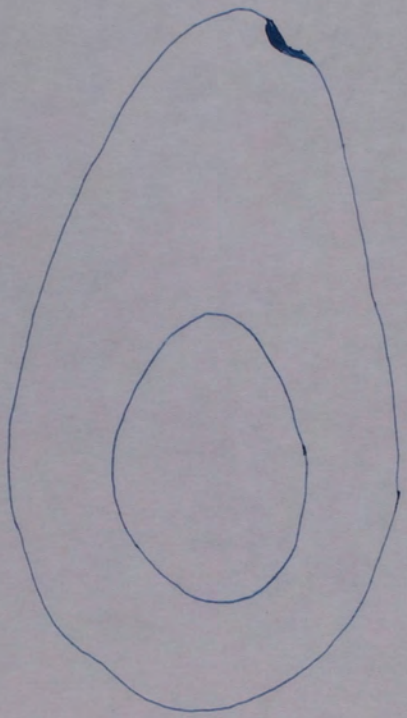
14376. A nice little Fuerte-like Hybrid. Not much anise-odor in leaves. Surface (now) pale green with numerous rather small lenticels. Skin thin and leathery. Some fiber streaks in flesh at present; Season here probably October-November.

14377



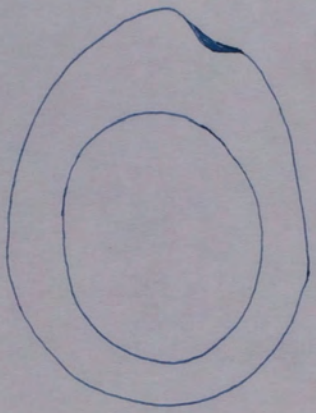
14377. Perhaps a hybrid, but the leaves have little anise-odor and the fruit looks much like a smooth-skinned Guatemalan. Still quite immature. Surface with abundant rather small lenticels. Skin thick; no apparent fiber in flesh. I suspect this may turn out to be a Guatemalan.

14378



14378. A Fuerte-like hybrid with fruits of good size. It has been selected by Carl Crawford for propagation at the Hacienda Xahuentla. Almost no anise-odor in leaves. Surface of fruit smooth, glossy, now ~~xxxx~~ light green with abundant small lenticels. Probably not mature until November - about like Fuerte. Parent tree not bearing much of a crop this year but Carl Crawford says it has born some good crops in the past.

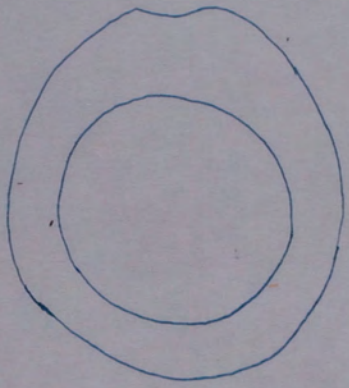
14379



14379. Apparently a pure Mexican, and perhaps rather late for this race. Dark purple, or green around the base and purple elsewhere. A nice shapely fruit with the large seed characteristic of this race.

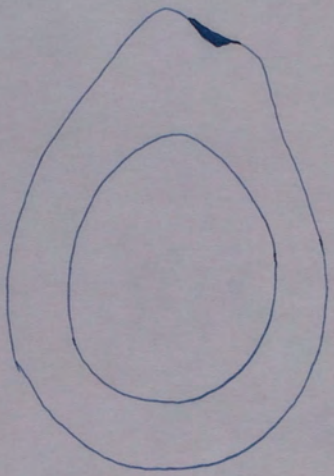
Apparently a strong grower. For trial as a rootstock.

14380



14380. A variety of the Mexican race chosen primarily because it seems to be an unusually strong grower and might be interesting as a rootstock. Only one fruit left on the tree- there were several seeds on the ground. Appears to be a green fruit but this is not certain.

14381

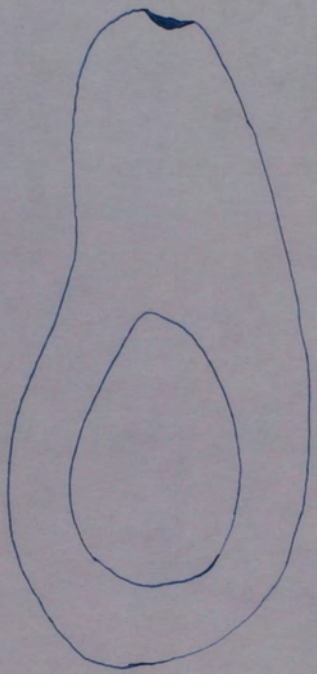


14381. A variety of the Mexican race, taken because this and 14379 appear to be strong growers, hence of possible value as stock-plants; and at the same time they are about as good fruits of this race as can be found here.

This variety is glossy-purple and green in color. Seed large as is almost always the case with this race.

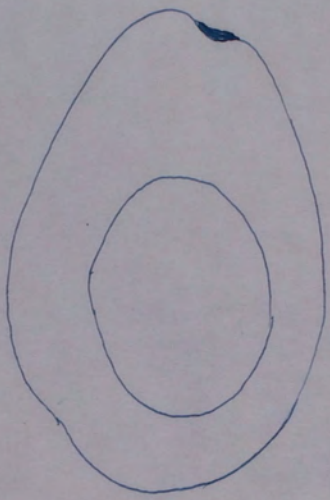
VARIETIES NOT FROM ATLIXCO

14382 28 August 1948



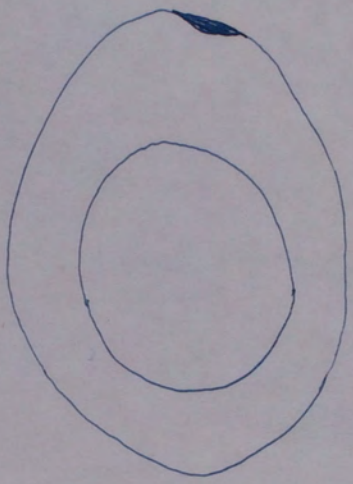
14382. From Huerta of Eustolio López Pliego at Villa Guerrero, Mexico (Budwood labelled his No. 2) A grafted tree. Fruit said to be black when ripe. Looks to be mature now, but main crop said to be in April. Flesh looks clean and color good. Mexican race.

14383 28 Aug. 1948



14383. From Huerta of Eustolio López Pliego, Villa Guerrero, Mexico. Budwood labelled his No. 1. A fine Mexican. Taken from a grafted tree. Color green when ripe. Principal season said to be April, but a number of fruits are now on tree and almost mature.

14384 28 Aug. 1948

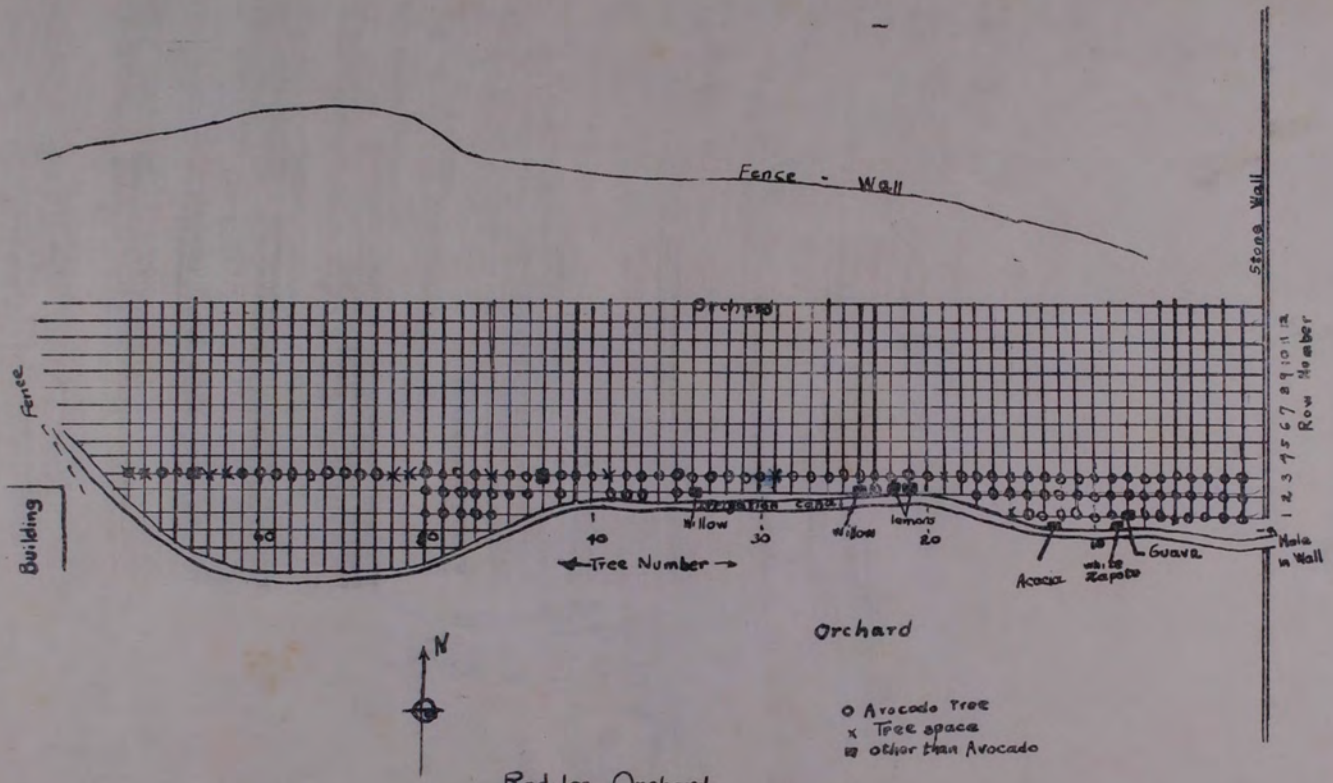


14384. From huerta of José Vera in Villa Guerrero, Mexico. A good Mexican. Dark Purple with maroon lenticels. Main crop said to be in April. Only a few fruits now on tree but some of these are mature. Locally considered a very good aguacate.

14385 29 Aug. 1948

"Curunguero" Parent of this tree said to be a seedling in Zitácuaro which was grown from a seed brought from Atlixco. This tree is said to bear a long black medium-sized fruit of good quality with a small seed. Probably a hybrid tending toward the Mexican side.

Tree at house of Nabor Contreras at settlement of Curingueo a few kilometers from Zitácuaro. Fruit not seen by us.



Rodiles Orchard
- Atlixco -

per. CA Schroeder
Aug 22, 1948

Popenoe - Williams - Schroeder

Dr Schroeder's list of Avocados collected at Rodiles grove, August 22-23, 1948:

Williams No.	Location in Grove	
14361	Row 5	Tree 3
14362	4	24
14363	3	28
14364	3	31
14365	3	32
14366	4	38
14367	3	47
14368	7	65
14369	12	65
14370	6	51
14371	7	38
14372	6	30
14373	7	20
14374	11	16
14375	11	18
14376	12	17
14377	10	6

All the foregoing trees were marked with numbered copper labels. 14378 Row 5 Tree 2? (Crawford's location) marked with copper label carrying no number. This variety is being propagated at Xahuentla as Rodiles No. 3.

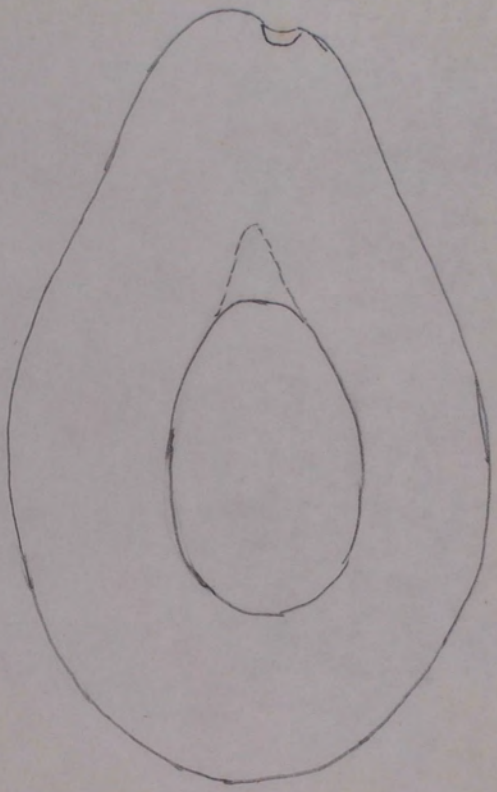
14379 14380 14381	Mexicans?	Taken Williams and Popenoe, as of possible interest for rootstocks or good Mexican fruits.

ESCUELA AGRICOLA PANAMERICANA

APARTADO 93

TEGUCIGALPA, HONDURAS
CENTRO AMERICA

13515



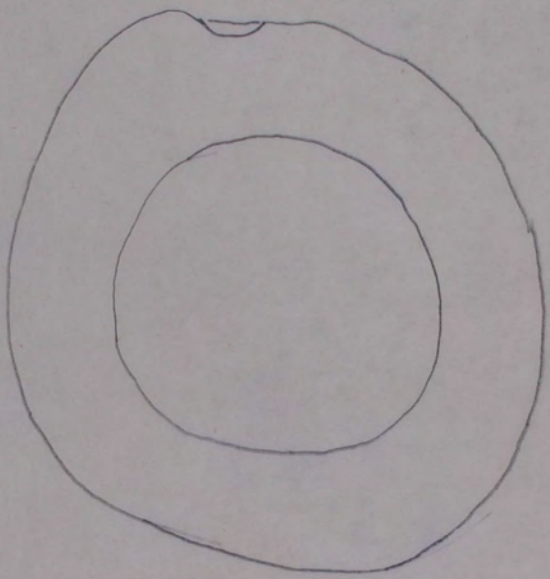
13515. "Rodiles No. 1". Fruit stalk 5 ins long. Skin moss green and rather thick. Flesh cream yellow, changing to pale green near skin. Probably mature in December.

ESCUELA AGRICOLA PANAMERICANA

APARTADO 93

TEGUCIGALPA, HONDURAS
CENTRO AMERICA

13516



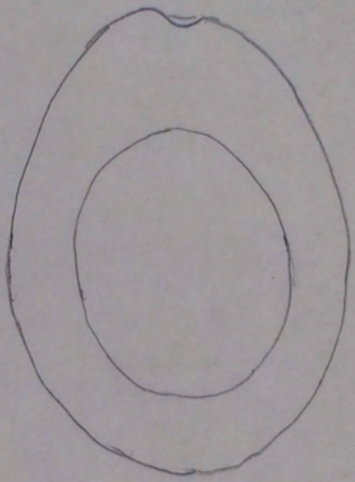
13516. "Rodiles No. 2". Fruit stalk 6 inches long, slender. Pale yellowish green with conspicuous lenticels. Flesh pale cream colored, greenish near skin. Probably rather early in season - perhaps November.

ESCUELA AGRICOLA PANAMERICANA

APARTADO 93

TEGUCIGALPA, HONDURAS
CENTRO AMERICA

13517



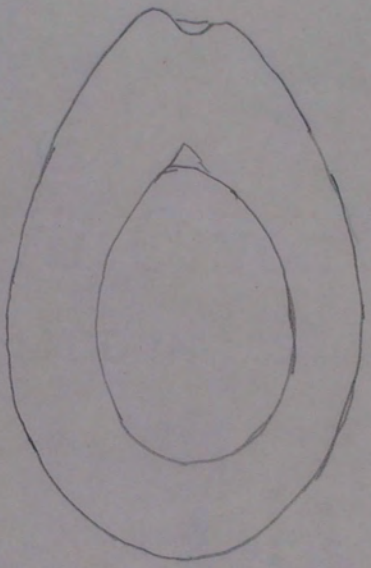
13517. Fruit stalk 4 to 5 ins long, slender. Color dark purple. Flesh cream colored, changing to palegreen near skin. Probably early in season - perhaps October as this specimen seems mature.

ESCUELA AGRICOLA PANAMERICANA

APARTADO 93

TEGUCIGALPA, HONDURAS
CENTRO AMERICA

13518



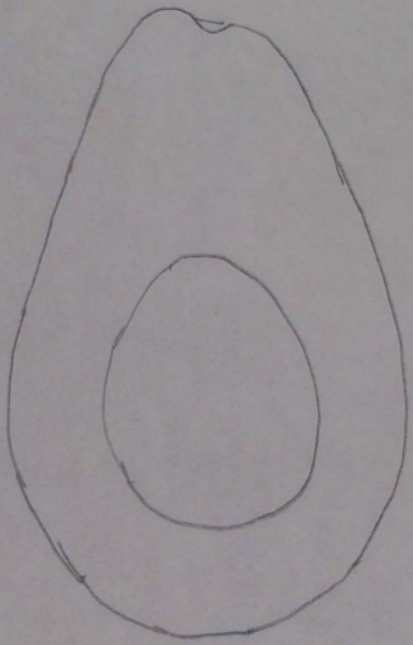
13518. Fruit stalk 6 ins long, rather slender. Fruit immature; only a few on the tree which is in bad condition. Surface like that of Fuerte. Color when ripe? Probably mature about December 1st.

ESCUELA AGRICOLA PANAMERICANA

APARTADO 93

TEGUCIGALPA, HONDURAS
CENTRO AMERICA

13519



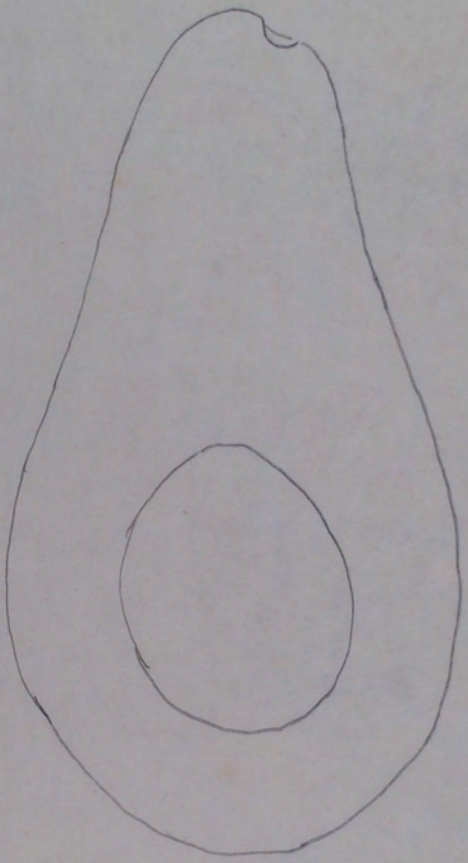
13519. Surface smooth, pale yellowish green, attractive. Flesh pale cream colored. Season? Probably not early; perhaps December.

ESCUELA AGRICOLA PANAMERICANA

APARTADO 93

TEGUCIGALPA, HONDURAS
CENTRO AMERICA

13520



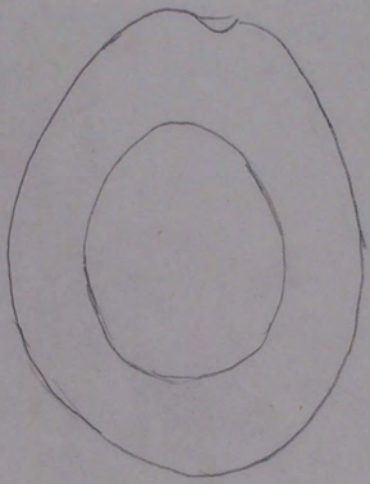
13520. Not mature end of October; season perhaps late Nov. Moss green, flesh yellowish cream colored. This fruit is very similar in general character to Rodiles No. 1.

ESCUELA AGRICOLA PANAMERICANA

APARTADO 93

TEGUCIGALPA, HONDURAS
CENTRO AMERICA

13521



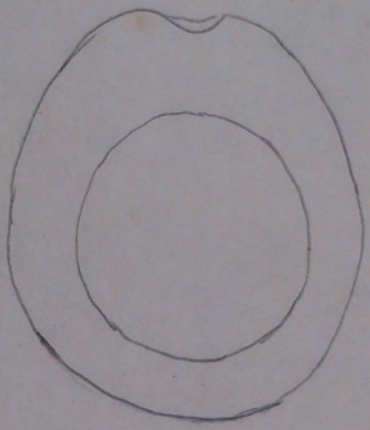
13521. Fruit stalk 2 ins long, stout. Surface pale yellowish green, flesh cream colored, pale greenish near skin. Mature at end of Oct.

ESCUELA AGRICOLA PANAMERICANA

APARTADO 93

TEGUCIGALPA, HONDURAS
CENTRO AMERICA

13522



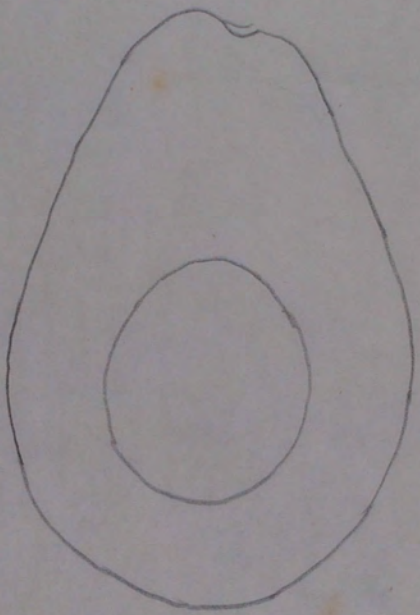
13522. Chosen because it was carrying a tremendous crop. Color moss green, glossy. Skin thin. Flesh greenish cream color. Fruit probably mature in November.

ESCUELA AGRICOLA PANAMERICANA

APARTADO 93

TEGUCIGALPA, HONDURAS
CENTRO AMERICA

13523



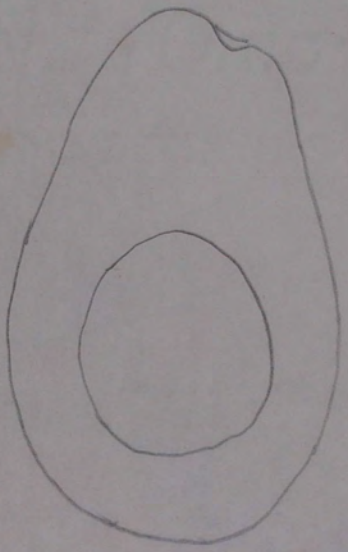
13523. Color light green. Flesh yellowish cream color. Fruit probably mature in December.

ESCUELA AGRICOLA PANAMERICANA

APARTADO 93

TEGUCIGALPA, HONDURAS
CENTRO AMERICA

13524



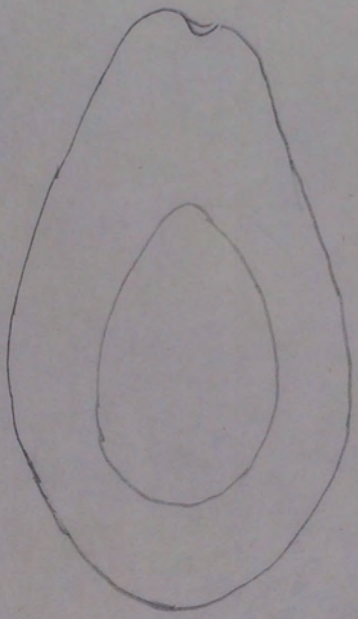
13524. Fruit stalk 3 ins long, slender. Fruit pale yellowish green, surface smooth. Flesh yellowish cream color. Mature in November.

ESCUELA AGRICOLA PANAMERICANA

APARTADO 93

TEGUCIGALPA, HONDURAS
CENTRO AMERICA

13525



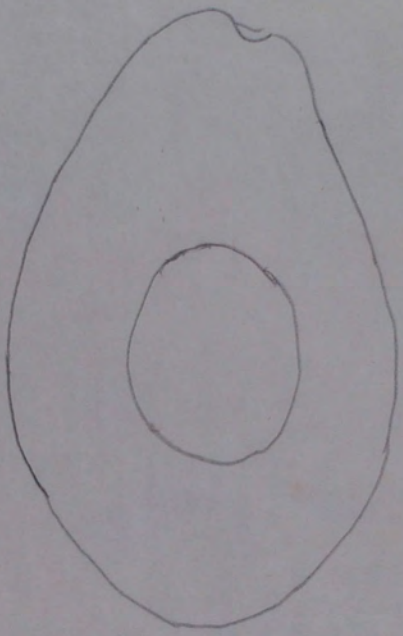
13525. Surface smooth, pale green. Flesh greenish cream color. Fruit mature at end of October - probably an early variety.

ESCUELA AGRICOLA PANAMERICANA

APARTADO 93

TEGUCIGALPA, HONDURAS
CENTRO AMERICA

13526



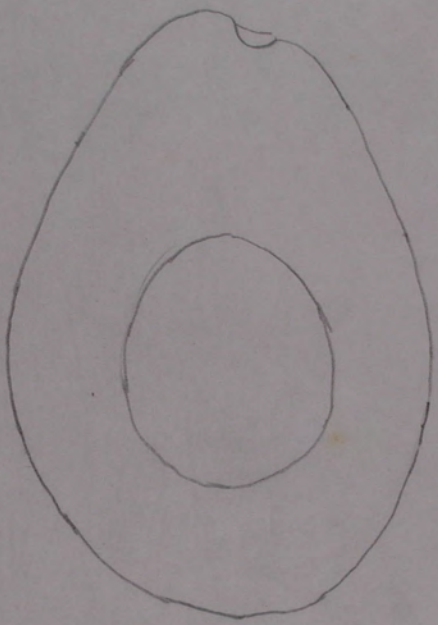
13526. Color dark purple. Flesh cream color in the immature fruit. Probably ripens in December.

ESCUELA AGRICOLA PANAMERICANA

APARTADO 93

TEGUCIGALPA, HONDURAS
CENTRO AMERICA

13527



13527. Color dark purple. Flesh yellowish cream color. Probably matures in December.

THE EXPEDITION TO MEXICO OF OCTOBER 1947

Wilson Popenoe and Louis O. Williams

The possibility of discovering rootstocks resistant to those conditions which favor tree decline is perhaps the factor most directly responsible for the appointment, by President Griswold, of the Committee on Foreign Exploration; but it has already become quite obvious that such a committee can serve the interests of the California Avocado Society in more ways than one. Here are a few of the objectives which, in our opinion, the committee may well hope to attain:

1. It can explore those regions in tropical America where avocados and avocado relatives grow wild, and bring together the forms which seem worth testing as rootstocks. This, as stated above, we may assume to be the primary objective. It will take some years to get results. Seedling will have be assembled and grown at one or more points in tropical America, until budwood is available for sending to California. There trees will have to be grown until they come into bearing and their seeds can be planted for trial as rootstocks. Unless, of course some short-cut can be worked out. The probability that it will take a considerable number of years to obtain results makes it all the more important that no time be lost in getting under way.

2. New varieties can be introduced. While it has been the feeling, in many quarters, that California should depend in the future upon varieties of local origin, the fact remains that the industry has been based, for more than a quarter of a century, upon varieties which originated in the American tropics. President Griswold has pointed

out that the industry needs varieties which capitalize the prestige of Fuerte and which at the same time will extend the season for Fuerte-like avocados, or prove satisfactory in regions where Fuerte is not wholly profitable. The fact that many Fuerte-like varieties are now known to exist in the Atlixco region of Mexico makes it seem worth while to explore more fully the possibilities along this line- and perhaps along other lines. This work was commenced in October 1947, as will be described later in this report.

3. The classification of horticultural varieties of the avocado and their development from ancestral forms, has not yet been worked out satisfactorily. While these problems may be of greater academic than practical interest, they are never-the-less worth consideration in connection with the general development of the avocado industry. It seems possible that much information can be obtained, as a side line, in connection with the search for wild forms and species closely allied to the avocado which are desired for trial as rootstocks.

As background for some of the work which has been undertaken by the newly-formed Committee on Foreign Exploration, President Griswold has requested that we attempt to summarize the situation as we see it. This we here attempt to do, in the light of what has been learned in past years and in the expedition to Mexico of October 1947 conducted by Harlan B. Griswold, Carl S. Crawford, and ourselves.

WHAT DO WE KNOW ABOUT WILD AVOCADOS?

The accounts of early travelers, the prevalence or absence of common names in native languages and dialects, and other evidence has led us to believe that the avocado was cultivated, at the time of the Discovery, from Mexico on the north to Peru on the south, extending from the Pacific side of South America only to the eastern

slopes of the Andes. The available date have been presented in earlier issues of the Yearbook, and elsewhere. We have assumed that we must look for the ancestral forms of cultivated avocados in this general region. What have found, to date?

1. There is a tree which grows, in what has every indication of being an indigenous state, on the slopes of the volcano Irazú in Costa Rica, that was described in the 1935 Yearbook ("Origin of the Cultivated Races of Avocados", by Wilson Popenoe) What may be the same thing grows on the Caribbean coast of Honduras, at low elevations. This tree produces round fruits two or three inches in diameter which are strongly anise-flavored; and the foliage and bark have the anise odor to a high degree. The fruit has a thick, woody skin like that of many variations of the Guatemalan race of avocados. Probably it occurs in other regions in addition to those where it has been observed.

Whether or not this plant has any connection with development of the present-day horticultural forms of the avocado we do not know. We are rather inclined to doubt it. As a possible rootstock it should receive consideration because it seems, botanically, to be a true avocado and because it grows in parts of Honduras where the annual rainfall is from 100 to 200 inches. In explanation of this latter point, it should perhaps be mentioned that we are assuming one of the requirements in California is a rootstock which will thrive on lands which are, at times, so saturated with moisture as to be inimical to the development of trees budded on those rootstocks at present in commercial use.

2. About 1930 a wild avocado was discovered in the mountains above Tecpán in Guatemala, which was described in the 1935 Yearbook as

"The Wild Avocado of Tecpán". This tree gives one the impression that it might easily have been a progenitor of the cultivated Guatemalan avocados. To produce the latter little but selection for larger fruit with a higher percentage of flesh to seed would seem to have been required.

Later a wild tree, which seems to be the same thing, has been found in the cloud forests on several mountain-tops in the general region of Tegucigalpa, Honduras, at elevation of 6000 to 7500 feet. Further specimens have been seen near Tecpán, Guatemala, as high up as 9300 feet, which is the greatest elevation at which we have seen avocados, wild or cultivated, in Central America.

And in October 1946, Harlan B. Griswold and Carl S. Crawford discovered a wild avocado at 7500 feet on the heights above Acaltzingo, in the state of Veracruz, Mexico, which was seen again by our party in October 1947. This has every appearance of being the same as those known from near Tecpán and Tegucigalpa. It is not difficult to imagine that this wild avocado, now known to have a fairly wide distribution, might have given rise through selection and adaptation to different climatic conditions, to the West Indian as well as the Guatemalan races. We have only to assume a long period of cultivation - and there is every reason to suppose that avocados have been cultivated in Mexico and Central America for more than a thousand years.

3. The origin of the Mexican race of avocados phylogenitically and geographically is by no means clear. It is difficult to believe that it could have originated from the same wild form as did the Guatemalan or West Indian races, though it is not difficult to imagine that these two last-named might have been derived from one and the same form, as mentioned above. Because the avocados of the Mexican

race which are grown around the eastern slopes of the volcano Orizaba, in Veracruz, are characteristically small with relatively large seeds, and give one the impression of wild avocados, it always had seemed logical to search for wild trees in this region. Such a search was commenced by Harlan B. Griswold and Carl S. Crawford in 1946 and continued by the expedition of October 1947. Our search included the region from Maltrata, down through the city of Orizaba, and northward around the base of the volcano to Coscomapepec. It was assumed that elevations between 4000 and 7000 feet would be the most likely ones at which to find this avocado native; but the results were negative. No trees were seen in what we could believe to be a truly indigenous state and, more important still, the Indians of the region, whose familiarity with native trees is intimate and admirable, asserted without exception that avocados of this race do not grow in the forests; that they are only in cultivation, or escapes.

There still remains to be explored a region to the north of the volcano, where climatic conditions are such that one might expect avocados to grow; but there are scant grounds for believing that the Mexican race is to be found there in an indigenous condition. Carl S. Crawford, who has made the discovery of the wild form of this race his pet project, may be able to find them eventually; if they are not found we shall be forced to assume that this race no longer exists in the wild state. It might originally have grown in the valleys and on open slopes, where cultivation has absorbed it as an apparent wild tree. We do not know; perhaps we shall never know, though it must be emphasized that there is need of further investigation.

Perhaps the principal result of the 1947 exploration was this:

seeing the wild avocado near Acaltzingo, which gives one the impression of having been a possible progenitor of some of our cultivated forms, and comparing it with trees of the Mexican race near Orizaba, it is difficult to escape the feeling that the two are botanically different - distinct species - in spite of the fact that botanists working with dried specimens of foliage and flowers have had a hard time differentiating them.

AVOCADO RELATIVES

The rootstock problem can be approached from several angles. When tree decline first began to attract serious attention in California, growers began to wonder if there was any connection between this trouble and the use of Mexican seedling as rootstocks. We were asked if we had seen avocados anywhere in tropical America which seemed resistant to wet soils. A review of the situation did not seem to offer much hope. Of course, it is still possible that some cultivated form will be found which will prove more satisfactory than anything yet used commercially; we do not know.

The next step seems to have been the development of interest in wild avocados as possible rootstocks. This, we take it, was behind the trip to Mexico which was undertaken by Harlan Griswold and Carl Crawford in October 1946; and the second one, on which they were accompanied by Dr. C. A. Schroeder and Harold Wahlberg, in April 1947. These two trips furnished the background for the latest expedition - that of October 1947 - to which the present report specifically relates though it is our desire, while covering the results of this expedition, to summarise in a general way what has gone before, and some of the lines along which we may expect interesting developments in the future.

Wild avocados being the main objective of the recent explorations in Mexico, it is obvious that anything which looks like an avocado would come in for attention; hence the program has spread out to include Perseas other than Persea americana, and as time goes on will doubtless spread out even more. We have little experience on which to base our hopes; but it is possible that relatives of the avocado may be found which can be used as rootstocks for our cultivated varieties. Let us review the situation for a moment.

We know that the Guatemalan race can be grafted onto the Mexican. These two forms are not greatly alike. We have noted above the possibility that further study may convince us that they are derived from two distinct sources.

We know that avocados can be grafted upon Persea Schiedeana, the chineni or chinini of Mexico, coyó of Guatemala, chucte of Honduras and yás of Costa Rica. This species has received little attention in the United States: many years ago it was introduced into Florida, where it was grown on avocado rootstock, but did not thrive. for reasons with which we are not familiar. The expedition of October 1947 was particularly interested in the chineni, which is cultivated in gardens of the Orizaba-Córdoba region in Mexico, perhaps to a greater extent than in any other part of tropical America. We know that this species is not frost-resistant; we do now know much more about it as a possible stock plant.

There are other Perseas, plenty of them, growing wild in Mexico and Central America. A few of them may be fairly close to Persea americana in character - close enough to prove congenial to the latter when grafted. Practically nothing has been done, as yet, to investigate the possibilities. But if we are to judge by past experience with

other crops - such things as Citrus fruits, peaches, grapes, persimmons- we have every reason to feel that we are justified in conducting an extensive long-time investigation into the possibilities of closely related species as stock-plants for the avocado.

And if we are going this far, we might as well experiment with a few other genera. In Mexico and Central America there are species of Phoebe and Ocotea which produce avocado-like fruits, though usually of small size. "Aguacatillo" (little aguacate) is the name commonly given to a number of these. In our search for wild avocados of the Mexican race near Orizaba in October 1947 we ran across one of these aguacatillos (a Persea, allied to P. longipes (Schl.) Meissner); it was brought down from the mountains by an Indian we met in the village of Chocomán, and had all the characteristics of a small green thick-skinned avocado, though the foliage and inflorescence are different.

Many of the Phoebes and Ocoteas give the impression that they will be more difficult to bud or graft than the avocado; they are thin-barked and slow-growing, with rather dry wood compared to that of young avocados. But they will have to come in for attention, as will also the Anay, Beilschmiedia Anay (formerly Hufelandia Anay), a tree which grows wild in Guatemala, producing a fruit so similar to a good-sized Mexican avocado in appearance that it might be mistaken for one. Buds of this species put on avocado stocks at the Escuela Agrícola Panamericana in Honduras failed to "take" which suggests lack of congeniality; but the experiment was done on too small a scale to be conclusive.

NEW HORTICULTURAL AVOCADOS

Let us leave the problem of tree decline and its possible solution through the development of new rootstocks. As President Griswold has stated, unless this problem can be solved, the avocado industry in California may suffer serious geographic limitations. It seems highly important, therefore, that attention be focused upon rootstocks as one of the more likely solutions.

When we come to discuss avocado varieties, what we already have and what we want, we are on more familiar ground. For thirty-five years no subject connected with the industry has received so much attention as this. Season after season new varieties have come upon the scene; season after season the Variety Committee has brought together records of growth and production, seeking to get the facts and protect growers agains costly mistakes. All in all, the job has been remarkably well done.

Throughout the history of the industry the need has been not for more varieties, but for a few which would measure up to commercial requirements and at the same time produce enough fruit to make their culture profitable to the grower. The introduction of Fuerte, in 1911, seems to have established certain standards which have become even more definitely fixed as the years have gone by. But obviously a single variety cannot meet all the needs of the industry, particularly when it is a variety which does well in some sections and badly in others.

When Fuerte was introduced, we thought it to be a first generation hybrid between the Mexican and Guatemalan races, both of which were cultivated abundantly in the home of this variety, Atlixco. This belief persisted for many years until men like Profesor Hodgson began to notice that Fuerte seedlings did not show the segregation of characters which would be expected of first generation hybrids. Then

visitors to Atlixco began to notice that there existed, in the small orchards of that town, other trees which produced fruit resembling Fuerte in several characteristics formerly considered peculiar to that variety.

An attempt was made to summarise the situation in the 1943 Yearbook ("Aguacates de China", page 27 et seq.) which concluded with the suggestion that Fuerte might be representative of a distinct horticultural race and that it definitely would be worth while to give the subject further attention.

There may be varieties in the Atlixco area which are sufficiently like Fuerte in fruit characters to fit the North American market, automatically as it were, and which at the same time are sufficiently different in season of ripening or in cultural requirements to be of great value to the grower.

The expedition of October 1947 was planned to include an investigation of the Atlixco area at a time of the year when avocados of Fuerte character would be coming into season. From two standpoints the situation was perfect: previous visits to the region by A. D. Shamel, by Griswold and Crawford, and others, had focused attention on the remarkable Rodiles grove; and second, the courtesy of Henri Gilly, owner of the beautiful hacienda Xahuentla, adjoining the Rodiles grove, provided a base from which to work conveniently and expeditiously.

The history of the Rodiles grove had best be told by others, more familiar with it, but the story in brief seems to be about this: Twenty or twenty-five years ago, Adolfo Rodiles, owner of the Hacienda San Diego in the suburbs of Atlixco, became interested in avocados (perhaps because of the fame which had been acquired by avocados of that region) and resolved to develop an extensive grove. To this end

he bought every good avocado he saw in the market, whether Guatemalan, Mexican, or of the Fuerte type, and planted the seed. Several thousand selected seeds were thus grown; and the result is the most remarkable and, in one sense, probably the most valuable avocado orchard in the Americas. Had this orchard been available during the years when tropical America was being combed for varieties worthy of trial in California, the history of the industry might have been very different.

For in this orchard there are several hundred seedlings which, if we can judge by foliage and fruit characters, are perhaps the result of crossing, and recrossing, of the Mexican and Guatemalan races - just as we believe to be the case with Fuerte. That there are so many of them, and that they show certain characteristics in common suggests that many years or generations have passed since the original crosses occurred. Segregates have fallen by the wayside, and the group is now stabilized to a considerable degree at least; so much so that it must be recognized as a group, perhaps a race - a hybrid race.

Three days were spent by our party, examining carefully the trees and fruits in this grove. Carl Crawford had previously made arrangements with the owner, a son of the original founder of the grove, to the end that we could do this and take budwood. With avocados selling in the markets of Mexico City at a peso each (twenty cents in United States currency) the generosity of this man in allowing us to pick samples freely is worth more than passing mention, as also is the permission granted us to take budwood from any trees we thought interesting. The time may come when the California Avocado Society will feel called upon to recognize officially the unlimited cooperation given by Señor Rodiles.

Passing by, with only a nod, dozens of trees which were producing avocados of Guatemalan character, which would have been the delight of an explorer's heart twenty-five years ago, and passing by dozens of trees of Mexican character which were in flower or carrying tiny fruits which would mature late next spring, we devoted our attention to trees of the hybrid group; those whose fruits were in the majority of cases approaching maturity. Because considerable areas of the orchard are characterised by rocky soil, and because cultural attention has been rather sketchy, many of the trees are in poor condition. Some are dying out, others not producing as they would under more favorable conditions. The fact that here are brought together, in regular orchard form, several thousand trees - a thing itself almost unique in tropical America - plus the fact that these trees were grown from selected seeds, makes the Rodiles grove outstanding in importance. When we think of California, and remember that Fuerte has proved, during 35 years, to be the best commercial avocado; and then remember that here are a large number of trees obviously with the same background as Fuerte, it is hard to restrain enthusiasm. We can only urge that continued attention be given to this grove until we are sure that it has furnished its best to California.

Budwood of twelve varieties was taken home by President Griswold, to be propagated at the College of Agriculture in Los Angeles. If these varieties are saved they should prove to be a highly interesting group, since most of them were chosen because the fruits were strikingly like Fuerte in size, shape and color.

A primitive avocado of the Guatemalan race from Toquian Grande, Dept. of Soconusco, Chiapas. Reduced in size. November 9, 1918. 1663.