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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.





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Ex Libris



Wilson 
18 Popenoe

VOL. I, GUATEMALAN EXPLORATIONS

Wilson Popenoe
Dept. of Agriculture,
Washington, D.C.
U. S. A.

Heights in Guatemala determined by the French Expedition.

Tactic	4725	Sta. Catharina (Puebl.)	2321
Coban	4356	Esguipulas	2986
San Cristobal	4643	Paso del Rodeo	2744
San Miguel Uspantan	6040	Los Horcones	3637
Cuxen	5942	Piedra de Amoler	2340
Jacupulas	3826	Copan	1830
Sta. Cruz del Quiché	6621	Valle Honda	1237
Quezaltenango	7697	Chiquimula	1244
Totonicapán	8150	Zacapa	449
Salalá	7041	Pacaya	8366
Guatemala City	5013	Volcan de Agua (summit)	12,313
Antigua	5072	" " (S. Maria)	6828
Ciudad Vieja	5151	" " (crater bet.)	12,087
Escuintla	1450	Volcan de Fuego	13,127
Amatitlan	3901	" " (La Marota)	12,001
Palin	3753	Acatecanango	13616
Cusajinuculapa	2548	Volcan de Atitlan	11723
Cerro Redondo	3542	Cerro Quemado	10201
Los Esclavos	2394	Santa Maria	11453
Agua Blanca	2658	Lago de Atitlan	5112
Suchitan	4108	" " Amatitlan	3895
Sta. Catharina (Rio)	2251	" " San Cristobal	4643

Weights and Measures.

Caballeria = 33.33 acres.

Hectarea = 2.47 "

Mangana = Square of 100 yards

Vara = 2.75 feet.

Quintal = 100 lbs.

Arroba = 25 lbs. of 16 ozs. each.

400 cacao beans = contra

8,000 " " = jiquipil = 20 contras.

24,000 " " = carga = 3 jiquipils.

— Brigham, "Guatemala".

LISTA de los Departamentos y Cabeceras de cada uno.			
DEPARTAMENTOS	CABECERAS	Altura sobre el mar Pies Ingleses	Distancia de la Capital. Miles leg.
SUROCCIDENTE	Guatemala	4877	00
	Racatepeques	5314	25
	Chimaltenango	5385	51
	Amatitlan	3673	24
	Escuintla	1111	67
SUROCCIDENTE	Santa Rosa	Barberena	
	Solola	8074	73
	Totonicapán	7194	95
	Quezaltenango	7351	110
	Ruchupéquez	1145	104
SUROCCIDENTE	Retalhuleu	792	125
	San Marcos	7150	126
	Huehuetenango	7052	104
	Quiché	5662	66
	Santa Cruz del Quiché	2821	60
SUROCCIDENTE	Salamá	4919	105
	Cobán	678	275
	Petén	43	209
	Uspantán		
	Zacapa		129
SUROCCIDENTE	Chiquimula		116
	Jalapa	1252	65
	Jutiapa	6777	75
	Progreso	2821	65
	El Progreso		

Names of Crosses in Central America.

Cross	Male	Female
Mestizo (ladino)	Spaniard	Indian woman
Castiso	"	Mestiza
Españolo	Castiso	Spanish woman
Mulato	Negro	" "
Morisco	Spaniard	Mulata
Albino	Morisco	Spanish woman
Tornatras	Albino	" "
Tente en el aire	Tornatras	" "
Lobo	Negro	Indian woman
Caribajo	Lobo	" "
Barcino	Coyote (Indigena)	Mulata
Lifo	Lobo	Negress
Albarazado	Coyote	Indian woman
Chanico	Indio	Mestiza
Mechino	Coyote	Loba

- Brigham, "Guatemala"

Friday.

Washington D.C.

July 7 1916

Talked with O.F. Cook re Guatemala.

San Cristobal produces better avocados than Coban.

Finca between Antigua & San Antonio where avocados are planted for shade in coffee plantation.

Rodriguez

Capt. Wm. Owen, Guatemala City, owned finca near Coban at which Mr Cook stopped.

Grand Hotel probably best place to stop in Guatemala.

Escuintla might be better place for nursery than Guatemala.

Bacaya seeds. Get quantity in Coban. Send up shipment of inflorescences for Mr Fairchild to try as food.

Notes from Brigham's "Guatemala".

Dahlia At Cunen, between Coban and Quezaltenango, Brigham reports a fine pink dahlia. Also Stevens, Barwardis, & light compositae.

Pinus Two species are common, P. cubensis, called ocote; and the long-leaved pine, P. macrophylla, of the mountains.

Sassa-parilla Similar sp. grows wild, abundant in forests of the Atlantic seaboard. Is this not worth introducing?

Oranges Exceptionally fine ones are grown at Telemán on the Paloché.

Potatoes near Arqueta, between Coban and Quezaltenango, are very peculiar potatoes, cult. by the Indians.

Carica A small wild species is abundant on the Pacific coast.

Cherimoya Common in the uplands. A red-fleshed var. is much prized.

Grape Grows finely on the Pacific coast.

Guatemalan Correspondents.

Walter F. Carley,
Cajabon, Guatemala.

J. H. Cammack { Missionary from S. Calif. Wrote
Chiquimula in 1913

~~E. E. Knight~~
~~El Rancho.~~

Dr. Rafael Tejada
Guatemala City.

Leonard C. Kellogg
Guatemala City.

Juan L. Rodriguez
Guatemala City.

F. Eichlam
Guatemala City.

Written 1911. No answer.

~~D. Billow~~
~~Guatemala City.~~

R. D. Anderson Coban
Supplied rose flowers

Don Julio Hartman Written last in 1905 for
Coban chayote, No answer Ref.
At Cook.

Paul Burgess
Quezaltenango) knows of tree (agave) at ~~San~~ Amalaga, which are
John J. Gurdy, probably hardy
Santa Rosita

J. C. Cassell, San Marcos, friend of McBath.
Latter says he knows of free agave near
San Marcos.

Rev. Walker McBath, at Quezaltenango,
interested in plants and has received seeds from
us. Important to hunt him up. Missionary.

Mrs Lucie Potts, at Livingston, sent in
avocado seeds in 1911. Last letter from her in
1911. Interested in plants, especially rubber.

Dr. Rafael Tejeda, Guatemala, sent
in about 150 ~~herbarium~~ specimens for identifi-

fication in 1913-14. On June 6 1916 he had
not yet been sent these determinations, though
he had repeatedly written asking for them. Has
sent in seeds of Cobosa + a sp. of Theobroma.

Kennett Champney
Sepacuita, Panajol, Alta Vera Paz.
Friend of Cook + Calch. Written in 1905 last.

Dead S. Bellow, Guatemala, has rec'd
quite a lot of plant material (about 1910-13)
and sent in several lots of seeds.

Walter F. Curley, Cajabon, Alta Vera Paz, sent
in seeds of Annona pellucida + a sp. (Tournefortia
Pae) in 1915.

John J. Gurdy, Sta. Rosita, wrote in 1915 re
corn. Seems to have done some interesting work
with native strains.

Leonard C. Kellogg, Guatemala, went
down from Calif in 1915.

Notes from "Biologia Centrali-Americana"

Flora of the uppermost zone of vegetation in Guatemala has been little investigated. Alpine element examined in preparation of this work is exclusively from Volcan de Fuego.

Between Peten and Alta Vera Paz the forest is perhaps the largest in Guatemala; it is here that *Theobroma* occurs wild, also many *Anonaceae*, *Sapota* (?) etc. & palms and ferns in great profusion.

On Volcan de Agua & Ulu-Tuep. Pine Forest above 10,200 ft, clear to peak on Agua. Below this level is mixed forest. Large evergreen oak prevalent at 7000-8000 ft; below this virgin forest has been destroyed, & lower Indian corn is grown, & some 2nd growth timber.

Rainy season usually lasts from middle of May to middle of October, with an occasional intermission in August. In more elevated portions of Alta Vera Paz dry season is of much shorter duration, rain often lasting until ^{beginning} ~~middle~~ of March & commencing again at end of May.

Suggested names for Guatemalan avocados.

Mr Fairchild suggests that we distinguish all our Guatemalan introductions by prefixing Guata to each name, making names such as the following:

Guaterosa, Guatapay, Guatepadre, I am to take a proposed name on to each variety sent in.

The Guata names ought to be only those of Guatemalan type.

Mrs Fairchild wants some Guatemalan clothes, kind the girls wear porcho fashion. One she saw was yellow & black, designs embroidered or woven on a whitish ground.

Palms common in Guatemala, according to Brigham

Colme Attalea cohune; after a stem has formed
it is called corozo. Also called manáca.

potnaboy Bactris balanoides

warree cohune Bactris cohune

Cabbage palm Oreodora aluacea

pacaya Euterpe edulis

Acrocomia sclerocarpa

Acrocomia vinifera

Dasmoncus sp. (climbing palm)

confra Manicaria plukenetii

Achradelpha viridis (Pittier) Cook.

injeto or xaptul. Higher altitudes around
Colan 38478-38481.

Lynecanthus sp. - beech palm. Senader Alta
Avera Poz. 38498.

Persea americana. 38549. Large spreading
tree growing behind the hotel Casa de Rojas in
Antigua. Carrying large crop of mature fruit in
June 6th 1914.

Dahlia imperialis Roesl. 21963. Call. Gg
Kellerman Location not given.

List of unfilled requests for propagating material from
Guatemala, C. A.

Date of	Request.
Rev. Walker E. McBath, Quetzaltenango, now in this country.	1/16/14.
Avocado and various fruits occurring in that section,	2/ 6/14.
Various species of the genus <i>Cobaea</i> (Seeds.)	7/ 5/14.
<u>Zea mays</u> seed	
Walter F. Curley, Alta Verapaz, Cajabón.	
Specimens of leaves and flowers and photograph of fruit of S.P.I. No. 41384 (<i>Annona</i> sp.). 7-1/2 ozs. seed of this number received from Mr. Curley Oct. 7, 1915.	10/15/15.
One-half dozen fruits each of different varieties of <i>Chayote edulis</i> .	7/18/16.
Paul Burgess, Apartado 5, Quetzaltenango.	
Fruit from different avocado trees in Almolonga.	7/23/15.
American Consul, Guatemala City.	
Sacred ear-flower (<i>Gynopetalum penduliflorum</i>).	
S. P. I. No. 42047. Additional quantity of seed.	3/17/16.

Wednesday Washington DC August 9 1916
Prof Hitchcock collected grasses in Guatemala
at following places:
Guatemala
Guatemala 5 m. west of Guatemala City
Volcan de Agua, up to Summit
Antigua
Sta Maria
Puerto Barrios

Panicum tischkei type locality Cuchumatán
collected but once. Alt. 3500 m. About 1 day
ride N.W. from Cobán. Would like more
material of this.

Commence numbering Guatemalan herbarium specimens with 669. Old series ends at 655.

Letter of Credit on Brown Bros & Co.
No. 11/30 393

From our point of view the
vegetation of the ^{high} islands is more interesting
than that near the coast, and we are especially anxious to obtain material of the various oaks and Pines which grow on the mountains of Central America. I hope you may be able to get out to the Oak region where I am sure you will find very interesting vegetation.

Wishing you all possible success,

I am,

Faithfully yours,

Mr. Wilson Ropensee,

L. S. Sargent.

R. C. Benedict of Brooklyn Botanic Garden wants
Nephrolepis from Guatemala. Suggests following
locations:

Santa Barbara.

Cubizquit, Alta Vera Paz

San Felipe, Retalhuleu

Casas, near Finca Sepacante

Schedule of Sizes. AVOCADOS.

Very small	Below 5 ozs
Small	5 to 8 ozs
Below medium	8 1/2 to 10 ozs
Medium	10 1/2 to 14 ozs
Above medium	14 1/2 to 16 ozs
Large	16 1/2 to 19 ozs
Very large	19 1/2 to 24 ozs
Extremely large	Above 24 ozs

Descriptions should contain:

Form.

Size (by above schedule) and actual (weight, length & breadth)

Base, form, and stem insertion

Stem length, clusters?

Apex

Surface texture, glossiness, color, dots

Skin actual thickness, texture

Flesh texture, color, fiber

Flavor

Quality

Seed form, size (relative weight) seed coats, size of cavity.

Season

Tree height & character of growth, hardiness, productive
ness.

After having completed arrangements for the trip, and purchased a letter of credit, I left Washington Tuesday night, August 22nd, 1916. Arriving in New York the next morning I put up at the Hotel Algonquin, and spent Wednesday and Thursday in New York City, calling on several people and purchasing a few articles for use on the trip.

On Thursday, August 24th, I took lunch with Mr. Goldsmith M. Williams, of the United Fruit Co. and arranged with him to get letters of introduction to the Company's managers at Puerto Barrios, Guatemala, Tela, Honduras, and Port Limon, Costa Rica. These were signed by Sheppard G. Schermerhorn, Executive Vice-President of the Company, and were delivered to me the following day. As well as notes of introduction, they were requests to facilitate my work as much as possible, and to arrange to forward budwood shipments, which it was understood would not be bulky nor very numerous, in cold storage on the Company's ships to this country.

I also called on Mr. J. P. Rosen, U. S. District Agent, 2 West 42nd Street,

to advise him of my departure and mention that I would probably be sending ship ments in his care from time to time.

I visited the New York Botanic Garden, and looked over all the Persea in the herbarium. Thursday afternoon I visited the Brooklyn Botanic Garden to talk with R. C. Benedict regarding ferns which he wished me to collect in Guatemala.

On Friday I sent my baggage down to the boat, and after a few errands and a final talk with Mr. Williams, I went on board and we sailed about 5 p.m.

On board ship I made the acquaintance of Mr. J. H. L. Dodd, of Jamaica, a civil engineer who has with the United Fruit Co. seven years. From him I learned many interesting details regarding the Company. Mr. Dodd's address in Kingston is c/o E. A. Dodd, at the Railway Offices.

Wednesday Santiago de Cuba Aug. 30 1916

We got ashore here about 11:30 a.m., too late to get to the market before it closed. This deprived me of the opportunity to see all of the fruits available at this season, and I had to depend on the small fruit stands around town, which contain inferior stuff almost invariably.

The only mangoes which I found were maney, Toledo, and Corazon. I inquired if Biscochuelo was not obtainable, and was told that there had been none in market for a fortnight.

Avocados were very scarce on the fruit stands, and inferior in appearance. I was told that they were abundant in the market, however.

Sugar-apple (Annona squarrosa) were seen in one fruit stand, also an inferior guanábana or two (A. muricata). The mamoncillo (Melicocca bijura) was also offered by one dealer. Pineapples were fairly abundant, and of two varieties.

At the Hotel Casa Granda Mr. Dodd introduced me to Mr. Hutchison, one of the officials of the United Fruit Co. Cuban branches, and a nephew of G. G. Goldsmith, Williams, PA.

Friday Kingston, Jamaica Sept 1 1916

We arrived here at 1.30 a.m. and were called out for medical inspection, after which we returned to bed and slept until 5.30, when the ship docked and commenced to discharge cargo. I went ashore and walked down to the market, but found it would not be open until 6.00 I walked around town, and took a bit of a look at the Public Gardens, which are fairly attractive. Most of the trees showed the effects of the recent hurricane, and the palms have also been thrashed about badly.

About 6.15 I returned to the market, and found it open. On entering the gate the first thing to catch my eye was the following large

NOTICE.

The fruit of the ackee contains under certain conditions a powerful poison. Among such conditions are:

Unopened fruit, or fruit which has not opened naturally on the tree.

Fruit from decayed or broken branches.

Fruit with soft spots in it.

The water in which such ackee has been boiled is particularly harmful.

The greatest possible care should, therefore, be taken if the ackee is to be used for food. For example

1. No fruit should be used which shows any of the above conditions.
2. The fruit should be boiled separately from any other parts of the meal.
3. The water in which the fruit has been boiled must be thrown away, and on no account mixed with other food, or used as soup.
4. The pot water is particularly dangerous for children.
5. The ackee should be gathered carefully and separately, and not be shaken from a tree.
6. On no account should unripe ackees be left lying on the ground near a dwelling.

Warning

Neglect of the above precautions may result in serious and possibly fatal poisoning.

Published by order of His Excellency the Governor
Robt Johnston,

Acting Colonial Secretary

29 September 1915.

The following fruits were offered in the market this morning:

Breadfruit, fine large specimens, 8 to 10 inches long, at 2 d. each.

Avocados, here called "pears" in the market, small ones 5 for 6 d., large ones 2 1/2 d. each.

Guava, a large bunch (about 2 lbs) for 1 1/2 d.

Apples, 10 for 1 d.

Mangoes, only a few offered, 3 for 1 d.

Grapefruit, small specimens, 1 d. each.

Oranges, good sized, 4 for 1 1/2 d.

Cacumata, ripe, husked, 1 1/2 to 2 d. each.

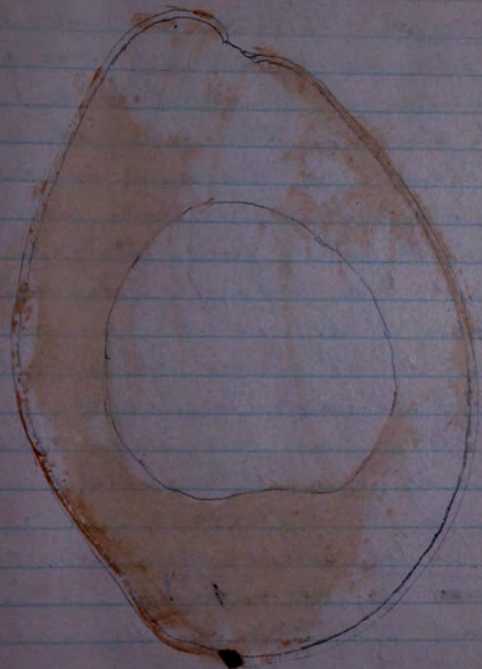
Chayotes, small ones 4 for 1 d., larger 2 for 1 d.

Sweet cops, large ones 1 d. each.

I purchased some fruit and returned to the steamer. At 8 o'clock Mr. A. H. Ritchie, Colonial Entomologist, came on board to find me and we had a long talk. As a result of this talk and my own observations in the market, I may set down the following notes:

Breadfruit. This seems to be more of a staple here than in any other tropical American region I have visited. I do not know, however, whether the trees are abundant on the island or not.

Avocados. These are very numerous in the market just now, and seem to be of considerable importance. Ritchie says the principal avocado sections are situated back in the hills, at some considerable elevation. He says the trees are severely attacked by a small hopper on of the *Jassidae*, which sears up the leaves terribly. All the fruits I saw were undoubtedly of the West Indian type, and would compare very favorably with the avocados offered in the Havana markets, - in fact they look just like the ones I have seen in Havana. Practically all were pear-shaped, some short, broad, and scarcely necked, some with a long, slender neck and bulbous toward the apex. The majority were light green in color, but there were quite a few ~~greenish~~ maroon ones, such as we have in Florida. Ritchie says he knows of one tree which produces very early fruits, opening habitually in the first part of July. He does not know of any very late seedlings. Budded avocados seem to be unknown in Jamaica as yet, at least Ritchie thinks there are none.



Outline of avocado purchased in Kingston market, at 2 1/2 d. Color light green. Skin rather thick for this type. Flesh deep cream-yellow, free from discoloration, of very rich flavor. Quality excellent. Seed coats more or less loose, but the seed not loose in the cavity. Cotyledons rough. Probably superior to the average Florida seedling.

Mangoes. Ritchie says he thinks the names are applied very loosely here, and he believes it would take a thorough study to straighten them out. Most of them are inferior. He knows of one seedling which produces a small, almost fiberless, highly colored fruit of fine quality, which he thinks ought to be propagated. He says the seedling forms of the island are very numerous, and the trees are attacked very severely by anthracosis. There is also a mildew or wilt of some sort which attacks the young foliage when it makes its appearance.

Chayotes. These are called ^{chayote} ~~chayote~~ (the ~~they~~ ^{ay} as in ^{gray} ~~gray~~) and are quite abundant and cheap in the market. The only type I saw this morning was a rather elongated light green one without spines.

Chirimoya. This fruit is not now ripe. Both Ritchie and Mrs. Dodd say it is not abundant on the island, but rather scarce and found only at considerable elevations. Ritchie says there are quite

a few around Mandeville. He says the fruits are sometimes very large. They do not often reach the King's market in any quantity.

Soursop is grown, according to Ritchie, and the fruit is used for ice creams and soft drinks.

Sugar apple, here called sweetsop. I saw some unusually large ~~ones~~ ones in the market.

Acker was not abundant in the market this morning. I only saw one small lot.

Ritchie says the fruit trees of the island are suffering badly from the attacks of scale and other insects, the worst of which seem to have been introduced within the past 20 years. Nothing, practically, is done to combat them.

Monday Puerto Barrios, Guatemala Sept 4

Barometer readings at elevation of approximately 20 ft. above sea level.

12 m. Sky clear, very bright, hot 29.95

4.30 p.m. Clear, cloud on horizon. Breeze blowing 29.85

7 p.m. Cloudy with drizzle. Air very still 29.90

6 a.m. Sky overcast 29.95

✓ We arrived here last night at 7.30, but stayed on board the *Dipsakia* until this morning at 6, when the baggage was put ashore in the Custom House and examination commenced. The trunks all go through to Guatemala City without examination, and are there inspected and the duty collected.

Puerto Barrios is situated on low, flat ground with the principal buildings right by the water's edge. Aside from the building of the United Fruit Co., the railroad, and also three hotels, there are practically no other structures of any size visible except the Comandancia and Capitanía, the seat of the local government. The large buildings are all frame affairs, generally with a veranda on both the first and second floors.

The inhabitants are a very heterogeneous lot, composed of Guatemalans, the United States

and some native Guatemalan Indians and Caribs; Americans and a few Guatemalans of the better class.

Early in the morning I took a walk through the native village, which is irregularly laid out and composed of frame huts, usually thatched with palm leaves. In the few small shops and fruit and vegetable stalls there were only a few fruits offered, and these seemed to be very ordinary stuff. I saw limes, sweet limes, oranges, a few poor avocados, chayotes, and one or two other things.

During the morning I called on Mr. J. R. Chamberlain, one of the local officers of the United Fruit Co., and presented my letter to Mr. Shaw, the local manager, who is one of the plantations inland at this time. Mr. Chamberlain thought that I would do best to ship all my plants and indigo to Washington via New York, as everything can go in cold storage at 55° F. to New York and would then be less time at ordinary temperatures than if sent

via New Orleans.

Mr. Edw. Reed, American Consular Agent
Livingston

Mr. Joaquin Hecht, American Consular Agent
at Puerto Barrios.

The S.S. "Vildfugl" of the United Fruit Co.
makes regular trips about every two weeks from
Livingston to New Orleans.

The U. S. Dispatch Agent at New
Orleans is Mr. J. Ward

According to the Railroad levels
run from Puerto Barrios, Guatemala City
is 4877 ft above the sea.

My calculations are

Barrios 29.90 = 975 ft -
Guatemala 25.10 = 5750

Then 5775
975

~~Barrios 29.90 = 975~~
~~Guatemala 25.10~~

~~4775~~
4800 ft

Altitude of Guatemala

Thursday

Guatemala City.

Sept 7 1916

I left Puerto Barrios without any pang of
regret on Tuesday morning, after paying \$9.35 for my
ticket, \$4 extra for a seat in the carro de salon,
and \$12.70 for my 5 pieces of heavy baggage. Only
hand baggage is carried free.

For the first half hour or more we passed
through some of the finest tropical jungle
I have ever seen; then we came out into
country somewhat more open in nature, and
for many miles followed closely the Motagua
river. Banana plantations lined the track
on either side through much of this region.
About 11 we passed out of the banana
country and reached a little higher level.
At 1.30 we reached Zacapa and stopped
for dinner: it was oppressively hot. Toward
4 o'clock we began to climb and the air
began to be noticeably cooler. As we
approached Guatemala City I was almost
chilly in my linen suit.

We arrived here at 7.35 p.m. and I was
met at the station by Mr. Pedro Bruin,
agent of the United Fruit Co. The
Guatemalan manager of the company, Mr.

Gilbert M. Shaw, whom I had met for a moment at the station of Quirigua, on the way up from Barrios, had warned Mr. Brunie of my coming, and had asked him to place a room in the Fruit Co's building at my disposal. I went to the Green Hotel for the night and the next morning came over to Mr. Brunie's office, and he showed the room he had for me. There are 3 furnished rooms in the building, kept for officers of the company when they come to Guatemala City, and as none of them are used very often, Mr. Brunie told me I might just as well occupy one of them. On seeing the room I was almost overcome, as they are furnished in excellent style, with every comfort, and there is a servant in the house who looks after things and brings me chocolate and rolls in the morning for the moderate sum of 10 pesos (25¢). My room opens on to a large patio, where I can take photographs and pack plant material. I do not know how long I will feel free to impose on the

hospitality of the Company by staying here, but I will remain a few weeks and then talk it over with Dr. Brunie.

Yesterday morning I visited the market and to my surprise found a good many avocados of the Guatemalan type, said to have come from Antigua. I inquired concerning prices, and the lowest I could get was 40 pesos (\$1) per 100. I am going back to the market today to buy all I can get for seed. It is early for them, and they are about 4 times as dear as they will be in January and February.

In the afternoon I called on the American Consul, D. K. Lupton, and he took me over to call on the Minister, Dr. W. H. Leavell. I presented my letter to Dr. Leavell, and explained to him the nature of my mission. Mr. Lupton and I then took tea with Mrs. Wm. Owen, who is exceedingly well informed concerning Guatemala and its plants. Mrs. Owen promised to give me letters to friends in Antigua & Alta Verapaz.

Mr. Lupton and I called on Mr. Juan

I. de Jongh, C.E., an architect, and consul for Holland. He has taken temperature records for some years and I wanted to get the minimum I found. However, that his thermometer is not self-registering, and as he takes his readings at 6 a.m. and 6 p.m., he gets neither the highest nor the lowest temperatures which are experienced here. He says there is no one else in Guatemala who is taking meteorological ~~observations~~ observations, ~~not~~ but I seem to recall that I have been told the Jesuits are doing this, and I shall look into the matter. Mr. de Jongh has a small aneroid and says the average reading for 9 years was 26.16; for 1913 it was 26.1. This does not agree with my aneroid, I find on comparing the two, mine reading ~~26.42~~ ^(25.11) for the last 24 hrs.

The following are Mr. de Jongh's minimum temp. readings

1910	58.6°F	3 Dec.
1911	56.3	30 Nov.
1912	58.3	16 Jan.
1913	60.3	11 Nov.
1914	60.3	21 "
1915	56.3	8 Feb.

Thursday Guatemala City Sept 7 1916

Second entry of this date

I went to the market this morning with the mope from the Fruit Co's building to purchase aguacates for seed. We bought the following lots:

7 empty sacks @ 12 pesos	84 pesos
120 small pyriform, smooth green fruits, mostly average, making rotten, @ 15 pesos 100	18 pesos
200 small to medium sized, broadly oval to pyriform green fruits, smooth to rough, mostly hard, @ 22 pesos 100	44 pesos
200 small long pyriform to oval, rough & nearly smooth, green, hard, at 22 pesos 100	44 pesos
600 medium to large like last, at 30 pesos 100	180 pesos
200 broadly oval to round, smooth to rough, green & dark purple, mostly hard @ 25 pesos 100	50 pesos
200 mostly round, large, green & purple, hard @ 25 pesos 100	50 pesos

225 pinniform, green, hard, rough
to nearly smooth @ 25 pesos 100 57 pesos

Contag on above fruits 20 pesos

Rafael Rodeno, cattle man, American
citizen, can probably advise me re purchase
of a mule. Step in 10 calle 4 6 Ave
and inquire.

Must have been at P.O. by 5 pm Tuesday
to catch N.O. boat.

Mail is here at Consulate Wed noon

Las Novedades 7th Ave & 9th Benney
Deeny. For Smith

Friday Guatemala City Sept 8, 1916

This morning was bright and clear, after a
heavy rain last night. It was the first
time since I arrived here that I have
been able to see the volcanoes to the
south of the city. I took my camera on
my shoulder and walked out of town to the
south, taking a few photographs along the
way. After going about 2 miles I came
to the attraction Paseo de la Reforma
lined on either side with conifers and
Quercus robur. There are some villas
along this paseo surrounded by fine gar-
dens, and in one I saw some avocado
trees in fruit, — the first I have seen
in Guatemala. The mud was so bad, how-
ever, that I did not attempt to go
off the road, but took a few photos
and came on home, stopping in the Mercado
del Sur (south market) on the way.

This afternoon I hired a native, Pedro
Quinonez, who appears to be mostly Indian,
and he will commence work tomorrow
at 20 pesos (50 cents gold) per day.

Saturday Guatemala City Sept 9 1916

This morning I went to the market to purchase some avocados for seed. The following lots were obtained:

350 small to medium, pyriform,
green mostly rough fruit @ 25 pesos 87.50
400 as above for 100 pesos 100

I was unable to obtain any more at the price today, most of the people asking 30 to 40 pesos per 100.

I paid 15 pesos for the cart to have the fruit to the house, and 5 pesos more to Pedro Quirós for assistance (his assistant) in purchasing and loading the affair.

Monday Guatemala City Sept 11 1916

Today I purchased the following lots of avocados in the Mercado del Sur:

500 small to medium sized obovate
green and purple fruit, smooth to
(somewhat rough skinned) @ 12 pesos 100 60 pesos

50 as above, culls, @ 8 pesos 100 4

250 small pyriform rough skinned
yellow, green fruits, said to come
from Antigua @ 12 pesos 100 30

150 medium sized obovate, smooth,
green and purple fruit, @ 12 pesos 100 18

I paid 12 pesos to have the above lots hauled from the market to the house.

Avocados appear to be cheaper in this market than in the central market where I have bought the other lots. It is probably because most of these are grown in this region, in place of coming from Antigua as do most of those in the central market.

Tuesday La Antigua, Guatemala Sept. 12, 1906

There are two companies operating diligencias between Guatemala and Antigua, and as they run on alternate days, there is a diligencia each way every day. The fare is 40 pesos, and 10 pesos *por aproba extra* for baggage. The diligencias leave Guatemala at 7 a.m. and usually arrive at Antigua about 3 p.m.

I left Guatemala on this morning's diligencia. The road was terrible the first few miles, and we had to get out and walk around several of the worst spots. After crossing the floor of the valley we began to ascend, and at 10 reached Mijes, where my barometer showed the elevation to be 5500 feet, or slightly more. Half an hour later we stopped for *almuerzo* in the upper edge of Mijes. After leaving there we continued climbing until 2 p.m. when we reached our highest point, which the barometer showed to be 7200 feet. At this elevation the air was quite cool, and the trees were scattering and not very large.

After crossing the divide we commenced to descend rapidly, and soon reached the

village of San Lucas (6800 ft), where I saw one or two young avocado trees. Continuing, we soon reached Santa Lucia (6525 ft) where avocado trees were abundant. From here we came down a rather narrow and beautifully wooded cañon to Antigua. My barometer shows the elevation here to be 5125 ft. or thereabouts, while a railroad guide book I have gives it as 5314. Where I have been able to check the barometer it seems to have given accurate results (for an aneroid) and I suspect it is nearly correct here.

I went to the market on arrival, but it was 5 p.m. and most of the people had gone home.

The outskirts of the town contain a great many avocado trees, and there are a few, one or more, in nearly all the small gardens here in the town. It undoubtedly is a great place for avocados. There is a great deal of coffee planted around the edges of the town, and *Quercus robusta* is commonly planted in the *fincas* to shade the coffee bushes.

Wednesday La Antigua, Guatemala Sept 13

In order to demonstrate the character of the climate here, a list of the plants commonly seen in cultivation is probably more valuable than anything else, since meteorological observations are lacking.

I find in the patio of the Casa de Hospedes of Sr. Rojas, where I am stopping, a fine collection of ornamental plants, of which the following is a list:

Nephrolepis spp.
Begonia spp.
Monstera deliciosa
Philodendron sp.
Peperomia zonale
Chamaedorea sp. "Palmyra" palm
Dracaena sp.
Brugmansia arborea
Richardia africana "Calla lily."
Rhynchospermum jasmminoides
Pyrus sp. Pear
Rosa, cultivated varieties
Euphorbia spina christi
Lagerströmia indica
Hibiscus rosa-sinensis
Montbretia crocosmifolia

Dianthus nobilis
Criminum sp.
Alocasia sp.
Asparagus sprengeri
Sandewiera zeylanica
Tradescantia zebrina
Psidium cattleianum
Cestrum sp.
Jasminum sarabae
Smilax sp.
Solanum jasmminoides
Cyperus alternifolius
Codiaeum sp. *Croton*
Viola odorata
Asparagus sprengeri
Coleus, *Cardinalis*, *geranium*, *chrysanthemum*.

In the park in the center of the town I observed the following plants:

Jacaranda mimosaefolia "Jacaranda"
Schinus molle "Poncetto"
Cabaca scandens "Campanula"
Musa sp. Banana
Arundo donax
Canna indica "Crocus"
Vinca rosea

Acalypha sp.
Phoenix canariensis
Acacia floribunda (?) "Acacia"
Eurobolus japonica
 Rose, cultivated varieties.
Taberna imbricata
Lagerstroemia indica "Jupiter"
Dolanum wendlandi
Amygdalus persica, Peach
Citrus sp.
Duranta plumieri
Iris germanica "Iris"
Papaver sp. "adornidera"
Spirea sp. "Bouquet de noia"
Fuchsia Montbretia *Crocos maculosa*

And the following common herbaceous ornamentals: *Shasta daisies*, *violets*, *calendulas*, *sweet alyssum*, *celery*, *geraniums*, *larkspur*, *achyranthus*, *snapdragons*, *balloons*, *asters*, *Impatiens Sultan*, *blue flag*, *Dianthus*, *cockscomb*, *centaurea*, *ginnias*, *campanula*, *vinca major*, *stocks*.

Some of the commonest trees in gardens about town are *Greiviera robusta*, *Arancaria esculenta*, *Annona cherimola*, *Punica granatensis*, *Cedrela* (?) and the *Bay* palm.

There is very little fruit in the market today. Only saw two small avocados, while there are hundreds in the markets of Guatemala City. I found a few *cherimoyas* (here called *Anona*) and bought 2 large ones for 4 reales each (1 $\frac{3}{4}$ cents). There are a few green peaches on sale, some pefinos, and plenty of guisquiles.

Cherimoya

The largest of the two fruits I purchased measured 4 $\frac{7}{8}$ " in length, and weighed 1 lb. 10 oz. It is shown in photo No. P. The smaller one was also 4 $\frac{7}{8}$ " long. Both had been attacked by an insect, which had, apparently, lived within the seed for a while and then burrowed out to the surface through the flesh. The flavor and texture of both fruits was excellent, but they were rendered practically unfit for eating by the insects.

I am told that very fine *cherimoyas* grow near here in the village of San Juan Chispe, but it is not yet the season for them. They are said to come into market about November, and those obtained today were probably off season fruits.

Loquat

Called here Nispero del Japon. It is just getting ripe. The tree is quite common here, but the fruit is inferior, rarely saw 1 inch long and having large seeds. The flavor of those I have sampled was good. This is a tree which seems to be eminently suited to a region such as this, and it is to be regretted that better varieties are not grown.

Avocado.

I have eaten two excellent fruits here at the hotel. They were both very rich and oily. Without doubt they were left over from the crop of last spring. I have just seen a tree on which there were quite a number of fruits from the crop which ripens in February. Much still on the tree. The fruits for next spring's crop are half grown or more. Evidently fruits of this type hang on the tree a long time here, as they do in California.

The current price for avocado is the height of the season here is said to be 7 to 40 pesos per 100.

There is a fine tree at Finca Sta Lucia, property of Mr. Gándara. Should watch it in Oct. and Nov.

Saturday Guatemala City Sept 16 1916

Guisquil I purchased 7 varieties of guisquil in the market today. There are several others more or less common, probably bringing the number of common forms up to 10 or more. Many other forms are probably just wild and not useful.

There are two main classes of guisquiles sold here, guisquiles prietos and guisquiles perilesos (or Perilesos guisquiles). Both classes are usually seen in the market. In following forms were obtained today.

Guisquiles prietos
These are always rough, and medium to large size. The surface may be prickly or without, prickles white or green.

No. 1. Large variety, about 5 inches long, light green in color, slightly prickly with several deep sutures from base to apex. Said to be a very good variety.

No. 2. Medium small, about 3 1/2" long, white, very prickly. Surface somewhat furrowed but not deeply sutured. Quality said to be good.

1. Usually, small, dark, smoky, green
 2. white, yellow, without prickles
 3. small, brown, uniform, about 2 mm
 4. deep, dark green in color. Quality said to
 be inferior to that of the cheap sort.
 5. small, white, longer than the
 6. 7. not as small as, waxy white. Quality
 said to be good.
 8. large, white, round, almost round, about
 9. 3/4 mm. but waxy white. Very attractive in
 appearance. Said to be the best of all
 in quality.

Count of avocado seeds packed to be shipped
to Washington

This morning we packed for shipment 2745
avocado seeds, placing them in 7 small pack-
ing cases. I shipped them by express this
afternoon to Puerto Barrios, and they will
go forward on the Tivives to New York, where
they are due to arrive October 1st.

In removing the seeds from the fruits and preparing them for shipment we have come up against several problems. In the first place, many of the fruits now offered in the market are not fully mature, and the seeds, when removed and dried, wet or shrivel. It is said that seeds should only be taken from

fruits which are fully ^{mature} ~~ripe~~. Later in the season there will be no difficulty on this point, but just now it is hard to get fruits on the market without finding some immature ones among them. I threw away 200 or 300 fruits which chiselled and thereby demonstrated that they had been picked ~~too~~ prematurely.

In removing the seeds from the fruits, we have found it best to let the fruits become soft (as for eating) for it is difficult to remove the seed from a hard fruit without having the seed coats tear loose from the seed and remain attached to the seed cavity.

If dried on the sun, the seed coats split and frequently fall off of the seed. While I do not know how important it is to have the seed coats remain on the seed, it seems to me better to have them do so. Hence I tried to dry the seeds in the shade, but with the excessively wet weather we have been having they would not dry, and to prevent their becoming mouldy I put them out in the sun for an hour or two every morning. Many of the

seed coats split, and quite a few came off, but I believe they would have been ruined by mould if I had not put them outside each day.

In packing the seeds, I laid a little hay in the bottom of the box, and then put a thin layer of hay between each hundred seeds. This made three to five layers in a box. After putting some hay on top, I nailed the lid down tight, so that the seeds could not rattle around in the box. I believe this will prevent them from being broken in halves, which frequently happens if they are loose in the box.

The seeds were dried in the sun just before packing, and the hay used was perfectly dry. I hope, therefore, that mould will not attack the seeds in transit.

Wednesday Guatemala City

Sept 30 1916

Spent a day in the market. I saw a papaya in the market which was a sort of 10 pesos. It was said to have come from Escuintla and was different from the one I have seen. It was mostly cylindrical. The flesh was thick, ranging from 1 1/2 to 2 inches thick, and not at all like the one I have seen. It was rather thick in the center. The fruit was peculiarly so. The variety was the color of the flesh, which was a dark reddish salmon, much redder than any other papaya I have ever seen. The seeds were small in form and quite numerous. I think the fruit may have been picked before fully ripe and this may account in part for its lack of flavor. It would be interesting to try the variety at Miami.

Thursday Amatitlan Guatemala Sept 21 1916

We left Guatemala this morning at 7:30 and arrived here at 9:15. The town is not large, probably 4000 or 5000, and according to my barometer is 3900 ft above sea level.

In the center of the small plaza is the largest Ceiba tree I have ever seen - truly an enormous specimen. The market is close to the plaza and was well attended this morning.

The difference in elevation between here and Guatemala City, though not quite a thousand feet, seems to permit the culture of several plants which are not grown at Guatemala. I assume, at least, that the difference in temperature must be responsible.

The Guanabana (*Annona muricata*) is to be seen here, though I have so far seen no fruits - only trees. The coconut palm is growing in quite a few patches, but all that I have seen here have been young specimens. The mango is common here, and the fruit is now ripening. The season seems very late; it may, perhaps, be due to the relative coolness of the climate, which does not hasten growth nor maturation of

the fruit. There are quite a number of
fruits in some of the trees I have seen,
and plenty in the market. All that I have
seen appear to be of the seedling race known
in Cuba as mango and in southeast Florida
as the *Manila* *Pilawa*. They are literally
black with sugar.

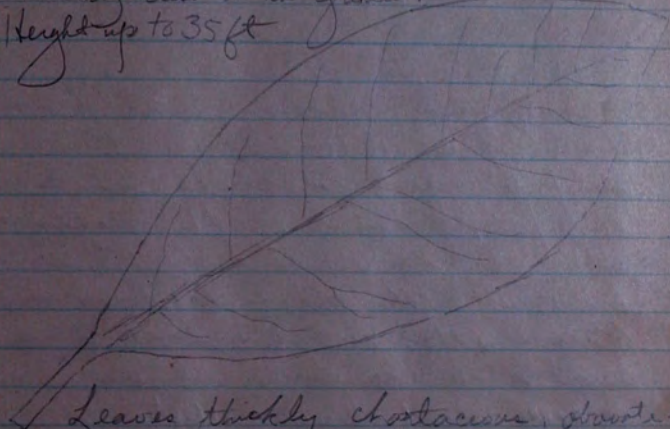
The *Manila* *Pilawa* tree, and is now a
fruit. It is a tree about 30 to 35 ft
high. The *Pilawa* is also common in the
garden. It is a tree with a fruit resembling
that of *Tropaeolum* *Pilawa*, now being
ripe. The *Pilawa* is very common, and
I saw one about 30 ft high -
perhaps 35. It was the tallest *Pilawa*
I have ever seen.

Agave trees are abundant here, but
it seems that comparatively few of them
are in fruit. I have seen some trees
with good crops, and a few with splen-
did crops. I think it would pay to
come here again when the fruit is
ripe, but this was too early. The fruit
that is offered in the market is being
picked so early.

Nance

This tree, which is common in the gardens
of Amathion, is erect, with a slender trunk some-
times dividing near the base, and ~~branching~~
~~close to the ground.~~

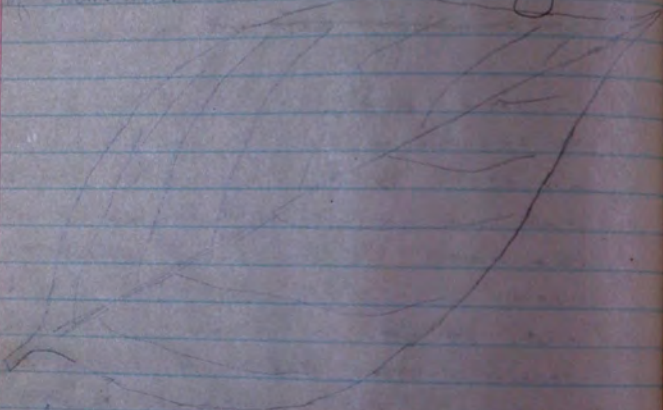
Height up to 35 ft



Leaves thickly coriaceous, ovate-
elliptic to elliptic, acute, attenuate toward the base,
dark green and glabrous above, covered with short
tawny hairs beneath; venation prominent below.
Fruits borne in short terminal racemes 2-3 in
long. Pedicels $\frac{1}{2}$ in long, hairy; calyx persistent, 5 lobed,
the lobes more or less acute and crenate by two
peculiar raised portions. Fruit obovate, smooth $\frac{3}{4}$ in
broad, bright yellow when ripe, containing a single
rough seed the size of a cherry stone.

Agave

A spreading arborescent shrub up to 20 ft. high with a compact crown. Common in the garden of the institute.



Leaves membranous, elliptic acuminate, shortly acute at the base, bright green and glaucous above, heavily pubescent beneath, the venation prominent below. Fruits axillary in clusters of 2 to 5, on slender peduncles. Pedicel about $\frac{1}{2}$ in long, hairy. Calyx lobes 5, persistent, acute, surmounted by 2 raised areas as in the rose. Fruit oblate to broadly turbinate, up to $\frac{3}{4}$ in broad, with the remnants of 3 styles at the apex. Color light red; flavor acid, agreeable.

Friday Escuintla, Guatemala Sept. 22, 1916

Soncaya

This morning we found one fruit of the soncaya (*Ammona purpurea*?) in a tienda, and purchased it at Escuintla.

It is an immense fruit, nearly a globe in form, and of a dull russet brown color. It measures about $6\frac{1}{2}$ in. in length and weighs a little over 3 lbs. The surface is covered with conical protuberances about $\frac{1}{4}$ in. long, sharply pointed and corky in character. The rind is fully $\frac{1}{4}$ in. thick, rather brittle, granular and easily broken. The flesh within is pale orange, soft and in texture, rather juicy and with an aroma and flavor almost identical with that of the north american papaw (*Asimina triloba*). The seeds are very numerous, lacunae, shaped like those of the cherimoya, but much larger, being fully one inch long.

An exceedingly interesting fruit, seemingly with good possibilities, because of its thick rind and good flavor.

I later bought 2 more in the market.

We arrived here at dusk last evening, and found that it has been raining very heavily recently and everything is very wet. There are many trees and shrubs over the town and the fields are green in the garden.

The morning after the visit here to the 1:30 P.M. train. To the railroad level it is all right. The vegetation here is dense tropical in character and very different from the commonest trees in the garden in the mango, the breadfruit, the star apple, and the coco palm. After looking over a considerable part of the town I had not seen one beneath tree. On inquiring of the natives we found one man who had a young tree about 3 feet high near his place, grown from a seed brought down from Amatlán or some other place in the highlands. The man, who seems to be very intelligent, said that many seeds from the highlands had been planted in Escuintla, but he had never known one to develop

into a tree of fruiting size. They start off well but die when young. He said he had known them to grow in some gardens, and he did not know of a single fruiting agave tree in the Escuintla. We asked him why the trees did not thrive here, and he thought it was due to the fact that the soil was a heavy, light colored clay, to which the agave tree is sensitive.

In the market here are abundant the following things of interest:

Lepodilloe rather small, abundant.

Lupinus minor, abundant.

Onions good large ones, abundant.

Chenopods, a few small, not very good.

Patachle, only 2 fruits seen. Dependence there at 6 marks each.

Guiseque abundant, rather inferior.

Mangos, Crataegus of few.

Agave trees quite a few, but all said to come from the highlands. Palm and San Vicente.

Any inquiry for avocados, we asked
 in no way of a thin skinned
 Peruvian native, an old man said
 he did not know it was a "type" of
 avocado. It was called a "cay". He
 showed us the fruit, a large, green, oval
 fruit, about 10 inches long. On examining
 we were told that there were trees in
 the hills, and were there; still a
 tree, but we were warned by a man
 that there were some trees in
 fruit not here now. We went there
 and it did not show. Two trees,
 however, which had been left for
 shade when the land was cleared for
 coffee, and were now standing among coffee
 bushes. The foliage was so high in the
 air one could not see very well, but
 found a couple of sprouts with
 leaves close to the ground. The fruit
 all appeared to have fallen, and none
 such on the ground had sprouted and
 were now 1 foot high. We found
 8 good fruits on the ground, a few
 small, and brought along 1 dozen or more
 young plants.

The anay is a tall, rather slender tree,
 up to 70 ft high, with a smooth trunk covered
 in some lichen or from the ground and an
 open, rounded-topped crown. The bark is
 smooth, of a red red-brown color. The
 young branchlets are light brown, finely
 pubescent. Leaf blades broadly elliptic
 to oblong lanceolate, 8 to 13 cm long,
 3 to 6 cm broad, acute to shortly acuminate
 at the apex, rounded to broadly
 acute at the base, rigidly chartaceous,
 bright green and glabrous above, with the
 exception of the costa and primary veins,
 which are finely and sparsely pubescent,
 the lower surface slightly lighter in color
 and glabrate. The young leaves are slightly
 pubescent below, sparsely shiny above.

Primary transverse veins 12-15 pairs, impressed
 above and prominent below, petiole
 $1\frac{1}{2}$ to $2\frac{1}{2}$ cm long, terete, slender, pubescent,
 with a swollen portion just below the
 junction with the leaf-blade. The foliage,
 when crushed, has no aromatic odor.

Fruit ripens August and September. In
 form it is slender pyriform, sometimes curved,
 pointed at the apex, and often

Fern I collected in the Finca El Compadre
these ferns, all of which appear to me to be species
of *Microlepia*, which are to be forwarded to the
author with the request that they be transmitted to
Prof. Bonnier of the Brooklyn Botanic Garden, who
is studying this genus, and asked me to
ask him some questions from Guatemala. The
three species are as follows:

Cola de Rata (rat tail), very common
hereabouts. It does not grow near the river
nearly all that I have seen being attached to
large limbs at some 30 to 50 ft from the
ground. The fronds hang down gracefully to
a length of six feet or more.

Palmito, a species with very long and rather
coarse pinnae which I found growing on
the trunks of trees within 6 to 10 ft of the
ground. The rhizomes are stout.

Palmito Mz. I was told this was, also
called *palmito*, though it is quite distinct
from the last. The fronds are small and
delicate. This species grows among moss on
mossy tree trunks and buttresses close to
the ground, in moist situations.

This morning I found in the market here about
3 quarts of cherries, called *cerezas*, which I pur-
chased for seed. This fruit is said to grow on
a medium sized tree in the *tierra fria*, or
highlands. It is $\frac{1}{2}$ to $\frac{5}{8}$ inch in diameter, sometimes
round but more commonly flattened on both ends,
making it oblate. It is shiny purple-black in color
and has a thin skin, dark-colored, juicy pulp, and
a rather large, flattened stone. The flavor re-
sembles that of the Ap Heart Cherry, except in
a slight bitterness, which is especially no-
ticeable in fruits not fully ripe.
Used for preserves here.

Anguilla This fruit is common in the markets. I have
seen it in Guatemala City, Escuintla (where
I bought a lot for seed) and here at
Nagatzenango. It is apparently a *Crataegus*
and looks like the one grown on the
Gillespie place at Santa Barbara, California,
except that the fruits are generally lar-
ger. The ones I bought at Escuintla
for seed were especially good. They
were spherical, sometimes more or
less angular longitudinally, and to

much as a meter in diameter. The
 hole is deep 4-5, on side deepening to garden
 level. The stem is rather thick, and (I believe)
 contains a large canal, but not the characteristic
 cylindrical shape. The seeds are rather
 small, and usually three in number.

My morning has proved to be
 a very interesting one, and I believe
 I should like to return here later.
 The market is extensive, and fruits in
 which I am interested are brought in by
 the vendors from surrounding districts.

The Finca El Compadre, close to
 the town, contains some interesting things,
 and the Administrator, Don Alejandro
 Merz, a Canadian, is willing to give
 us anything on the place.

The Hotel Paris is really excellent,
 and charges \$3.50 a day (\$1.25 gold).

Tuesday Ayutla, Guatemala. Sept 26 1916

The fruit from which
 the accompanying
 outline was made
 came from Tapachula,
 Chiapas, Mexico,
 about 25 or 30
 miles from here.

I bought ten
 of them from a
 woman as she left
 the Custom House
 here after having
 come across the
 river from Mexican
 territory. They were
 the only avocados I have seen in
 Ayutla, the season now being past and only
 a few late fruits remain.

The fruit here shown was 11 oz in weight
 and 5 inches long. It was pyriform in
 shape, the stem insertion oblique and the
 apex obliquely flattened, though very slightly
 so. The surface is slightly roughened by the



usually very purple with a thick skin. The
much confidence cannot be placed on this
description of color.
While there are occasionally fine trees here
in the valley there are said to be plants
in the hills in the surrounding country.
The chocolate is a very cutie or one of
the smallest kinds of avocados used here.
I am not sure that there is
any kind of one of the trees here at
Chilindron or Tuzigite as far as I have
seen. I am not sure of the appearance of the
plant. I do not think they are the great
chocolate trees which I saw to come from
Mexico to find out what they
are (they are said to bloom in February)
but considering the unexpected scarcity of
the trees, and other factors, I rather
doubt if there is much material of value
to be obtained this side of Mague-
tenango.

The principal plants of interest in the gar-
dens of this town are the following:

Annona

This name is not applied here to the cher-
imoya, as it is in the highlands, but to
Annona reticulata, one of the commonest trees
in backyards and around houses. It makes a
very handsome tree here. It is now commencing
to flower, and is said to ripen the fruit in
verano (probably meaning January to April). To 35 ft.

Case

Common tree around the houses. Grows up
to 30 or 35 ft high, and is now producing its
yellow flowers. I have seen no ripe fruits
here, though they are now ripe in the highlands.

Chilindron

Thevetia peruviana is called Chilindron here.
It does not seem to be very common.

Resodon

Lawsonia inermis, which is seen here occasionally,
is called Resodon. Not in bloom.

Annona

This name is applied to Annona squamosa,
as well as A. reticulata, but the former
is not common. I only saw one plant of it.

Suncuya

I have seen two specimens in backyards
here. It is commonly called suncuya but also
known as Chinuya.

Guayaba Fairly common. Fruit not much ripe yet. This is the name by which Anacardium occidentale is known here. It is quite common in the woods.

Guayaba This name is applied to several varieties of *Guayaba* (Anacardium occidentale?) here, one of which is called *guayaba*. It appears to be the yellow form.

Tamar The tamarind tree is quite common here, and the fruit is used for suppositories.

Camote *Chrysophyllum camote*, fairly common here.

Guayaba This is the name applied here to *Coccoloba* (Coccoloba) a common shrubby tree. The fruits are used here as a laxative.

Nican *Chrysobalanus icaco*, not common but occasionally seen.

Patera This name is applied to *Inga* sp. which is now in bloom.

Guayaba One of the *Pathecolobium* is occasionally seen here and is called *guamucha* (or perhaps *guamuchil*).

Guayaba The red fruited species appears to be called *guayaba de corona* and the long yellow fruited variety *guayaba jobo*, or simply *jobo*. It is not, however, *S. lutea*, but apparently by a form of the same species as the *guayaba de corona*.

Guayaba A species of *Amorpha* is known here by the name of *Papaula*. I have only seen one tree and it had neither flower nor fruit, being too young yet to bear. The fruit is said to be dropped here from Tapachula, but it is not common. The tree has a leaf resembling that of *Amorpha squarrosa*, but larger, and broadest above the middle. When crushed, the leaves have a rank odor.

Saturday Guatemala City Sept 30 1916

Avocado

We found yesterday in the market a very curious form said to come from Antigua. It appears to belong to the Guatemalan type, but is much smaller than any other sample of this type. I have seen the average specimen is about 1 1/2 inches long, about 1 inch broad, and about 1 inch thick. The flesh is very green, and a seed very large in comparison to the size of the fruit, leaving only a small amount of flesh. The flavor is very rich and the quality good. The variety is too rare to be of value as a fruit, but it is of interest in connection with the study of avocado types and varieties. There seems to be a suggestion of green flavor in the flesh when eaten hard. I have not seen the tree and do not know that it is the true Guatemalan type. It may be a different type or form of some sort or other. So far I have only seen this one lot of fruit.



I today shipped to Puerto Barrios one box of seeds and plants to go to Washington via New Orleans, on S.S. 'Suriname' sailing Oct 5. This shipment contained the following numbers:

- 26a. *Claytonia edulis*
- 27a. *Persea*?
- 28a. *Amorpha purpurea*.
- 29a. *Citrus*?
- 30a. *Carica papaya*
- 31a. *Byrsonima parvifolia*
- 32a. *Crataegus* sp.
- 33a. *Persea americana*
- 34. *Persea* sp.
- 34a. " "
- 36. *Nephrolepis* sp.
- 37. *Nephrolepis* sp.
- 38. *Nephrolepis*?
- 39b. Specimens of Mollusca

All the seeds in the above shipment were packed dry. The plants of *Persea* sp. (34) and the three ferns (36, 37, and 38) were packed in moist sphagnum. Plenty of dry hay was used as packing material. The *Claytonia* (26a) were not wrapped, and simply packed in hay.

Monday Guatemala City Oct 2 1916

This morning we went by train to Ixcuin
and arrived from there to San Miguel Petapa
(20 minutes ride) where we had been told
there were many aguacates, and that the ones
were being picked. We found quite a lot of
them in the market. The ones matured quite
early and some were mature. There
was to be picked down on the border
of Lake Peten. There were more guavas
belonging to people who lived in Peten,
and that the fruit was not mature
and being picked for market. This difference
in the degree of ripening was attributed
to difference in temperature between the
two places.

We walked to Moran on the railroad,
(about $9\frac{1}{2}$ miles) and then followed the rail-
road track to Laguna ($3\frac{1}{2}$ miles) which
is on the edge of Lake Amatlan. About
 $\frac{1}{2}$ mile from here, along the north shore
of the lake, we found coffee fincas
and plenty of aguacate trees, with
fruit which appeared to be mature.
It was raining part of the time, and
we only entered two fincas, but found

some fine trees and cut and wood from
two. Expected to go back there next
week.

The location of these fincas is on low,
moist land along the lake. The altitude
here is 3875 feet. Due to the recent heavy
rains, some of the mature fruits had
already fallen, and on tasting them they
were found to be very watery in flavor,
or "lechosa" (milky) as they say here.

We were told by a man on one finca
that they would commence picking as soon
as the moon was in the first quarter
again. On inquiring why they chose this
time, he said that aguacate falls in
the new moon ripen up quicker than
others.

This appears to be an important place for
aguacates, and we saw more trees with
heavy crops than I have seen else-
where. Apparently many of the trees ripen
their fruits very early here, but I do
not know from what cause.

Wednesday Guatemala City Oct. 4, 1916.

Rainfall Through the kindness of Mr. Pierce of Chalmers, Guthrie and Co, I have obtained the following record of 10 years rainfall in Guatemala City. The observations were made by Stanley MacNider, and according to Mr. Pierce great care was exercised to have them accurate:

Year	Rainfall
1906	47.66 inches
1907	34.66
1908	57.87
1909	58.13
1910	47.29
1911	65.19
1912	29.45
1913	47.29
1914	26.95
1915	59.12
	473.61

Avocado Yesterday I mailed 4 mailing tubes of birdwood to Washington, 2 tubes containing no. 40 (Avocado #1) and 2 containing no. 41 (Avocado #2).

Thursday Guatemala City Oct 5 1916

I today prepared my accounts for the quarter ending Sept 30.

I claimed in cash	\$ 284.22
Travel requisitions	107.65
	391.87

My present letter of authorization is for the sum of \$3000⁰⁰ for my office and \$200 for Cook's. I have been given \$2200 in cash and the travel requisitions. If I get the whole \$3000 for my use I now have left

\$3000 ⁰⁰
391.87
\$2608.13

But if Pettus comes and my share of the letter is altogether only 2400⁰⁰, then I have

\$2400.00
391.87
2008.13

Weather A chart in the Museo Nacional gives the following maximum and minimum temperatures for the year 1906, in degrees Centigrade:

Month	Maximum	Minimum
January	83°F 28.7°	47°F 8.5°
February	80 31	49 9.4
March	80 32.5	48 8.8
April	81 32	50 10.2
May	82 33.5	52 11.2
June	82 33.5	58 14.5
July	85 29.8	58 14.5
August	83 28.5	57 14.2
September	86 30	59 14.8
October	82 27.8	53 11.5
November	78 25.5	50 10
December	81 28	41 5.5

Friday Palín, Guatemala Oct 6 1916

On the way down here I talked with Rafael Rodenas, a live stock man, who has been over Guatemala a great deal. He tells me that there is a kind of aguacate found near Chiquimula and El Rancho, which is called shucte, and is of very fine flavor. It is probably not a true aguacate, but a wild species of Persea. He thinks it ripens about April.

Here at Palín I found that most of the fruits being sold came from Sta. Maria de Jesus, between Palín and Antigua. Granadillas and injeritos were both said to come from there. There are quite a lot of avocados in Palín itself, and they are now commencing to mature. I was unable to see much of them, because it rained nearly all day.

I doubt if there is anything here better than in Amatitlán, but it might pay to make another trip, in order to look over the avocadoe more carefully.

Saturday Guatemala City

Oct 7 1911

This morning I examined the avocado brought from Laguna on Oct 2 and made the following notes on them.

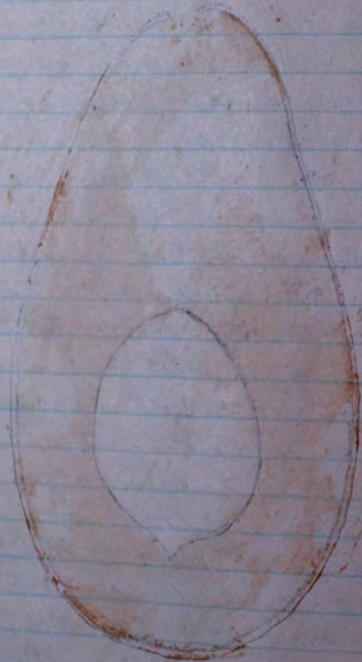
Avocado #1 From the house of Don Miguel Loto, on the edge of the Lake of Amatitlan. The tree is about 25 feet high and is carrying an excellent crop of fruit. These, while rather small in size, are smooth, light green, of desirable form and have a rather small seed. An unevenness is not always an objectionable feature, provided it does not give them extreme and the proleg habit of the tree is a very desirable character.



Form broadly obovoid; size below medium weight 8 ozs, length $3\frac{1}{2}$ ins, greatest breadth $2\frac{1}{2}$ ins; base rounded, rather broad, stem insertion nearly central; apex rounded. Stem 5 ins long, stout; surface smooth bright green in color, with scattering minute, yellowish dots; skin $\frac{1}{16}$ inch thick at base, slightly thicker at apex, granular, brittle, separating readily; flesh pale green near skin, changing to yellowish cream color, clear, free from discoloration; flavor rich, quality excellent. Seed oblate, $1\frac{1}{2}$ ins long, $1\frac{1}{8}$ ins thick, with both seed coats adhering closely and tight in the cavity.

After remaining 5 days in the room this variety has not softened, but it seems to be "in season" and is not wilting. The season I can probably be said to commence in October, therefore, but it must be remembered that this fruit was grown on the shore of Amatitlan, at an elevation of about 3900 ft, which is 1200 ft lower than La Antigua. This may account, in whole or part, for the earlier season of ripening at the Lake.

Avocado from the fruit of Don Miguel Soto, on the
No. 2 shore of Lake Amatitlan. Fruits picked Oct. 9
and at same date (5 days later) have softened
without rotting and are ready for eating.



Form oblong-pyriform, not necked, size
above medium, weight 14 to 16 gms, length
5 1/2 in., greatest breadth 3 1/4 in., base rounded,
with the stem insertion nearly central, stem
moderately stout, 5 cms long, base rounded,
surface pebbled, light green to yellowish green
in color, with faintly numerous yellowish dots;
skin slightly less than 1/8 in thick at base
of fruit, slightly more than 1/8 at apex, separ-
ating readily from the flesh, which is greenish
flesh pale cream colored, greenish near
the skin, fiber markings very slight, texture
firm, meaty, flavor nutty, quality excellent;
seed small, oval-conic, 1 1/2 in long, 1 1/2 in
broad, with both seed coats adhering closely
and tight in the cavity. Season commences
Oct 1st at Amatitlan.

The tree is not so heavy a bearer as #1,
having a rather small crop this year. No
records of past years could be obtained. It
is an early fruit, of good quality, with
a very small seed. Its size is about right
and its appearance attractive. If it
bears well it ought to be an excellent
variety.

Thursday Guatemala City Oct 10 1916

Proseles From the Church of Angel
No. 3 Guaymas, at Guatemala

The tree is apparently young. I should
say I saw one old. It is about
2 ft in height with an erect crown
and a trunk about 1/2 in diameter at the base. The trunk is
smooth and at the base. I counted
the fruits on the tree and found that
there were a few more than 100.

This is a fruit of good size being
one found in a small. It is uniformly
oval shape and has green, almost
smooth surface, ripe at a very early
in fruit. In addition, the seed is not
large, and the flesh is clean, and
said to be of very good quality for
productiveness, size, form, and
proportion of flesh to seed. This seems
to be an unusually good fruit.

The tree is said to bloom in Nov.
No record of past crops could be
obtained.



Four uniformly oval; size above medium to
large, weight 14 to 18 ozs, length $4\frac{1}{2}$ in, greatest
diameter $3\frac{1}{2}$ in, base rounded, with the stem in-
sertion oblique; stem stout, 6" long; apex
rounded, with the stigmatic point to one
side and slightly raised; surface nearly
smooth, slightly undulating and obscurely
ribbed, color deep green, almost glossy,
with few large yellowish green dots; skin
thick, slightly over $\frac{1}{16}$ in at base, nearly $\frac{1}{8}$ in
at apex, coarsely granular, brittle, flesh

Asian colony, pale green near skin, for
fine fibers, flower said to be red,
quality probably very good; seed rather small
in comparison to size of fruit. Almost
spherical, 1/2 inch long and broad, with 1/4
inch seeds, shiny, and light
the cavity.

With regard to the amount of not with
out at the time. I have said they could
also be from the same, as this is probably the
case. Estimate of Amalthea 3872 ft

I today sent to Washington the following:

- 43 a. Passiflora ligularis (?)
- 44 a. Rubus sp
- 46 a. Achradelpha viridis
- 47 a. Citrullus (?)
- 48. Persea americana. Avocado #3.

Also in century notes for following material
sent last week.

- 40 Persea americana Avocado #1
- 41. " " " 2

Paul writes:

"The ancestor of our cultivated Dahlias is
D. rosea Cav. = *D. variabilis* Desf.; has typically
once pinnate, sometimes bipinnate; lfts. ovate,
toothed, broader and coarser than in the other species.
This species grades into *D. coccinea* Cav., which
typically is always more slender than *D. rosea*, with
narrower leaflets, and in the wild, at least,
dwarfer than *rosea*. "The only characters that
certainly distinguish *coccinea* from *rosea* are
the glaucous ~~stems~~ stems and infertile rays
of the former, but these characters break
down in garden forms."

"There is a keen controversy as to whether
the cactus forms were ever produced in
Central America, by nature or art. If you can
find any wild forms verging on the cactus
type, it would be a matter of great im-
portance."

Saturday Guatemala City Oct. 14, 1919

On Thursday morning I started for Virginia Capt. and Quiroga in company with Capt. Alfred Hasbrouck, military attaché of the American legation: just before we arrived at Virginia the Captain suffered an apopleptic stroke, and we carried him off the train unconscious. He was put in bed and kept that night at Virginia. In the morning Dr. McPhail brought him up to the United Fruit Co's hospital, where he can be adequately cared for. His left side was partly paralyzed but the doctor thinks he will recover the use of both limbs, although it will take some time to do so. The Captain and I had planned to make several long trips on horseback together during the next few months, and I fear now I shall have to go alone.

At Zacapa I made inquiries regarding *Zacapa agave*, and was told that the season there was April to June. At Virginia a native told me that there was a very fine and unusual class around Zacapa which was small, with a very thick skin and rich

flavor. It sounds as though it might be the Mexican type. He said it could be found at Riondo, across the river from Zacapa, in April and May.

The same native also spoke of the shute or chuete, which he said could be found at Zacapa in April and May. He said it was a very long and slender fruit, with rather thin meat and a large seed, but the finest flavor of all the aguacates.

I found 2 or 3 trees in bloom at Virginia; they appear to be the West Indian type and the fruit is said to ripen in May.

Just below this station on the return trip, I saw a number of large aguacate trees in bloom. I also saw a few lower down the line.

Navel Oranges were offered for sale here. They look much like those of Bahia, having a great deal of juice but little flavor. The size was large, the color green-yellow.

temperatures
one the following, from the records of Stanley
McNider:

Average temperatures during January, at
7 a.m.

1906	56° F.
1907	55
1908	54
1909	52.96
1910	50.84
1911	53.64
1912	54.70
1913	55.17
1914	54.20
1915	56.8

Taken at Guatemala City.

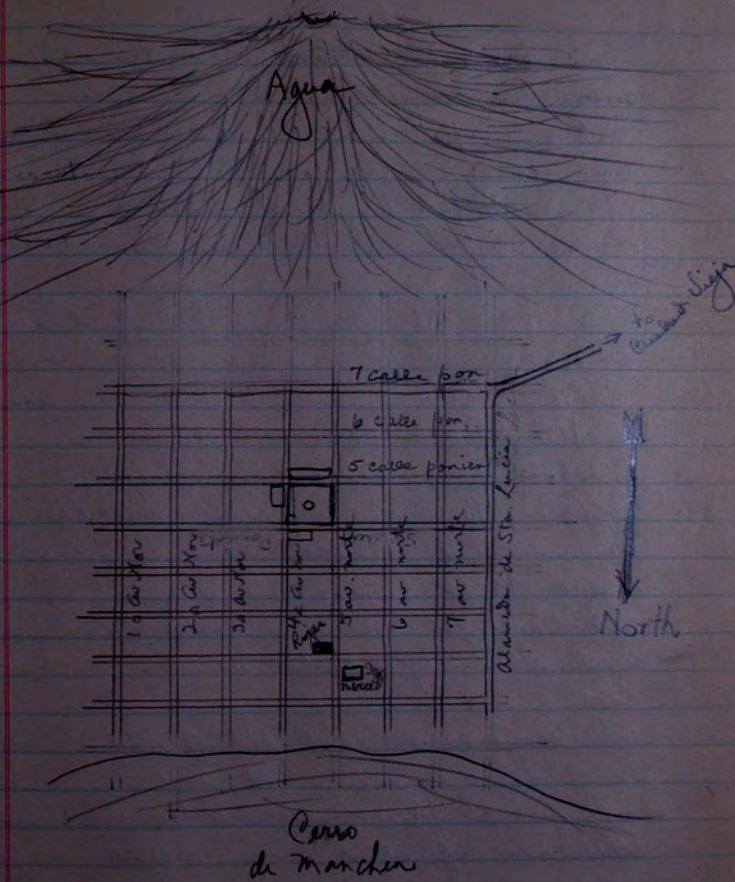
Tuesday Antigua Guatemala Oct 17 1916

I came over here yesterday in company with William Hohmann, of the United Fruit Company. We left Guatemala on the diligencia at 7 a.m. and arrived here at 3 p.m. This morning Mr. Hohmann took the diligencia back to Guatemala, leaving me here with Felipe to commence my study of the agaves of this region. We brought our camera, plant press and dryer, tin tubes to ship birdwood and the typewriter for making inventory notes.

The rains seem to be letting up, and the roads are getting dusty in places, altho there is still mud in low spots. Probably we are now seeing the advent of the dry season. We may have occasional rains from now on, but they will probably not be as heavy and as constant as they have been up to now.

In order to obtain data concerning the average yield of agave trees I propose to begin a count of the fruits in each tree specimen insofar as possible. It will be necessary to state the height of the tree, the distance from the trunk to the first branches (since trees in this region are variously branched and high), the amount of fruiting wood by dividing the tree in the crown and the approximate length of the fruits, as well as the number of the tree. It seems impossible here to ascertain the age of the tree with even a reasonable degree of accuracy.

Such a sketch as above outlined, however, should give me an idea of the amount of fruit produced by the average seedling tree of a certain size, and of a given size of fruit. When it is impossible to make a count of the number of fruits, I will in some cases give an approximation of the number, indicating that it is an approximation by putting a question mark after the figures.



7a Calle poniente # 29,
In the fence the following trees
were examined:

Tree 20 ft high branched 12 ft from ground
crown fairly well branched not broad. Fruits 16-20 g, round.

Tree 20 ft high slender branched 10 ft
ground crown fairly well branched Fruits 12-16 g, round.

Tree 25 ft high branched 10 ft from ground with
good crown only 4-5 g fruits. 1 lb pyramidal.

At the la Bodega - quite a number
in the 3^a Calle poniente. There is a very early
agavate here only half a dozen fruits are
left on the tree, many having been picked and
many having fallen to the ground. This variety
is said to commence ripening in July. The
seeds on the ground beneath the tree are
nearly all infested with weevils.

1^a Avenida San across the street from No. 5.
Large tree with quite a lot of fruits, fully ripe
and of rich flavor but with very large seed.
This is a fruit of excellent flavor, - very
rich and nutty, but is disqualified by its
large seed. A tracing is shown on the
following page.



Tracing of agavate described at foot
of preceding page.

Agave trees in the forest pertaining to the Hotel Managua, at the foot of the Cerro de Managua. One for each among coffee bushes.

Tree 30 ft high, branched 15 ft from ground, crown
broad, well branched. Fruits round, 10-12 yrs - 80

Tree 35 ft high, branched 20 ft from ground, crown
broad, well branched. Fruits oval 10 yrs. 90

Tree 35 ft high, branched 5 ft from ground, crown
fairly broad, well branched. Fruit pyriform 1 lb 150

Tree 35 ft high, branched 12 ft from ground with
broad well branched crown. Fruits pyriform 1 lb 16 yrs 300

Tree 30 ft high, trunk living 5 ft from ground into
3 main limbs, branching 15 ft from ground. Crown broad,
but lacking one side. Fruit round 12 yrs 200

Tree 40 ft high, branched 18 ft from ground, crown
very broad, scanty in parts. Fruits oval, about 12 yrs 300

Tree 35 ft high, branched 18 ft from ground, crown
rather scanty, broad. Fruit round, 8-10 yrs. 250

Tree 50 ft high, branched 15 ft from ground, with
slender, rather scanty crown. Fruits oval 8 yrs 500 (?)

Tree 40 ft high, branched 25 ft from ground, crown
slender, little fruiting wood. Fruits round 10-12 yrs 60

Tree 35 ft high, branched 20 ft from ground, crown
scanty. Fruits long and slender, 12-14 yrs. 100

Tree 30 ft high, branched 15 ft from ground, crown
fairly well branched but not large. Fruits obovate, 16-15 yrs 80

Tree 30 ft high, branched 15 ft from ground, crown
broad, well branched. Fruits oval 10-12 yrs 200

Tree 45 ft high, branched 25 ft from ground, crown
rather small. Fruits oval 10 yrs 150

Tree 30 ft high, branched 15 ft from ground, crown
rather scanty. Fruits obovate 14 yrs 50

Tree 35 ft high, very slender, branched 18 ft from the
ground, crown very scanty. Fruits pyriform 14 yrs 100

Tree 30 ft high, branched 10 ft from ground, crown
slender, rather density. Fruits obovoid 1 lb 160

Tree 40 ft high, branched 20 ft from ground, crown
rather broad. Fruits round, 10-12 oz. 250

Tree 35 ft high, branches 10 ft from ground, crown
intermediate, fairly well branched. Fruits obovoid, 12 oz. 270

Tree 25 ft high, branched 10 ft from ground, crown
rather broad, well branched. Fruits obovoid 12-14 oz. 140

There were two or three trees in the
finca which were without fruit, and which were
not therefore included in the above list. The
owner of the finca said that these trees ripened
their fruit early and it had all been picked; whether
this was the case, or whether these two or
three trees did not bear this year, I am un-
able to say.

Nearly all the trees in this finca seem to
be late ripening, the fruits not being fully
grown at the present time. Most of them
are round fruits, some are obovoid and
a few pyriform.

There are said to be some good aguacates
on the property of Justo Hernandez at
Dueras.

In the finca "La Palvora" on the road
leading to the cemetery here in La
Antigua, are a large number of agu-
cate trees, quite a few of which look
like very good varieties. None of them
is early ripening. The owner said they
would commence to ripen in November
and the season would be at its height
about January-February.

Wednesday Quetzaltenango, Guatemala Oct 18 1916

We started from Antigua this morning on foot at 7 am, and took the road for Ciudad Vieja. It proved to be broad, well kept up, and heavily traveled. Most of the way from Antigua to the Ciudad Vieja I passed through large coffee fincas of which Quetzaltenango is generally used for coffee. The distance between the two towns is about 9 kilometers. We arrived in the Ciudad Vieja at 8 o'clock and left the main road to go up through the town on the upper slope of the Volcan de Agua. The town itself lies on the lower slope of the Volcan at an elevation very little higher than Antigua.

The slopes of the Volcan up to an elevation of about 7000 ft (I judge) are cultivated by the Indians, maize being the principal crop. The soil is remarkably loose and friable, black, and shows its volcanic origin very plainly. Occasional pocotes (*Spondias* affinis) and other trees are seen in the corn fields.

The town of Ciudad Vieja is not large, in comparison with Antigua, but

probably contains a thousand or two inhabitants. There are very few tiendas, and no business houses of any importance. The houses are mostly small thatched huts, but they are all surrounded by coffee bushes and fruit trees. We were able to find no ripe agave-cates here. We saw plenty of trees, but very few of them in fruit.

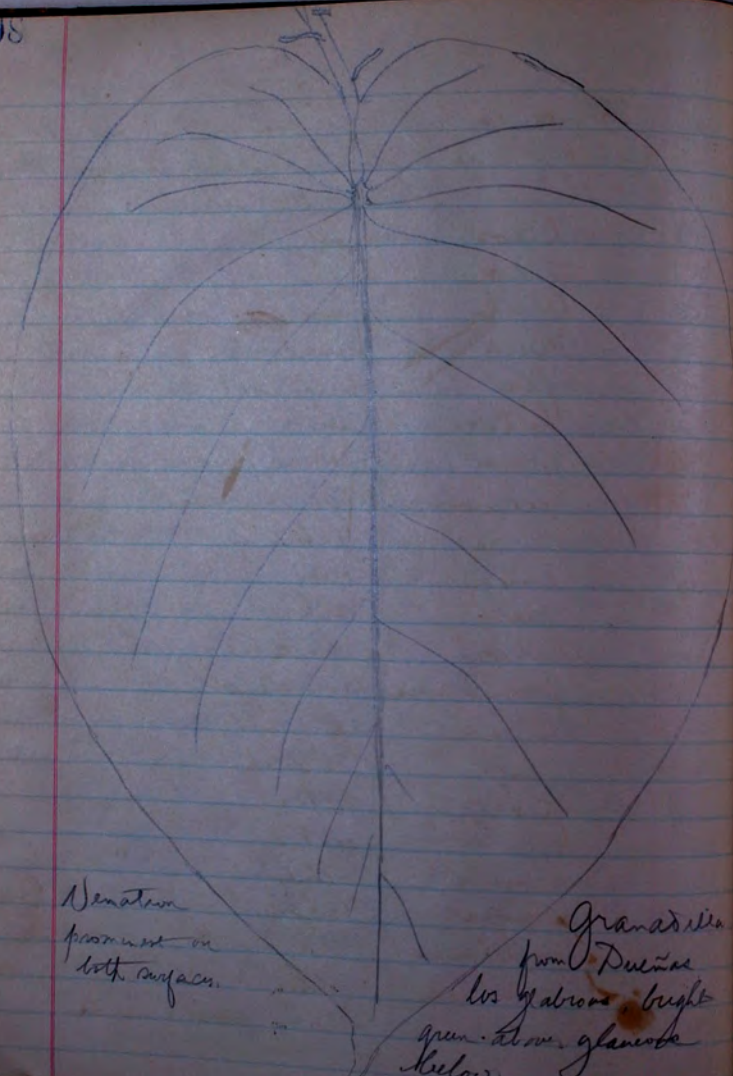
Coming out of the Ciudad Vieja we followed the main road which leads through the town, and after traveling about 1 km. the road forked. The branch to the left leads to Alotenango; the one to the right, which we took, leads to Quetzaltenango.

The distance between Ciudad Vieja and Quetzaltenango appears to be about 3 kms. The road is practically no change in elevation. The road passes through open rolling country, devoted to corn fields and pastures for cattle. To the right is a fine broad plain at the very foot of the Volcan de Fuego, on which are many cattle. To the left lie the slopes of the Volcan de Agua, mainly devoted to corn fields. The scenery here is really very fine, with the two Volcanes so close.

Duenas is a small place, with only a few *tiendas* and practically no other business houses. The streets, with the exception of the main road through the town, are very narrow, crooked, and lined on either side with fences of corn stalks or thin fences of chichicaste. There are some fine, almost sudden rocky cliffs, cottonwood trees, agave, banana, guineguilla and other plants, are the special bits of the Indians, with their stone walls and thatched roofs. They are smaller and the people in them are much smaller.

There are plenty of agave trees here, lots of them with large crops of fruit, but we were able to find none that had ripened at this time. Apparently they will not be in season for another month or two. The people here have a belief to the effect that they should only be picked in a certain stage of the moon, in order to ripen properly.

I found growing in a garden here an especially choice cherimoya, of which I obtained some budwood. The tree has a trunk about a foot in diameter, but has been cut back heavily about 16 ft above the ground. The sprouts which have come out from the large stubs, and which are now 5 or 6 ft long, are bearing heavily. This is, in fact, the most prolific cherimoya I have seen here. Perhaps the severe pruning has resulted in making it bear heavily. The fruit vary in size, from 3" long to about 7", and probably weigh 5 up to over 2 lbs. They are of uniform shape, loaves, but blunt at the apex, and nearly smooth on the surface, the corollary area being marked off by raised lines. One fruit had already ripened and fallen, and some of the others seemed to be getting up, though most of the crop was still quite green. This looks like a very choice variety.



Venation
prominent on
both surfaces.

Granadilla
from Duéñas
los glabros, bright
green above, glaucous
below.

I desired to get an idea of the Cachiñuel
dialect so called in Rosendo Cubur, an
Indian, who gave me the following words:

Dios	diooh
arbol	cheh
fruta	munih
raiz	tushén
pas	kush lon wa
tortilla	wi
frijol	kineé
nuevas	sac ma lon
el sol	kih
luna	ih
seco	tsik
Adios!	chirika
papita de aguacate	gunak oh
papino	pipinch
hoja	rushak
flor	katzuk
día	unah
hombre	achik
mujer	ishak
muchacho	alá
muchacha	shten
Caballo	no hay otro nombre

gustase
"

Words

casa	kaik	kaik	päih
pueblo	tenemet	tenemet	chihai
camino	kaik	kapih	baik
calor	langwerch	katan	kati
frio	teo	tió	teó
lluvia	khops	khop	khóp
dulce	kil	kop	kép
ácido	tehum	kaeh	tehum
grande	nem	nem	nim
pequeño	chutín	huwahara	chutín
volcan	huyin	huyin	huyin
arbol	chah	chah	chah
rama	ruga chah		rúka chih
hoja	rushak	rushak	rúshak
fruta	norayih	?	?
pipita	rushak		rúshak, sak
raiz	rushamal	iz	rúshak
agua	yiah	yiah	yiah
sal	stagan	stagan	stagan
flor	kataikh	katzeh	katzikh
bueno	kabal	algavain	itá
malo	iteh	keishie	manti, itá
aquí	woweh	shenakat	chih
allá	chilá	kulsh	chiloi

Words

cabeza	kaholón	kaph	rúholón
ojo	runak kawatch	os	rúnak rútsch
cerazo	kakah	áá	rúhah
mano	"		aká
pie	kakun	akán	wákun
piedra	abakh	abakh	awákh
amarilla	un	un	ün
moreno	shak		
colorado	kiak	kiereh	kirk
negro	shak	salistre	shak
blanco	suk	nanto	suk
azul	agui		
duro	kosh	koph	kóó
suave	suave	manokpteh	buyte
fuego	kaak	aak	káak
noche	chaka	chaka	chaka
día	pakih	pakih	fékih
ciudad			
padre	katatai		katatai
madre	kate		rúth
hermano	wachalal	wachalal	rúchak
hermana	"		aná
rio	yiah (agua)	yiah	rúhuyah
aguacate	okh		

Thursday San Antonio Aguas Calientes Oct 19 1914
Guatemala 1535 m

The road between La Antigua and this village is one of the most picturesque and beautiful I have seen, and the scenery along the way is very fine.

The distance between the two towns is about 8 kilometers. Leaving Antigua, one follows the road to the Ciudad Vieja about two kilometers, and then takes a road branching off to the right. There is an ascent of a couple of hundred feet, after which one drops down into a beautiful valley, in which lies the village of San Antonio. To the southwest of the village is a small lake, and beyond it a broad plain, on the farther side of which the village of Duenas can be seen, some 4 kilometers away. The country is cultivated very extensively, the principal crops being corn, frijoles, and millonates. & the corn fields. Cherimoya trees are quite common, and also about the houses. I saw several mango trees here at an elevation of at least 5200 ft., but they were small and looked stunted and unhealthy. One of the Indians with whom I talked, - an intelligent fellow - said that they did not

amount to anything at this elevation. I found no cherimoya which looked as promising as the one I got yesterday at Duenas.

In this village the aguacate is not very common, but there are many other fruit trees. The orange is probably the most abundant. The ajonjolies here grow to an immense size. I saw one which must have been more than 60 ft high. The cocopal palm is also cultivated here, the plants being grown beneath the shade of orange or other trees. The granadilla vine climbs to a height of 20 or 25 feet.

Friday Sta Maria de Jesus Oct 30 1914
Guatemala

We left Antigua at 7 am and arrived here at 9.30. It is a steady climb of 10 kilometers. The road is good enough for carriages, being the best road from Antigua to Cobán.

This village lies E. of Antigua on the upper slopes of the Volcan de Agua. The barometric pressure is 33.40, which corresponds to an altitude of 6700 ft. The wind, which blows in from the open gap to the E. is quite cool, and the general appearance of the place is not at all tropical.

Dahlia Coming up from Antigua we saw many plants of the wild Dahlia which is found in these regions. It seems to be very uncommon below 5500 ft. and its principal zone seems to be from 5500 ft upward. I have not yet been to the upper limit of its zone. By some of the natives it is called tumbato, by others papalot. I have been unable to get its Coahuil name, none of the natives from whom I have enquired seem to know it. The literate natives call it Dahlia.

Peaches are abundant here. The trees grow to 15 ft or more in height and are now in bloom.

W. C. DO #4 Aguacate. I found here a tree with fruit of very good appearance, though not yet fully grown. The tree is about 25 ft high, with a dense crown. The crop is not very heavy, but fair.

~~Turned~~
~~to gamma~~



This fruit is not nearly full grown. It is light green, with numerous large, yellowish dots. The skin is over $\frac{1}{16}$ in thick. Probably it will not ripen before next April.

Cherimoya The Cherimoya is grown here at some of the commonest fruit trees.

Guava The Guava (*Passiflora ligularis*) is quite common.

Guava The guava is extensively grown here, on a long cultivated of light soils. They are built about 5 ft. above the ground, with a flat top, and the guavas climb over this. The fruit hangs down, where they are easily gathered.

Guava One of the Indians here goes on the following Guava (*Cashipal*) names for the fruit:

Guava	jak
Guava	karnara
Guava	okh
Guava	sahil
Guava	umim
Guava	kiish

Matasano I saw one tree in a garden here, but it was old and not in a flourishing condition.

Effect of
climate on
fruit culture

The Abyssinian banana is grown here but apparently the edible fruit varieties do not thrive. I saw none at all. Neither are the citrus fruits grown here, apparently. The town is characterized principally by peach trees, guava and avocados, and gardens of peas, and other vegetables.

We have here, then, an interesting situation: no bananas or citrus fruits which usually predominate, but avocados and guavas, which unlike the other mentioned, do not yet seem to have reached the upper limit of their zone.

Effect of
climate on
fruit culture

About $\frac{1}{4}$ mile below Sta Maria, to the left of the cart road (descending) stands a tree of the Mexican type of Avocado, the first I have seen in Guatemala. It is a tree about 20 ft high, and is now coming into bloom. It also carries 4 or 5 fruits, nearly ripe. One ripe one had fallen to the ground.



The tracing here shown was taken from one of the fruits of the Mexican type of agave. The seed coats are with very thin and adhere closely to the seed themselves. The fruit is an oblong, was also one of the Mexican type which is common in California. It is also found in a high tree of this type, which we have seen 15 or 20 ft. of the ground level in and around the mesa. I make no wonder when this strong resemblance of a distinct type could have come from Tanguis of the Comandante and then in Sta Maria if there were any wild agaves in the mountains, and they said that there were trees here and there but that they had sprung from seeds dropped by the Indians. They believe there are no truly wild agaves in this region.

Saturday San Lucas, Guatemala Oct 21 1916

We came here this morning on the diligencia from Antigua (about 13 kms.), arriving at 11:15. The barometric pressure here is 23.27, indicating an altitude of 680 ft. The town lies NE by N of the Volcan de Agua. It is a small place, with practically no *tiendas* of any size.

The gardens of the Indians contain many fruit trees, among which the following are the most prominent:

Peaches: These are very numerous in nearly all the gardens. Probably the most important fruit here. I saw several trees with fruits which appeared to be fully grown. There was in bloom, as was the rule at Sta. Maria de Jesus yesterday.

Anonas (Chirimoyas) quite common, but very few fruits seen.

Aguacates Fairly abundant and the trees look better than at Sta. Maria, probably because this situation is not exposed to the wind as is Sta. Maria. Several trees had mature fruits on them. The people say that the crop is often partly destroyed by frost.

Guinea. I saw a few bushes in the gardens, but no fruits.

Pongamia. A few bushes seen.

Mangrove (Crataegus) fairly common. The fruit is very large.

There are no bananas grown here and only have 2 or 3 orange trees. The principal crop is maize, but there are also other garden vegetables, whose produce is undoubtedly marketed in Guatemala.

With the lights on my compass focused on the peak of the Volcan de Agua, the azimuth points N. at 162 degrees.

Avocado
#5



Avocado No 5. This tree is about 50 ft high, and stands next to the fence in the garden of an Indian in the western portion of the village of San Lucas. It was selected for this reason: — It comes from an elevation of 6800 ft, above the banana zone and practically above the orange zone, and may, therefore, be harder than those from Antigua, and ~~second, it is a very early variety, being fully ripe at that time.~~ The tree, which is small, is said to bear over 200 fruits in good seasons, so that it can probably be considered prolific.

The crop is said to be injured by frost in some years. It is carrying quite a few fruits now and some have already been picked. I sampled some which had been kept in the house several days to soften and found them all of good quality.

Fruit truncate with a ring median above median, lateral 10 to 16 eyes, length $2\frac{1}{2}$ to $3\frac{1}{2}$ in., greatest diameter $3\frac{1}{2}$ to $3\frac{5}{8}$ in.; base obliquely flattened, stem inserted to be seen as a shallow cavity; stem very short, about 4 mm. long, truncate to rounded, the stigmatic point slightly raised; surface pubescent or slightly rough, dense deep green in color, with few yellow dots and numerous orange russet spots on the surface, skin $\frac{1}{16}$ inch in thickness at basal end, somewhat thicker toward apex, coarsely granular, separating readily from the flesh, brittle, flesh firm, oily, rich yellow near seed changing to pale green near the skin, very slightly discolored with fiber traces, flavor very rich, nutty; quality very good; seed medium to rather large in size, oblate-conic, $1\frac{1}{2}$ to 2 in. broad, tight in the cavity with both seed coats adhering closely.

Sunday Antigua Guatemala Oct 22 1916

This tree is growing in the sitio 'La Compañía' belonging to Sr. Gándara, No 13, 3^a Calle Poniente.



The particular value of this variety is its late season of ripening. Coupled with this important characteristic it has good quality and productiveness.

The season is said to commence April or May. Only a few fruits remain on the tree at this time, and these are fully ripe, the flesh being of a deep yellow color and very rich in flavor. The seed is large in some of the fruits, but seems to be more

variable than in most other varieties I have seen, such as some specimens as medium sized or smaller than usual.

The tree is very distinctive. Many fruits are still on the tree, packed and sold from the market early, and many have fallen to the ground. The number of fruit sets on the tree. The tree is quite good sized, some fully 35 ft high, with a broad spread. The fruit is not devoid of foliage at this time.

Form oval or oblong; size medium, weight varying from 25 to 50 ms, greatest diameter 3 in, base rounded, sometimes slightly extended close to the stem, which is not quite obliquely, apex rounded; surface pitted, yellow green in color, with inconspicuous yellow blotch; skin thick, more than 1/16 inch, very coarsely granular, separates readily from the flesh; very brittle; flesh firm, buttery, deep yellow near the seed, changing to pale green near the skin, clear free from further discoloration, and of very rich, nutty flavor; quality excellent.

but; seed medium to rather large, oblate conic in form, 1 1/2 to 2 ms in diameter, fitting tightly in the seed cavity with both seed coats closely adhering to the smooth cotyledons. Season from May to the end of October at Antigua.

~~It appears that most of the early ripening varieties of this fruit, found up to the present, such as the one last described, are characterized by a small seed. These varieties seem to differ greatly from the majority of varieties now obtaining in the market. Perhaps the missing of October, and the fruit to mature some August, though it probably has not developed the rich nutty flavor before the end of September. There are very few here of this character to be found in the region.~~

Avocado Tree growing beside camino de herradura from
No 6 Arroyo to San Antonio Aguascalientes, just above
bridge at San Lorenzo del Coco.



Fruit rounded oboate, size below medium,
weight 8-10 oz, length $2\frac{3}{4}$ ins, breadth
 $3\frac{1}{2}$ ins; base truncate, the stem inserted
squarely without depression; apex flattened;
surface pebbled, deep purple in color,
with numerous small yellowish dots; skin
 $\frac{1}{16}$ in thick at base, nearly $\frac{1}{8}$ at apex, sep-
arating readily from the flesh; rather finely
granular, brittle, flesh deep cream yellow near
seed, changing to very pale green near skin,
quite free from fiber discoloration, firm in
texture, and of rich flavor; seed small

in comparison to size of fruit, and un-
usually small for a fruit of this shape;
oblate, $1\frac{1}{8}$ ins broad, $1\frac{1}{4}$ ins long, light in
the seed cavity with both seed coats ad-
hering closely. Season commencing Oct 15.

The tree is large, and is bearing an
immense crop of fruit. The fruits seem to
be mature, and open up well after
being picked.

This is an early variety, of excellent
quality and the size just about right
to give $\frac{1}{2}$ fruit as a salad. The
only objection to it which I can see
is the color, and this would not be
considered objectionable by any one but
Cullen.

Tuesday Antigua Guatemala Oct 22 1919

Dahlia on the return trip from Guatemala I collected some specimens of the wild Dahlia about 2 km above Sta. Lucia at an approximate elevation of 6600 ft. The plant is one of the most abundant at about this elevation; I have not seen it as far as 7000 ft, but have found it up to 8000 ft, which is as high as I have been able to get some. It is much smaller than the one we go.

The plant is a bushy near Sta. Lucia grows to about 4 ft in height. The stem is dull green, purple to purplish green, usually glabrous but sometimes with scabrous hairs toward the upper portion. 2-pinnate near the base of the stem, 1-pinnate above, the leaflets ovate, acuminate, $2\frac{1}{2}$ ins long, $1\frac{1}{2}$ ins broad, remotely dentate, sparsely furnished with short bristly hairs, most sparsely below, reaching up to 5 ins long (often very short); petioles 0 to $3\frac{1}{2}$ ins long.

The florets are 2 to 3 ins broad, with 8 ray florets. The latter are

all infertile, and orange-brown to crimson. They vary greatly in form, some being short and broad, others long and more slender. The shortest and broadest measured was $1\frac{3}{4}$ ins long, $5\frac{1}{2}$ in broad, the form being broadly obovate, apex at apex. Probably the commonest form is oblong-obovate rounded to broadly acute at the apex, $1\frac{1}{2}$ ins long by $5\frac{1}{2}$ in broad; the slenderest measured was 1 in long by slightly less than $\frac{1}{2}$ in broad, sharply acute at the apex. Another one proportionately slender was $1\frac{1}{4}$ ins long by $5\frac{1}{2}$ in broad.

I have commonly noticed that in many of the larger flowers, whose ray florets are proportionately slender, that the edges of the florets recurve, giving the flower the appearance of a cactus dahlia, as opposed to this, in many plants the ray florets remain outspread. In the flowers which have very short and broad ray florets, the edges are sometimes slightly incurved.

Wednesday Antigua Guatemala Oct 25 1946

I then went back up to the church
as I found in a book of Las Casas
with the caption below:

Fr. Bartolomé de Las Casas, primer
vicario del convento de Santo Domingo de esta
ciudad y sucesor obispo de Chiapas. Yaciere
varios años en el convento de la Antigua
Ciudad de Guatemala, protector de los
Indios. Escribió: 1° Apologética Historia
de las Calidades de los gentes de las Indias 2° Historia General de los Yndios 3° La
Destrucción de la Indias 4° De única Vo-
cación India y Algunas Otras Obras que
se perdieron. Nació el año de 1474 y
murió el año de 1566 en el convento de
Nuestra Señora de Atocha, España, a los
92 años de edad.

This morning we went to Jocotenango and
Pastores. The former is merely a suburb of
Antigua, about 2 kilometers from the center
of town. In spite of its name, there seem to
be less *jocotes* about the place than in
most other sections hereabouts.

Following the road through Jocotenango
we continued about 3 kilometers farther
and arrived at Pastores, a very small
place of little importance.

The road all the way to Pastores
passes through a region of coffee
fincas, with *Grevillea robusta* planted
for shade. We saw plenty of *ague-
cate* trees along the way, but found
none that had mature fruits. I
only saw one tree which had fruits
of good large size. Most of them
seemed to be small varieties. This
region does not look like a very
promising one from an *aguecate*
standpoint.

I went to the market toward noon today to pick up some specimens for photographing and a corn for seed. The market of Antigua is situated on the block west of the main plaza; it occupies a large building with an ornate open portico on the center, but most of the stalls from the surrounding market are hung in produce to sell at a good price. The market building is part of a ruined church. There is an open space some 100 ft square they squat on the ground with their backs to the produce in front of them.

The items of interest which I noted today were the following:

Jacote amarilla (*Spondias* sp.)

Nispero del Japon (*Eurobotrya japonica*) this is not so abundant as it was 10 days ago. The season is passing.

Guayabas (*Psidium guajava*) large green fruit.

Miltomate (*Physalis* sp.) very abundant

Injeritos (*Achradelfia viridis*) only a few, and these poor.

Pacayas (*Chamaedorea* sp.) fairly abundant but expensive, large ones \$1 each.

Pinquiles (*Chayote edulis*) in great abundance.

Mangamillas (*Crataegus* sp.) only one lot seen.

eyate = string beans

Tabano = radish

yerba buena = mint

perajil = parsley

repollo = cabbage

cebollo = onion

camote = sweet potato

remolacha = beets

alberja = pea

nabo = turnip

Thursday San Juan del Obispo, Oct 26 1916
Guatemala

This village is a little over 5 kilometers from Antigua on the road to Santa Maria de Jesus. It lies on the lower slopes of the Volcan de Agua, at an elevation of 5325 ft., as indicated by a barometric pressure of 21.43 mm. There are no trees here, and on two small fields the vegetation apparently being dependent upon Antigua for moisture. There are a few old fruit trees in the garden the *Alnus* being especially abundant. This village is said to produce the best Annona in this section. The fruits are practically all immature at this time. The same applies to the agaves. There are plenty of trees here, but the fruits are seen to be immature.

There is lots of coffee here, most of the door-yards of the houses being filled with coffee bushes. Agaves, yuccas, anonas and other trees growing up about them.

The mango grows here, but the trees are small and do not look very healthy; undoubtedly the elevation is too great for the most successful culture of this fruit. The papaya

also grows here.

The commonest yucca seems to be *yucca amarilla*. It is very abundant and is now ripening its fruit.

Ploches are also grown here. I saw some trees in bloom.

Over a doorway diagonally across the street from the Iglesia de San Francisco (ruined) is a cross with a glass front, and below it the inscription and date:

El Amo. Sr. D. D. Francisco Figueredo y Victoria, Arzobispo de esta Ciudad. Concedió noventa días de indulgencias a los que incaren las rodillas delante esta imagen de Nuestra Sra. de la Luz. Otros quarenta por una Ave Maria

Mayo 1° de 1760.

Avocados: Just outside the edge of town (Antigua)
 at on the road to San Juan del Obispo is
 Finca a large finca and hacienda called
 Finca Jaiza. We stopped there this morning
 and talked with Hilario S. Cuellar,
 who seems to be in charge. There are some
 excellent avocado trees, and some of the
 trees are very large - more than 100
 years old, according to Sr. Cuellar. The
 latter told of an American who visited
 the place a year ago, examined all the
 trees, and selected two from which
 he cut budwood to send to the States.

I think he must be mistaken in the time
 which he elapsed, and that it was
 O.F. Cook, who was here two years ago in
 June. I thought at first it must have
 been S. S. Knight of California, but as the
 latter must have been here at best
 3, probably 4, years ago, it seems more
 probable that it was O.F. Cook.

Sr. Cuellar showed me the two
 trees selected by the American, and on
 examining the green fruits they both
 looked to me like extraordinarily

choice varieties. They are said to ripen in
 January or February, and I am going
 back then to examine the ripe fruits
 and get budwood, for the budwood ob-
 tained by Cook (as I suppose) was not
 saved.

AVOCADO #13



The fruit of which an outline is shown on the preceding page stands just to the south of the house at Guaya, and inside the wall a few feet. It is still quite green, but the rich yellow color of the flesh the small size of the seed cavity, and the large size of the fruit, make it appear like a Spanish nut season variety.

Avocado
F. 14



The other variety, of which a tracing is shown on the preceding page is a large tree just inside the hedge which runs along the main road toward the south end of the finca and opposite an estancia. The flesh of this variety is as precisely the same appearance as in the first one, and the season is said to be the same.

Dr Cuéllar says that the seedling varieties he has raised have come into bearing at about 5 years of age.

He also says that the trees bear heavy crops only in alternate years. If they bore heavily last year, then they would bear a comparatively light crop this year. The two trees of which fruits are shown are both bearing rather light crops this year, but he says last season they both had tremendous crops.

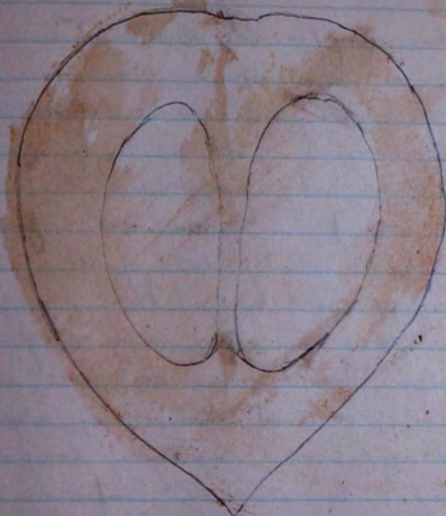
There are a good many aguacate trees in this finca, but no especially early ripening varieties. Dr Cuéllar says the two picked out are far the best of the lot.

Cachiquel
language

Names of fruits in Cachiquel, aka Tetas Shokoff

aguacate	okh
granadilla	kamala or pers'n
guayaba	kik
platano	sakel
mangonillo	mangilla
gooseberry	teatin
chirimoya	marb'o
guineo	kik
anona	kik
sapote	talit
ingito	ingito

Petas Shokoff is from San Martin, near
Chimallare, sp.



I bought some fine ingitos from the Cindas
Vegia in the market today, at \$1.50 (about
4 cents) each. The largest one was $4\frac{3}{4}$ in. long.
The external color of this fruit is an indistinct
mottling of brown and green. The skin is mam-
braneous, and the flesh is pale red-brown,
similar to the color of the flesh of *Lecythis*
mammosa but finer and more juicy in texture.
The flavor strongly suggests that of *L. mammosa*
but is much more pleasant. There were two seeds
in each of these fruits, and they had all germ-
inated within the fruit.

The different climatic zones (depend-
ent upon elevation) which are recognized
here in Guatemala are three, viz: the
tierra caliente (hot country), tierra templada
(temperate region) and the tierra fría
(cold region). I have seen figures giving
the approximate range of these zones, in
meters of altitude. The zones have no
well defined limits; and as far as I can
see these terms are all used in a very gen-
eral way, without there being any well-defined
idea as to what each zone comprises.

Lacking meteorological data on which to fix
the limitations of these zones, it seems to me
they could best be defined by selecting a
certain number of commonly cultivated fruit
trees, ~~and then~~ which are to be con-
sidered as typical of each zone and then
ascertaining, as accurately as possible, the
upper limit of cultivation of each group.
At the upper limit of cultivation of one
group would, therefore, commence the next
zone. Some of the trees would be found
in more than one zone, but by picking
a limited number of trees in each zone,

which seem to be as typical of that zone
as possible, I believe we could define
the zones more closely than has yet been
done.

Of course, a system of plant zones could
probably be worked out by the phytogeo-
graphers from the character of the native
vegetation, but as our interests are hor-
ticultural it seems to me the most useful
system would be one based upon a few
commonly cultivated trees, and considering
only the temperature limits of the zones.
Phytogeography would have to deal also
with the plant formations due to aridity,
excessive moisture, varying soil conditions,
etcetera. It would be a huge task to
work out such a system accurately for
Guatemala, and in addition would not
have nearly the same value, from a hor-
ticultural standpoint, as one based on
horticultural data.

I have not given the matter much thought
yet, but in order to get the thing under
way, I will put down the following plants
for each zone:

Tierra Caliente

Characterized by the strictly tropical fruit trees, such as

Artocarpus incisa

Chrysophyllum cainito

Anacardium occidentale

Annona muricata

" *reticulata*

Tamarindus indica

Crescentia cujete

The mango, avocado, and banana are also found abundantly in this zone, but as they extend well into the second zone they cannot be taken as characteristic.

Tierra Templada

This zone begins at the upper limit of successful cultivation of the characteristic plants of the Tierra Caliente, and is characterized by

Citrus aurantium (sinensis)

Eriobotrya japonica

Psidium guajava

Annona cherimola

Persea americana

Spondias purpurea

Tierra Fria

I have not yet been above 7000 feet, so I will have to postpone naming the characteristic trees until later. I anticipate that some of them will be

Amygdalus persica

Pyrus malus

Pyrus communis

Cydonia sinensis

Rhamnus salicifolia

Chalacypus guatemalensis (?)

I suspect that this zone will commence just a little below 7000 ft.

Based on the above plants, I think the zones will be somewhat as follows:

Tierra Caliente

Sea level to 2500 or 3000 ft

Tierra Templada

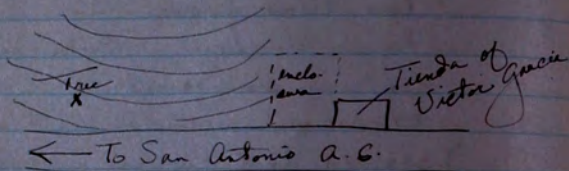
2500-3000 ft to 6500-7000 ft

Tierra Fria

6500-7000 ft to upper limit of fruit cultivation.

Friday Antigua Guatemala Oct 27 1916

This morning we went to San Lorenzo del
Avocado Cubo to get budwood from an aguacate tree
#6 I had picked out in the ~~city~~ of Victor
Garcia. The tree stands as shown in diagram:



It is about 35 ft high, with a spread of
equal distance, and a trunk $1\frac{1}{2}$ ft thick.
Garcia says it is 15 years old, but I think
it must be more nearly twice that. It
is now loaded with fruit; it was impossible
to count them, but I estimate the number
at considerably over 1000, and Sr. de Garcia
says 2000. They are now maturing. The
tree is ~~at~~ putting out bloom buds. Sr. de
Garcia says that when the flowers for
next year's crop begin to appear it is a
sure sign that the fruit are mature
and ready to be picked.

I am also told by the Garcias (and today
I have heard the same thing from two
other people) that when the tree bears a big
crop one year, it is followed by a small one
next year. They all state that it is the
habit of the avocado to bear a big crop one
year and a small one the next. I asked
if the tree ever missed a year entirely and
was told that there were always some
fruits, but not a big crop two years in
succession.

Chirimoya

I also cut some chirimoya budwood this morn-
ing from a tree in the yard of Julia Guerra,
who keeps a small tienda ~~from the~~ diagonally
across the street from the rear of the
Hotel Rojas. This is the most promising var-
iety I have yet seen.

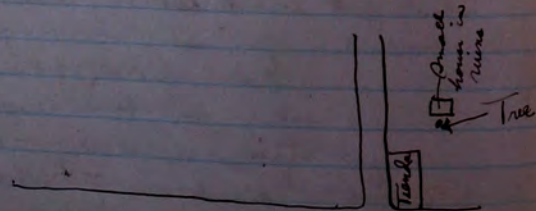
It is an interesting, and I believe signif-
icant fact, that the tree, which is unusually
productive for a Chirimoya, as well as
the tree from which I obtained budwood
at Duenas, has been heavily cut back
a few years ago, leaving only the stubs
of the main branches. The tree has now

made a new top of considerable size and the growths are all strong and stout, as would be expected of sprouts from a trunk 10 in. in diameter. Most of the fruit is toward the base of these sprouts. I counted over 50 on the tree, and a good many of them are now mature. It seems to ripen earlier than most seedlings, and the same was true of the one at Quetzal.

I have seen no tree, allowed to develop naturally, which was producing nearly so many fruits as this tree which has been heavily topped, though I have seen many trees of much larger size.

There may be, in the toping back, a means of inducing large chinmaya trees to fruit more abundantly. I will watch for further evidence.

Situation of tree in Julio Guerrero's yard



Tuesday Guatemala City Oct 31 1916

Visited the Exposicion Nacional in the Hipodromo

Laboratorio Quimico Central.

Has published meteorological observations.

List of Canned fruits shown by Cabarrus and Co. "Nortropico" brand
Piña Guayaba Durazno Jicote
Coco y Piña Framboesa Papaya
Cacha Matasano Toronja Mango

There are a few aguacates on exhibition which seem to have come from Tetonicapam. The type looks almost distinct to me. It is small. No other aguacates of interest here.

The Citrus fruits are rather poor. There are oranges of several kinds, one large as a Navel but without navel mark. Also Ponderosa lemon, sweet lime, rough lemon, citron, and a fruit which Lemus thinks is a hybrid between the lime and the ~~lemon~~ orange.

Thursday Guatemala City Nov 2 1916

Purchased following aguacates for seed in the Mercaderes del Sur:

300 aguacates @ \$14	42
1600 aguacates @ \$14	224
100 @ \$14	14
	\$280
Cartage on above fruits	15
	\$295

Saturday Guatemala City Nov 4 1916

Purchased the following lots of aguacates in the market for seed:

150 (3 average) fruits	\$12
750 @ \$10	75
900 @ \$15	135
	222
Cartage on above fruits	17
	\$239

Later expenses on this shipment were:

Cartage of avocados refuse	\$34
19 packing cases @ \$6	54
Cartage on packing cases	12
Felipe's labor, 1 week	180
Cartage on shipment to RR station	12
Express Guatemala to Pto. Barrios	718
Cost of Aguacates	534
Freight to New Orleans	

Sunday Guatemala City Nov. 5 1916

The following items suggest themselves as necessary for a trip to Solala or Coban on horseback.

1. On my horse

roll behind saddle	Hammock	Canteen
	Fresada	Towels
in saddle bags	Montana universal	
	Mosquito net (at least for Alta Verapaz)	
	Sweater (for Solala and Tecpan)	
	Provisions - sardines, biscuits, butter, chocolate	
in saddle bags	necessary toilet articles.	
	This journal	

2. On Felipe's horse

Camera case, with extra films
tin mailing tubes for balsa wood
empty sacks for seeds
filter

It will also be necessary to allow space on this horse for carrying seeds and plant material collected on the trip.

32.50 seeds shipped, total sent 1/2
\$54.95 paid in

In considering the matter of fruit trees for the Presbyterian Mission School, which I discussed with Mr. W. B. Allison several days ago, it seems to me that we ought to have the following seedling stocks to work with. When they are ready to be budded, we can obtain budwood from California and Florida, as well as certain kinds, e.g. aguacate and cherimoya locally.

Aguacate seedlings
Cherimoya seedlings
Sour orange seedlings
Peach seedlings
Apple seedlings
Mangonilla seedlings

Monday Amatitlan, Guatemala Nov. 6, 1916

I came down here this morning to cut some more budwood from Avocado #3, Mrs. Fairchild having cabled that the budwood cut previously was not saved.

Amatitlan seems to me to be on the lower edge of the subtropical zone. The strictly tropical trees such as the *Coccoloba* and *Lucuma mammosa* are not grown here, but the mango and the papaya are very common.

Mango Some of the trees here are now in bloom I have seen none that was blooming heavily, however, there usually being a few panicles of flowers somewhere on the tree. Perhaps they are going to bloom more heavily later on.

Papaya The climate must be particularly favorable to the papaya, as there are a great many plants in the gardens of the town. They grow taller (but than anywhere else I have seen them. I have noted both green stemmed and purple stemmed varieties.

Cherry. This tree is fairly common here, and seems to me to serve as an indication that this town is in the subtropical zone.

Wakara. A few of the metasequoia trees (*Casimiroa abutilifolia*) which are so abundant in the town, are now coming into bloom.

Pine. This fruit is fairly common here, and I have quite seen some very large bushes.

There is a large tree of *Lucuma namensis* north of the railroad station. I saw one *Mammea americana* just above Lake Amabilis, but it was not a large tree and did not look very vigorous. There are at least a few trees of *Quercus mucronata* here. It is evident, therefore, that it is not too cold to permit the culture of the strictly tropical fruits, but the fact that they are not more common here seems to me to indicate that they are not altogether successful at this elevation. I have seen no *Caimitos* or *Sapodillas* here.

Coccoloba. In talking with one of the natives I was told that aguacates are overgrown mature and ready to be picked when the tree which is bearing them comes into bloom for the next season's crop. I have the same thing at Antigua. In view of the fact that we have not as yet found any reliable means of determining when the aguacate is ripe, this seems to be worth looking into at home. If we should find that the fruit has not reached its best at the time the tree comes into bloom, perhaps we can establish a definite period of time after the flowers appear before which the fruit should not be picked. We certainly need some reliable means of determining when the fruit is ready to be picked, as at present it is largely a matter of guesswork. This question is worth further investigation, to see if there are not other indications of ripeness as well.

Avocado. I visited this tree to cut some more budwood.
#3 None of the fruit has been packed as yet. The owner says she will pick them until the tree comes into bloom. We looked for bloom buds and found what looked like a few young ones.

The crop of fruit now on the tree certainly looks well. The fruits are large, of good form and attractive appearance.

The tree has much less foliage than it had when I last saw it.



Monday Guatemala City. Nov 13 1916

This morning I packed the shipment of avocado seeds which we have been preparing during the past week. The count was as follows.

	tallies	
Box #1.	111	300
" 2.	11	275
" 3.	111	300
" 4.	111	300
" 5.	111	300
6.	11	300
7.	11111	600
8.	11	300
9.	111	400
10.	1	175
		3250

These 10 cases were dispatched for Pto Barrera this afternoon, as encomiendas. It should go forward to New Orleans on Thursday the 16th, arriving New Orleans following Monday 20th. It ought to be in Washington by the 25th at the latest.

Tuesday En route to El Rancho Nov 14 1910
Guatemala

El Fiscal about 3800 ft elevation.

First mango trees seen just above the station. Mango seems to be fairly circumscribed up to this altitude, though the trees are not so large nor as numerous as lower down.

Agua Calientes about 2900 ft.

Very few fruit trees about. A few mango and other bananae.

Anacardium occidentale abundant just below here, at elevation of about 2500-2600 ft.

First avocado seen some distance below here, at elevation of 2300 ft. Tree was in bloom. *Mangifera americana* seen at same place.

First coconut at same place. Mangos becoming abundant and trees quite large. The size to which the mango tree attains seems to be dependent upon temperature to a remarkable extent. *Quercus mammosa* first seen a short distance farther down, - about half a mile above

Chile 2450 ft. Quite a number of fruit trees in the valley of the Rio de

las Platanos, just below this station.

From Chile the train follows the river for a short distance and then leaves its valley, ascending several hundred feet before reaching Samartia. Along the track between these two stations *Annona reticulata* is occasionally seen. It almost has the appearance of being indigenous. *Tecoma stans* is very common and is now in bloom.

El Progreso 1697 ft (RR level) is on a dry, sterile plain in the valley of the small stream just above the town. However, there are many cocoons, mangro, and some other fruit trees.

Tuesday El Rancho, Guatemala Nov 14 1911

This afternoon I went in search of the shrute. I obtained an Indian who said he knew where there were some trees, and with him for a guide, I crossed the Rio Motagua in a canoe and walked West for two or three miles, keeping within a short distance of the north bank of the river. The land was stony, eroded in many places, and scrubby except with arid-region vegetation, cacti, *Ipomoea*, a few leguminous shrubs and small trees, and short grass covering the ground. The soil appeared to be a mixture of sand and clay.

Finally we dropped down off the rocky land to the level of the river, where we found a narrow strip of fine moist sandy loam. I suppose alluvial in origin. On this strip there were many large fruit trees, the principal ones being the mango, the aguacate, the sapote (*Lucuma mammosa*), the chico (*Aschroa sepota*), the orange, the mamon (*Anacardium occidentale*), the coconut, and the maney (*Mammea americana*).

Shrute

After inquiring at several places, we finally found a shrute tree. It was standing about 40 or 50 feet from the river bank, the ground being some 6 or 8 feet above the present level of the river. The tree was a large one, probably between 50 and 60 feet high, erect and rather slender in habit, almost identical with the aguacates grown in this same region. The bark of this tree was rough, scarcely distinguishable from that of the aguacate, being of the same color as well. The leaves are longer than those of most aguacates, but similar in form. They are more heavily pubescent beneath than those of any aguacate with which I am familiar.

I looked for signs of flowers, but found none. The Indians had a very vague idea as to the time of flowering and fruiting, but finally decided that it ought to flower in February and ripen its fruit in June and July.

From the appearance of the tree I believe it must be very close to *Persea americana*. Of course it is difficult to

say anything definite without seeing the flowers, but the habit of the tree and the look, the shape and character of the leaves are so strongly suggestive of *P. americana* that the difference, however, that the pubescence on the lower surface is heavier.

I thought at first the tree looked like the apple which I found at Magdalena. But this may be a smooth redish leaved, and as I recall it now the leaves were very densely pubescent below.

The apple is highly esteemed by the people here. It must be classed among the cultivated fruits, as it is occasionally planted in gardens. I can not recall having seen a description of any species of *Persea* which would answer for the apple, hence I wonder if it is not an undescribed species.

The trees growing on the river bank above El Rancho, and there are many of them, all appear to be of the West Indian type. They are now coming into bloom.

Persea This interesting tree, which I first saw at Sanarate a few days ago, also grows here, though I saw only one specimen and it had neither flowers nor fruit. It was called Persea exclusively here, according to the man I talked to.

Persea This interesting tree, *Theobroma bicolor*, I believe, grows here in moist land on the river bank. I found two trees, both in fruit, and photographed one of them.

Persea This tree (*Lucuma mammosa*) seems to do very well here and grows to large size. I saw some good sized fruits as well.

Persea One of the trees I saw was coming into bloom, but not with a profusion of flowers, only a few.

Wednesday. El Rancho, Guatemala Nov. 15/99

This morning we left the village at 6.15, reached the river before the ferry was running; got across finally at 6.45, and struck out for San Agustín. The road led to the East and then to the North, passing over sterile hills until it descended into the small valley in which is situated the village of San Agustín, a larger place than El Rancho. We arrived at 10.00, and made the ascent time, then 5 min., coming back. I should judge the distance to be about $3\frac{1}{2}$ miles.

San Agustín is situated near a stream of considerable size, and there is another and smaller stream to the other side of the village. Along the East bank of the larger stream there is a rather broad zone of rich alluvial loam, which is cultivated in beans, corn, and other crops, and has in addition many large fruit trees on it.

The principal fruits grown here are the mango, the sapote (*Lacuna marmosa*), the chico (*Asclepias*), the aguacate, the manzano (*Mammea americana*), the cashew, the guanabá (*Alseodora*), and the coconut. The guinea is also grown, but not highly esteemed.

Thru

I had been told the tree was common in San Agustín, but I was only able to find one close to the village, and that was on the East side of the large stream, which we had to ford, there being no bridge. The owner of this tree told me that there were others farther upstream on the same bank, but he said there were not many trees near town; there were plenty in the mountains, about two leagues from town, up the valley of the stream.

The tree which I saw stood on low, level ground about 50 feet from the edge of the stream. It was so similar in habit of growth, character of bark and general appearance to an avocado of the West Indian type, of which there were many in the same vicinity, that one would scarcely have distinguished it on first sight, but on looking at the tree more closely, the larger size of the leaves and the ferruginous tomentum present on the young branchlets showed plainly that the tree was not an avocado.

This specimen was about 45 feet high, - smaller than the one seen yesterday, erect,

with ascending branches, and an open crown. The foliage is said to drop just before the flowers appear, the latter being accompanied by the new leaves.

The leaves are clustered at the ends of the young branchlets, but are not crowded. The blade is oblong-elliptic in form, 8 to 12 in. long, 4 to 7 in. broad, truncate at the base, slightly acute to shortly acuminate at the apex, bright green and glabrous above, glaucous and below, beneath heavily pubescent below, venation slightly cambric above, prominent below; petioles $1\frac{1}{2}$ to $1\frac{3}{4}$ in. long, narrowly lanceolate above, roundly pubescent, like the ends of the young branchlets and often the base on the lower surface of the leaf.

Flowers said here to appear about February, and fruit to come into season in May or June continuing until August. Seed said to be large and long, flesh thin but very oily and bland in flavor, almost white in color.

Thursday Finca Depacinto,
Guatemala

Nov 28 1916

After a four days journey from Guatemala City I arrived here last night. Leaving the City last Friday morning, I came down to Virginia and stopped there over night with Mr. G. M. Shaw, Guatemalan manager of the United Fruit Co. Saturday morning I took the train back to Quirigua (I believe) and visited the ruins near there, also seeing something of the U.F. Co's banana plantation. I took lunch at the U.F. Co's hospital with Dr. Neil P. McPhail, the physician in charge, and in the afternoon talked with Dr. McPhail concerning the possibility of budding some woodroses for him and also obtaining some fruit trees to plant on the hospital grounds. That evening I went down to Puerto Barrios, where I remained until 1 p.m. Sunday, when I boarded the mail steamer for Livingston. It was only a trip of $1\frac{1}{2}$ hrs. to the lower port, where I stopped all night with the Owens, and took the mail steamer up the Rio Dulce at 4 a.m. Monday, reaching Pango, the head of steamer navigation, at 7 that night. Here I went to the house of

Mr. H. W. Guthrie, Superintendent of the Territorial Survey, and remained there all day Tuesday, waiting to obtain some sort of an animal on which to ride to Bepocuta. I borrowed a pack mule and left Pango at midnight yesterday, arriving here about 8 a.m. After a ride of 50 miles through magnificent tropics forest most of the day, to reach here from Pango, North-east from Pango, ascending the mountains to an elevation of 4000 ft., crossing a divide and then descending to 3200 ft., which is the elevation at the place, according to my barometer, and the distance is 40 miles. Walter Chappin.

The buildings of the finca are situated in a fertile valley, with many Indian huts on all sides. This finca, which is the property of Kerott Chappin and Co., contains 800 Caballeros of Land (Caballero = 112 acres), employs 800 Indian laborers, and shipped more than 7000 quintals of coffee the past season (quintal = hundredweight).

Quekehe The Indian dialect spoken in this region is Quekehe. The following list of words may be compared with the similar list obtained in the Cashique language at La Antigua.

Words

Uno	hün
dos	hät'ib'
tres	ashib'
cuatro	kā'ib'
cinco	ō'ob'
seis	quakib'
siete	gürhüb'
ocho	gaashikib'
nueve	bē'lēb'
diez	lahib'
el Sol	sākē'
la Luna	pō
hombre	quink
mujer	ishk
muchacho	chirakal
muchacha	ishkal
perro	tzi
casa	kāp
pueblo	tenemet
camino	bēke

calor	tiuk
frío	hi
blanco	hap
dulce	hi
acido	marich
grande	nin
frecuente	baibai
volcan	
arbol	chik
rana	ruk
hoja	shik
fruta	rit
pebete	ishik
carra	chik
acido	hi
pal	stgam
flor	stgim
bueno	tic
malo	in ka us
agua	arini
olla	arini
cabeza	ho lum
ap	ti
chazo	ruk
mano	ruk
pie	ruk

piedra	päk
amarilla	k. an
colorado	käk
negro	kek
blanco	säk
duro	kao
suave	kün
fuego	sham
noche	kökin
dia	kütän
padre	shawá
madre	nä
hermano	gwao. witzin
hermana	gwänip
rio	trähä
agucate	oh
gusguil	chimá
maiz	ishim
sapote	saltá
chicosapote	müi
Cherriroja	tgumuy
A. reticulata	spak
wild Rubus	tokün

Coyo This interesting fruit (*Persea* sp.) of which Mr. Collins and others had told me, grows in abundance around the buildings here at the finca. When I examined some of the trees this morning I found much to my surprise that this tree is undoubtedly the same as the *chucte*, which I met on the *Manchito* to her last week.

At the corner of the veranda on the left side of the finca stands a very large tree of this species. It is about nearly 3 ft. in diameter and a large spread of branches. It is badly infested with lichens, bromeliads and other epiphytic growths, which give it an unhealthy appearance. This said that this tree produces Coyo of unusually good quality, however. This old tree has grown in the forest which formerly covered the ground, and when the clearing was made it was allowed to stand.

Numerous young coyos are growing

about the house and the beds of the *Indians*, having been planted to furnish fruit. On a walk down the road this morning I noticed many young trees along the roadside, which are spring up from seeds dropped by the natives.

There are plenty of agave trees growing about the finca, and they are now carrying fruits which appear to be nearly mature. From what I have seen up to the present, I do not believe there is anything particularly choice here. I have examined one or two ripe fruits; they were small in size, and had a large seed, but were of good flavor.

The agave seems to be perfectly at home in this region, for seeds thrown by the weevil sprout and develop into trees, a thing which I have not observed elsewhere in Guatemala as yet, nor in any other country. To my mind this indicates that the tree is perfectly suited

To this region. In the Indian dialect spoken here (Quickche) it is called Sh.

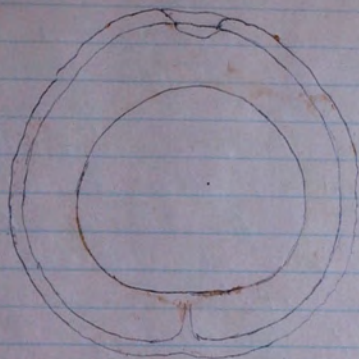
Sapote The tree sapote, *Incense marmosa*, grows wild in the forests of this region. I saw a number of large trees of the sapote from Pango up to today. Mr. Champney tells me that in clearing the forest for planting coffee they always leave the sapote as the Indians are very fond of the fruit. There were trees which I saw were laden with fruit which appeared to be 3 to 4 inches long.

Jobo A short distance above Pango I passed a tree which I think was the jobo, *Spondias* later. The ground beneath it was covered with oval yellow fruits about $1\frac{1}{4}$ - $1\frac{1}{2}$ inches long. Many of them had been trampled on and they emitted a very aromatic and rather agreeable odor.

The following temperature records have been obtained at Sepalcuti by Mr. Champney.

1910	Maximum	Minimum	Mean
Sept.	65	60	63
Oct.	64	54	61
Nov.	64	50	58
Dec.	62	48	55

1911	Maximum	Minimum	Mean
Jan.	61	51	56
Feb.	63	45	54
Mar.	61	48	55
April	65	53	59
May	65	56	62
June	66	62	64
July	65	59	63
Aug.	65	59	62
Sept.	65	58	63
Oct.	65	58	62
Nov.	66	51	61
Dec.	63	46	55



Agavecate from tree in Mr. Walter Chambers' garden. The skin is very thick and woody, and the seed is large in proportion to the size of the fruit. The surface is quite rough.



Another seedling, and a very inferior one. The skin was so woody and brittle it would not cut smoothly, but broke under the knife.

Will I have just been talking with one of the Aguar-femen here at the feria, - an intelligent ladino. I asked him if he knew where the aguacate was found wild, and he said that he thought not anywhere in this part of the country, but that he lived 3 days at Chichal, 2 days journey beyond Pochimil, and almost in the upper corner of Alta Verapaz, while there the Indians brought a lot of small aguacates into the village, and on his questioning them they said that they had found them in the mountains. They were small and had large seeds, but had the flavor of the aguacate and seemed to him to be true aguacates. He never saw more than this one lot, so the tree could not have been very common in the mountains.

I have already questioned a number of people here, and no one knows of any wild aguacates in the mountains of this immediate region. It looks as though the cultivated forms here, however, are in a much more primitive state than they are farther south, e.g., at Antigua.

Monday

Sepacuté, Guatemala

Nov. 27 1916



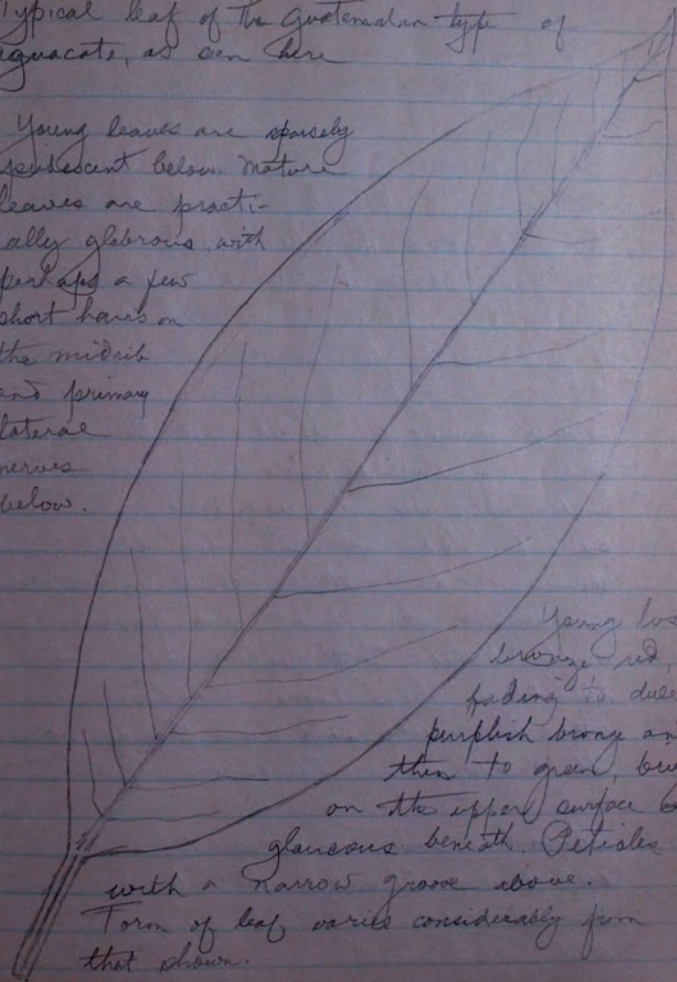
Outlines of two seedling aguacates grown near Sepacuté. Upper one called "aguacate de mico" - purple in color. Lower one green with very yellow flesh.



Another seedling avocado grown near here. The skin will be as stiff as my pocket knife, but breaks unceremoniously, and I had a hard time to get a sufficient branch fruit to take an outline from. The flesh was pale cream color, thin, green, and of rich flavor. I bought five of these fruits for \$1. Avocados seem to be rather high in price in this region considering their size and the great purifying power of a fruit. Mr. Thompson says there are a few trees here which produce fruits tending to become pyriform in shape, but almost all are round or nearly obround, and I believe this is the primitive shape.

Typical leaf of the Guatemalan type of avocado, as seen here

Young leaves are sparsely pubescent below. Mature leaves are practically glabrous, with perhaps a few short hairs on the midrib and primary lateral nerves below.



Young leaves bronze red, fading to dull purplish bronze and then to green, bright on the upper surface and glaucous beneath. Petioles with a narrow groove above. Form of leaf varies considerably from that shown.

Tuesday Sepacutl, Guatemala Nov 28 1916

The following are some of the plants of interest cultivated in Mr. Champney's garden.

Annona Chrysocarpa has called Tournefortii. I have not seen this in the Indians' gardens here at this time nor with the seed from Pango. Mr. Champney says that it will bear well here. He has one which has already borne a large crop of fruit last year.

Novel overcast. There are two times in the garden, one variety each and one about 3 ft high. They are bearing well. Mr. Champney says he does not care for the fruit and considers the native seedlings better, but I sampled one fruit and found it good, much better, I thought, than the ones raised in El Paraiso. It had more flavor than the latter, and more closely resembled the California product in color and quality.

Strawberries. These seem to do pretty well here, though the fruits sometimes do not open well because of wet weather. The plants came from the U. S.

Blackberries. Mr. Champney noticed the native blackberry which is common about here, and concluded that the cultivated blackberry should succeed also. He obtained plants of several varieties from Reasson in Florida. All the varieties but one were failures; this one has done remarkably well and yields large crops annually. He cannot remember what variety this is, but thinks that the catalog states it to be a variety of Florida. It is not the Mammoth blackberry, he says.

Yellow raspberry. The plant sent sent by Reasson as Rubus ellipticus is doing well here. It is now in flower. Mr. Champney says it bears well, but he does not consider its fruit of much value.

Eugenia uniflora is growing here, the first plant I have seen in Guatemala. It probably came from Reasson. The plant is about 8 ft high apparently rather old, and has recently produced a few flowers.

Lemon are grown here, but are thick and even-skinned. The quality does not seem very good.

Camellia japonica seems to do well. There is a large plant 8 or 9 ft high in front of the old house.

Psidium cattleianum is doing well, and Mrs. Champney thinks it is a fine thing.

Figs start off well. Mr. Champney says he said to get a lot to see and do not last long.

Guava do very well. *Reasoner's guinea* and *some* are good. *Boston* makes fine sauce.

Psidium sp. sent out by Reasoner is *orach* is doing finely. Plants 12 ft high, full of ripe fruit.

The fruit is deep yellow globose, diameter as shown. Flavor said, suggestive of guava, scarcely any of the guava mawkiness.



I have not seen the *matsano* nor the *peate* in this vicinity. There is a single mango tree in Mr. Champney's garden about 15 ft high, and decidedly unhealthy in appearance.

Cordia This tree is very common around the fences. It seems, like its relative the *avacato*, to spring up wherever a seed is dropped. It can hardly be considered a cultivated tree.

Amore Chermole. Mr. Walter Champney says that this tree seems to be *cherry* liked here, and that it bears much more fruit when young than when it commences to get old. There is a young tree in the garden here which he says was so full of fruit last year that the branches were bent down and the tree almost pulled out of the ground. He thinks the seedling began to bear at 3 years of age, and he considers a 15 yr old tree too old to bear much fruit.

Wednesday Defamite, Guatemala Nov 29 1916

To company with Mr. Kenneth Champney, I rode today to Defamite and Denahin. Mr. Champney knew of a large coyote tree near the old house at Defamite and wanted to show it to me, but when we got there we found that the tree had been cut down. He said it is the only one left. He has seen several others.

Two species of *Acacia*, a sizable range with a variety of *Albizia* and well stocked trees. Here I noted the following trees: *Mangifera indica* and the small *Clusia* with the large one an entire fruit tree. *Albizia* is the most abundant.

Amara (Chrysomelid) Abundant on the ground but the leaves left over in fruit. Mr. Champney thinks it appears in July. I saw quite a few trees in gardens between Defamite and Denahin.

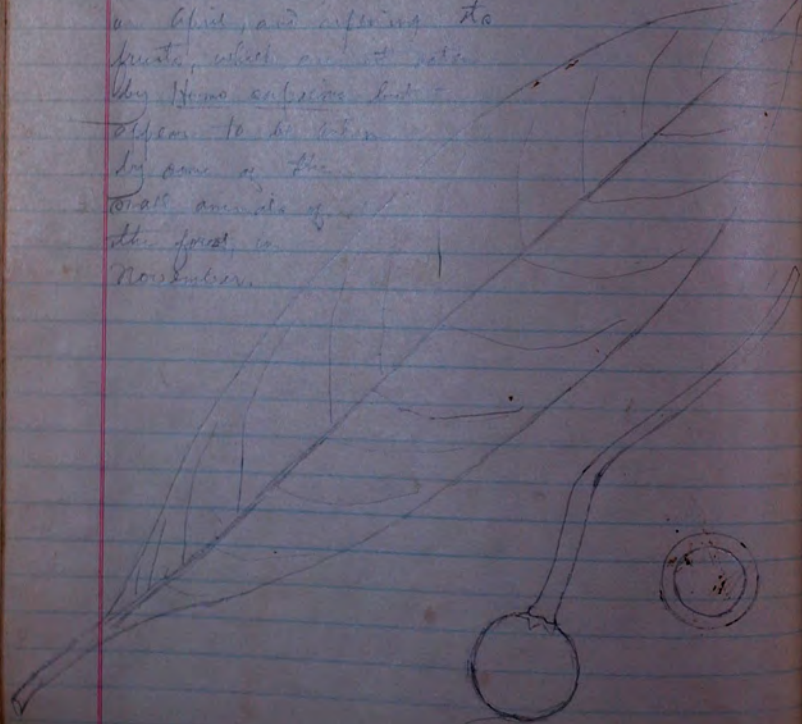
Catena (Inga sp.) The species given here is not the same as the one common in the lowlands West of Guatemala City. This one has small leaves, the rachis not winged. Mr. Champney says there are several wild species common here.

Injerito (*Archadelphe vinosa*) Mr. Champney says the Indians here call this *injerto* (Spanish orthography *injerto*). There are many crosses large like in Denahin, now loaded with green fruits.

Agave Abundant on the mountain and we also saw many trees growing in the lowlands. Had been dropped along the roadside. In the small mountain valleys many of the trees were loaded with small fruits. The curious thing to me about the vegetation of this region is the fact that the fruits are nearly all of the same shape, round or slightly oblate. No large ones were seen and only one or two tending to be more elongate. It seems to me that the trees produce most of their crop in the tops of the trees, few or no fruits being borne on the lower branches. Mr. Champney does not know about the habit of inflorescence in alternate years, but there are plenty of trees with out fruits this season, and it looks to me as if the habit may be the same here as in Antigua. The fruits here are all too small to be worth propagating. The season is October to February.

Thursday Depacanti, Guatemala Nov. 30 194

Tharboqueing Day in the United States of America
 Yesterday a Guatemalan name Lich-martin brought in
 some fruit of the Oh-chel oak (white Oh-chel), a
 species of *Persea* found in the mountains a few miles
 east of the town in the pine. It is a large forest
 tree, said to bloom in March
 or April, and referring to
 fruits, which are not eaten
 by *Homo sapiens* but
 appear to be eaten
 by some of the
 small animals of
 the forest, in
 November.



Branchlets, rather slender, glabrous, pale
 green, the leaves not crowded toward the
 outer ends. Leaf blades lanceolate, 4 to 5 ins long,
 $1\frac{1}{2}$ to $2\frac{1}{4}$ ins broad, cuneate at the base, long-acute
 to acuminate at the apex, rigidly coriaceous,
 glabrous, bright green and almost glossy, with
 the transverse vein slightly impressed above, light
 green, with the venation raised below; petioles
 slender, $\frac{1}{2}$ to 1 in long, glabrous, terete, flattened on
 the upper surface near the articulation with the rachis.

Fruits produced singly or in clusters of 2-5,
 upon peduncles 3 to 4 ins long, sessile for a distance of
 1 inch above the fruit. Calyx persistent, the sepals
 acute, slightly more than $\frac{1}{8}$ in long. Drupe globose,
 $\frac{3}{8}$ inch in diameter, glossy black when ripe, the
 surface smooth, thin skin but tough and leath-
 ery, peeling from the pale green highly aromatic flesh,
 which has a strong resinous taste. Seed over $\frac{1}{2}$ inch
 in diameter, hard, round, with thin brittle
 seed coats adhering closely to the whitish coty-
 ledons. Embryo a bare set of cotyledons.

The cotyledons, on being cut, turn black at once
 over the exposed region.

Aneroid Barometer readings at the
Hotel Rojas, Antigua Guatemala.

Oct 18 1916	7 am	24.88
	5 pm	24.84
19	7 am	24.92
	5 pm	24.84
20	7 am	24.93
	5 pm	24.82
21	7 am	24.90
	5 pm	24.80
22	7 am	24.90
	5 pm	24.83
25	7 am	24.90
	5 pm	24.84
26	7 am	24.90
	5 pm	24.80
27	7 am	24.90
	5 pm	24.80

Aneroid Barometer readings. United Fruit
Company's building, Guatemala City.

Sept 7 1916	7 a.m.	25.13
" 8	7 a.m.	25.08
" "	12 m.	25.09
" "	6.30 p.m.	25.04
" 9	7 a.m.	25.05
" "	7 p.m.	25.03
" "	8 p.m.	25.02
" 10	7 a.m.	25.06
" "	12 m.	25.05
" "	5.30 p.m.	24.98
" 11	7 a.m.	25.06
" "	12 m.	25.05
" "	5.30 p.m.	24.95
" 15	8 a.m.	25.05
" "	1 p.m.	25.00
" "	5.15 p.m.	24.99
" 16	7 a.m.	25.05
" "	1 p.m.	25.02
" "	5 p.m.	25.00
" 17	7 a.m.	25.10
" "	1.30 p.m.	25.03
" "	7.30 p.m.	25.04

Sept 18 1916	7 a.m.	25.08
" "	1.30 p.m.	25.02
" "	6.30 p.m.	25.00
" 19	7 a.m.	25.03
" "	1 p.m.	24.99
" "	7.30 p.m.	25.00
" 20	7 a.m.	25.04

Corypha (Persia sp.)

Brought in by Ish-ma-kim.

Young branchlets marked
with short, dense, purple
streaks, and heavily
ferruginous-pubescent.

Leaf-blades
obovate-lanceolate

to lanceolate

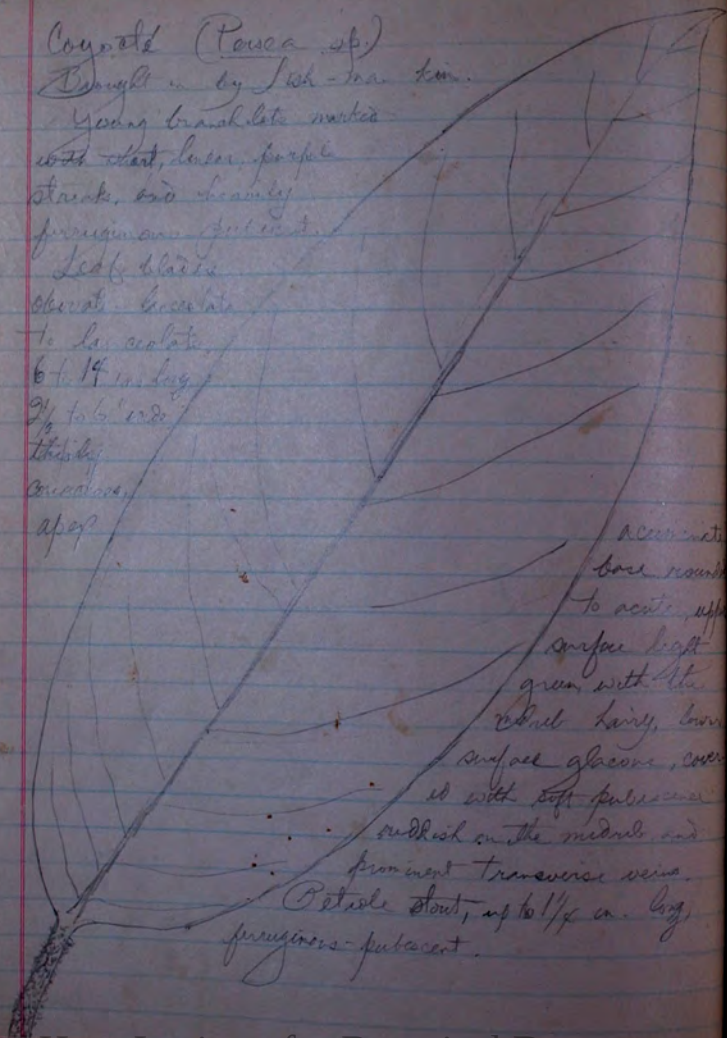
6 to 14 in. long

2 1/2 to 6 in. wide

thickly

concolorous

apex



acuminate

base rounded

to acute, upper

surface light

green with the

under hairy, lower

surface glaucous, covered

with soft pubescence

reddish on the midrib and

prominent transverse veins.

Petiole stout, up to 1 1/2 in. long,

ferruginous-pubescent.

Corypha (Persia sp.)

From tree in front of mess house. Dependent.

Young branchlets

short and stout, heavily

ferruginous-pubescent.

Less crowded towards

ends of branchlets

Leaf-blades

oblong-oval

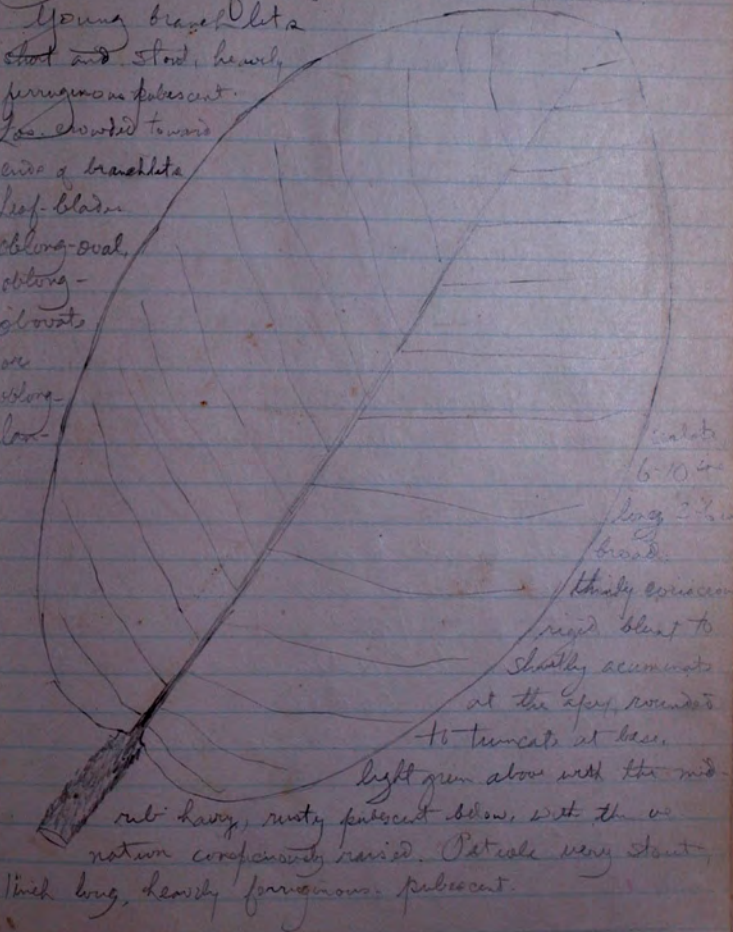
oblong-

obovate

or

oblong-

long



ovate

6-10 in.

long 2 1/2 in.

wide

thickly coriaceous

rigid, blunt to

sharply acuminate

at the apex, rounded

to truncate at base.

light green above with the mid-

rib hairy, rusty pubescent below, with the ve-

nation conspicuously raised. Petiole very stout,

thick long, heavily ferruginous-pubescent.

Encabezamientos de cartas:

Mi querido señor (señora).

Queridísimo hermano

Muy señor mío:

Señor mío (no teniendo confianza)

Señor mío y amigo.

No 73 npt

Final de carta.

Soy con el más profundo, señores, con
mis respetuosos saludos, que le (may de dignidad, etc.)
Reciba V. a la vez, y admitir la seguridad
de mi alta consideración, o de mi consideración
más distinguida.

Tengo el gusto de ser a muy obediente servidor.

Reciba V. la seguridad de mi respetuosos
afecto (más familiar)

Soy, con los sentimientos más distinguidos,
su afectuoso servidor.

Reciba V. mis afectuosos saludos

Soy todo de V.

Doy a V. la mano.

Los hermanos que te abraza con todo el alma

Que le estrecha la mano. q. l. e. l. m.

Que besa sus pies (hombre a señora)

VOL. II, GUATEMALAN EXPLORATIONS

Wilson Papenoe

United States Department
of Agriculture

Washington DC.

EE. UU.

Wednesday Panaj, Guatemala

Dec 6 1910

I reached here last night, coming over from Sepacuité in 7 1/2 hrs. I got off a package of birdseed to Washington containing *Caryo* No. 73 *Persea* sp. "*Coyo*", from a large tree standing also in the woods of the reserve at the foot of Cerro Sepacuité.

In fruit from different trees of the kind as well as from different in quality. Mr. Kenneth Champney, who has doubtless tested a great many specimens, says this is the best he has seen.

It was not possible to get good birdseed from this tree, as it is old covered with lichens, moss, algae, orchids, ferns, and tillandsias, and is making practically no vigorous young growth suitable for birdseed. The tree is one which lives in the forest which originally occupied this ground, and when the timber was cut, to make room for the fence this tree was left standing. There are now quite a number of young *Coyos* nearby, which live spring up from dropped seeds. Mr. Champney prefers the *Coyo* to the *aguate*.

Mr. Champney told me he thought the *Coyo* and the *Coyote* were distinct. I looked into this matter carefully and have reached the conclusion that they are one species, but that the name *Coyote* is applied only to trees growing naturally in the forest (*Coyote* means *Coyo*-tree) while *Coyo* is applied to those which grow in disjuncts, and are therefore somewhat cultivated. I have seen a number of trees in the state and many in cultivation, and there seem to be no differences in general foliage. Mr. Champney thinks the fruit of the *Coyo* is more elongated than that of the *Coyote*.

Undoubtedly the *Coyo* is the same tree known at El Rancho and I name by the name of *shute* or *Chute*.

Mr. Champney says it blossoms here in March, the fruit ripening in August. I believe this species may be worthy of attention in the United States as a fruit. It is said to be rather "stringy" but of fine flavor, quite distinct from the *aguate*. It might easily be improved in cultivation.

To On Friday last, in company with Mr. Whalen, Walter D. Champney, I rode to Cahabón, a distance of about 20 miles, 7 to 8 hours on horseback.

After leaving Sepacuité we ascended nearly a thousand feet and crossed over a divide, dipping gradually to 850 feet, where we reached a good sized stream ascending to Sepacuité. One of Mr. Champney's friends, an elevation of about 1550 ft. We then began a long descent, ending where we reached the Cahabón river, at 400 ft. We crossed the river in a canoe, saw the animals and went over a large hill to Cahabón, which according to my barometer is at an elevation of 550 ft.

I spent two days here with Mr. Walter F. Champney, a correspondent of ours. I had come to Cahabón in the hope of finding the wild aguacate, which I had been assured by several natives was to be found in the forest near Cahabón, but it proved to be a myth, as experienced men, who had spent most of their lives in the mountains, knew nothing of it.

There are very few aguacates grown in Cahabón. I found a few trees of the West Indian type, but they were not in flower or fruit. I also found a few of the Guatemalan type, but they also were without flowers or fruit.

There are a few trees of an interesting Annona growing in the town. It is a species unknown to me, which I saw growing along the bank of the Rio Cahabón.

Other than these things, there is very little of interest in Cahabón.

Psidium molle is common on the hills between Cahabón and Sepacuité, at elevations of 500 to 2000 ft or thereabouts. I grow chiefly on the open hillside and among sparse scrub, reaching a height of 6 ft in favorable places. This does not seem to be the season for its fruit, but I saw a few green ones. Mr. Walter Champney thinks it usually bears heavily, but I did not feel sure about this.

Sunday Tactic, Guatemala Dec 10 1912

I left the Finca Chajel at about 9.30 this morning, accompanied by Victor, an Indian boy, who was to serve as guide and carry my baggage. The latter was belatedly shown the front of his saddle, and he was placed with one hand, while the other held the reins with the other. The guide between Chajel and the Finca Chajel, and then to the Finca Chajel, taking the shorter cut via the Finca Chajel. The road was very rough (1600 ft) and it was very hard to ride, and took the cut road across the Palochia river. We passed the Finca Chajel (3350 ft) about the middle of the afternoon, and kept on ascending the Finca Chajel until it became nearly a level, when we passed over a divide at about 5300 ft and then followed down a small valley, in which flows the stream which flows down becomes the Rio Chajel. We got to Tactic (4750 ft) at 5.30, just as the sun was going down. I found very comfortable quarters here in the Hotel La Fama.

all the way up the Palochia valley from Tactic the *coyo* grows abundantly, - much more so than I have yet seen it in any other place. I saw it at the highest point on the divide we crossed this afternoon, as I know it grows as high as 5300 ft.

Upon arriving in Tactic, I found one fruit on sale in the plaza. It was a rather sorry specimen, the neck having been cut off and some holes eaten in one side, but as I found no others in town and knew that the season had gone by and I might not see another one, I bought it.

On first sight I took it for an *agave*, and inquired of the old woman who had it for sale "¿de donde vino este agave?" to which she replied "no es agave, es *coyo*". Apparently the name here is not *coyo* but *coyo*, as I inquired of other people and found it was always called thus. The price asked for the one I bought was 1 real, about 1/4 of a cent.



The form of the ovary is elongated pyriform, tapering toward the apex, where the fruit terminates in a sharp point about $\frac{1}{4}$ inch long, the surface of the fruit being depressed to the dorsal side of the base of this tip. The surface is finely pitted, light green in color, strongly resembling many avocados of the West Indian type, but slightly rougher

than the average. The skin is more than $\frac{1}{16}$ inch thick throughout, and nearly $\frac{1}{8}$ inch on the lower part of the dorsal surface. In texture it is leathery and pliable, of the same degree of toughness as the skin of the average West Indian avocado, and it can readily be peeled away from the flesh. The flesh is of a pecan color, brownish white, not changing the tint toward the skin, but of the same shade throughout. The texture is about as firm as that of the average West Indian avocado, but not as fine-grained; tough fibers extend through the flesh, and when squeezed it gives out a thick, milky juice. The flavor strongly resembles that of a rich avocado, but has a distinct nutty character which suggests to me the flavor of the meat of *Persea* species. It is decidedly agreeable, and were it not for the fibers in the flesh the quality would, to my mind, be superior to that of most avocados. The amount of flesh is quite satisfactory, in spite of the fact that the seed is large. The flesh adheres closely to the seed, which is elliptic-conical in form, pointed at

both ends, about $3\frac{1}{2}$ inches long, with the seed coats rather thick and both adhering more or less closely.

Indians for the imperfect specimens the young ones weigh 16 to 20 gms.

It seems to me the coy's may be of value in connection with the development of the rubber industry. If I shall be able to eliminate the objectionable parts I believe it would be a valuable fruit.

The fruit is entirely to the West Indian. A seed of avocado suggests a further study as to its characteristics, with a view to determining if there can possibly be any relationship between the two.

Monday Tactic, Guatemala Dec 11/1916

At sunrise this morning the temperature was 48° F. Judging from the character of the vegetation here, this spot is much colder than most others of the same elevation in Guatemala.

Matias Acevedo, proprietor of the lot, has a fine bed of strawberries planted in straight rows on ridges and well cared for. He says the plants he originally obtained here were for several years, but runners which he has taken from them and planted have not borne well for the last two seasons. He has a fine fig tree which he says he grew from a fruit of large size and good quality, but the fruit is inferior, and small in size. The peach grows to larger size here, and looks much better than anywhere else I have seen it in this country. *Camellia japonica* is also very successful; there are some fine shrubs of a large pink variety in the village. Avocados are abundant, but Don Matias says April is the principal season for them. The Chirimoya tree is abundant, but I saw none in fruit, though there were a few fruits on sale in the tiendas. The pink tree *Dahlia* is now in its glory here.

Monday, Coban, Guatemala Dec 11, 1910

We left Tactic just as the clock was striking 9, and arrived here at 2 p.m.

After leaving Tactic we followed down the valley to the coast for 3 or 4 miles, for all this distance due north. It was one of the finest psidium I have seen in Guatemala. It was a tree between the hills covered with liquidambar (?) with foliage of a similar but more different color than that seen in the Tropics. The cotton of the psidium was especially fine, notably fine and white for fruit culture. I believe many of the temperate fruits would do well here. Much of the land is now given over to cornfields. I saw a lot of corn of the year's crop at the hotel; it was a white flint race, the ears sometimes quite large.

About 11 we passed the village of Santa Cruz (4200 ft) where I saw a few fruits on a coyo tree. Apparently it ripens much later at this elevation than it does in the lowlands, just the same as the agave. I do not believe many coyo trees bear fruit, at least not regularly.

The sour guava, Psidium molle, was very common all the way between Tactic and Coban. Some of the finest specimens I saw were just below Tactic. They were shapely shrubs, about 10 ft high, often with a single, slender trunk. This fruit was called Chamach in Quiché, according to Victor while the common P. guajava is called pata.

Coban (4350 ft) was rather a surprise to me. It is a smaller town than I had anticipated, situated in a hilly region, and thinly spread over several small hills. The government buildings are large and rather imposing, but beyond these there are not many large structures except a few stores and houses belonging to Germans. Among the things which attracted my attention on first walk, my about the place were the pacaya palms, which are very abundant here, the Camellias, and the loguet trees. Although higher, the place does not appear to have as cold a climate as Tactic. Its appearance is not tropical, however.

Aguate Mr. R.W. Hempstead of Chetel tells me that he is informed by one of the men that the oil is expressed from the aguate in the following manner:

The fruit is allowed to become slightly over-ripe, as it is very soft. The pulp is then placed in a cloth bag and is pressed in a fire, without the addition of any water, for two hours. The oil is then pressed out of the bag and placed in another cloth bag. The bags are then pressed and the oil is expressed.

This oil is said to be used for lubricating machinery and is said to be of exceptionally fine quality for this purpose. The man who described the method had never used the oil for any culinary purpose, but said it was clean, smooth, and of a bland taste.

11
Tuesday Coban, Guatemala Dec. 12 1916

This morning I went out with Don Francisco Archila to look for aguacates. We found that most of the trees about town were either devoid of fruit or were carrying only a few. On a few trees which we saw had good crops, but it is a bad aguacate year, beyond a doubt. Don Francisco thinks it is merely an "off year" and does not know how to account for it, though he says it may have been too wet. He says there is a belief among the Indians that years when the corn crop is good the aguacate crop is poor, and *vice versa*.

From what I have seen I believe that the aguacates of this region are, as a whole, of particularly good quality, meaning by this size of fruit and seed, as well as flavor, and they are considerably superior to those of Sanahuil and the region around Depacutit. Most of them are round, a few pear shaped, and there are very few in the market yet. Don Francisco says the principal season here is from January to April. The fruits are selling in the market now at 1 real each.

Coyé I found 6 coyés in the market today, and bought them all. Most of them were small and rather malformed; it is too late in the season for really good ones.



From what little I have been able to see of the coyé it is evident that it, like the aguacate, is quite variable though it may not attain to the extremes of form seen in the aguacate. Some coyés are elongated pyriform—long and slender; others are broadly pyriform without a distinct neck. The commonest form seems to be pyriform with a short but fairly well defined neck.

The size varies from half a pound up to a pound and a half or even more, —

are full of very large ones, weighing 3 lbs, but it is necessary to be cautious in accepting such stories.

There is a slight cavity at the base of the fruit where the stem is inserted (usually slightly to one side of the center of the fruit), and to one side of this rounded apex is a depression, which is a less prominent point just above the base.

The surface is sometimes as smooth as that of an avocado, but more often rough, and sometimes quite rough. In color it is light yellowish green, occasionally tinged with pinkish brown, and marked with very numerous small dark spots.

The skin is exceedingly thick, though it usually varies greatly in thickness over different parts of the same fruit. Its minimum thickness is about 1/4 inch, its maximum about 1/2 inch. In texture it is leathery and fleshy, resembling the skin of the West Indian type of avocado, and peeling readily from the flesh when the fruit is fully ripe.

The flesh in the green fruit is dull creamy white; as the fruit ripens it becomes brownish white or very pale brown of a very

peculiar shade. Its texture is similar to that of an avocado, except that it is slightly coarser, and when squeezed it yields a thick, milky juice. Numerous fibers pass through the flesh from the stem to the base of the seed. They are rather tough and objectionable when the fruit is eaten.

The flavor of the flesh bears a strong resemblance to that of a rich avocado, but is even richer, and has a nutty character all its own, which suggests to me the meat of a ripe coconut. In my opinion it is superior in flavor to the avocado.

The seed is rather large in comparison with the average avocado seed, yet it varies greatly, and is sometimes little larger, proportionately, than in a good avocado. In form it varies from round to ellipsoid-conic, according to the shape of the fruit. The seed exerts very greatly in thickness but adheres closely to the cotyledons, and the flesh sometimes adheres to the outer one. The cotyledons, when cut, are dull pink in color, and the embryo is placed as in the avocado. The cotyledons are finely rough on the surface.

Seed should be planted on its side.

Avocado *with yards of Filadelfo Pineda*
8 *Calle de San Marcos, Cobán*

Tree 3 years
old, trunk 18"
thick, spreading
dense crown
40 ft. broad.
Said to be
very healthy
in good season



Form obovoid, tending to become pyriform,
slightly oblique; size above medium, weight 15 grs.
greatest length $4\frac{7}{8}$ in, breadth $3\frac{3}{8}$ in; base
rounded, the stem inserted obliquely without
depression; apex rounded; surface slightly rough,
deep green in color, with few small yellowish
dots; skin moderately thick, $\frac{1}{8}$ inch or slightly

more, coarsely granular and woody; flesh abundant,
deep yellow in color, changing to greenish close
to the skin, said to be of unusually rich flavor,
quality probably excellent, seed rather small in
comparison to the size of the fruit, rounded
oblate, $1\frac{1}{2}$ in long, $1\frac{3}{8}$ in broad, with both
seed coats adhering closely, and fitting tightly in
the seed cavity. Season at Cobán said to
be January to April.

R. W. Hempstead brought this tree to my
attention, saying it was the finest avo-
cate he had seen in Cobán. The tree
is large but is only bearing a few fruits
this season.

Elevations on Ferrocarril Terapay

Panajol	50 ft (waterside)
Rosario	150
Telemán	
La Tinta	350
Papalaja	475
Panajolche	650

Pandium Young branchlets 4-angled; new growth
more heavily pubescent than in *Pandium*
guianense and other species commonly 1-
flowered instead of 3-flowered.



nat. size



nat. size

The fruit has a thin
green or flesh outside the seed cavity. It
is usually found in *P. guianense*, and the
seeds are very numerous though slightly smaller
than in the latter species.

Testing Mr. G. M. Jones, manager of the Chatemian
Avocado Division, United Fruit Co., told me some
time ago that the way he tested avocados
Ripeness was to peel them. If a section of the skin
peeled off readily, the fruit was ripe and
good. It may be the skin does not peel
from fruit picked prematurely. I shall make a
test to find out.

I noted the following plants in the small
park in the center of Coban:

Eriobotrya japonica. Nispero del Japon. Several
rows of trees, apparently in splendid condition. The
cool, moist climate of this region seems to suit them
true admirably. I believe it is similar to some
of the warmer parts of southern Japan.

Jacaranda mimosaefolia. Jacaranda. Two
slender trees, not particularly thrifty.

Camellia japonica. Camellia. One of
the finest ornamental shrubs in Coban, and
apparently perfectly at home here. There are
several varieties, the commonest being a double
pink variegated with white, and a pure pink.
Joh. D. Seibold says the white variety does
not do well here.

Rosa. Rose. Common horticultural rose.

Linum Terasissimum.

Yucca sp.

Dracaena sp.

Dris germanica.

Erythrina sp. Shrub 15 ft. high

Montbretia crocosmaefolia

Abies rosea americana

Brugmansia arborea

- Pelargonium graveolens*
Mangifera indica - young tree about 6 ft.
 high does not look promising.
B. nifida glauca calycosum
Passiflora hispida - young plant 6 ft.
Grevillea robusta 9 ft high.
Asclepias tuberosa - native azalea.
Agave or *Funaria* sp.
Passiflora hispida
Dianthus barbatus 10 ft high
Jasminum officinale
Citrus sp. mostly soon orange
Sporobolus fruticosus 1 tree, 7 ft high
Passiflora guianensis
Lonicera (cf. *L. chrysantha*) honeysuckle.
Urtica dioica
Hydrangea arborescens - not healthy
Aspidistra foetida (?) sword fern
Liquidambar styraciflua (?)
Juniperus sp. - one tree of the *cypripedium*
 common at Guatemala City.
Tradescantia virginiana
Gardenia florida - does fairly well here.
Annona cherimola - 4 ft high
 Two or three other plants not determined.

Cherimoya The Cherimoya tree is common here, but I have seen very few fruits on any of the trees - almost none, in fact. There are a few cherimoyas in the market, and I bought a fine one today for \$1. It was conical with a rounded tip, the surface almost smooth, - slightly "finger-printed". It was in condition for eating and I found it delicious, though having a few more seeds than some other good ones I have eaten.

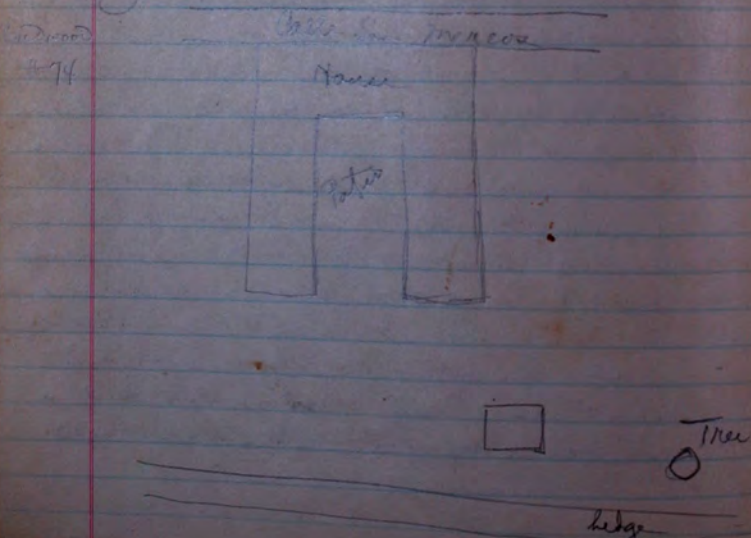
The trees do not look so thrifty here as they do about Antigua, and I am inclined to believe that the moist climate is not so favorable to their growth as the drier climate of Antigua.

The Cherimoya is certainly one of the most delicious fruits of tropical America. If those persons who complain that all tropical fruits are marshy and insipid could taste such a Cherimoya as I have just eaten they would be forced to change their opinion, and admit that the Cherimoya, at least, is as delicious a fruit as any produced in the temperate zone.

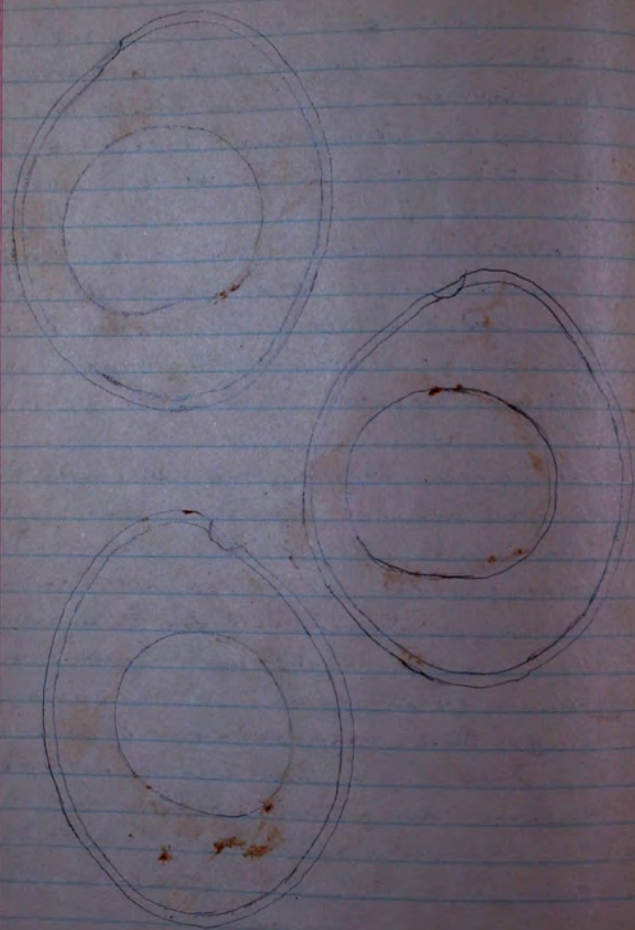
Wednesday Coban, Guatemala Dec 13 1916

Doctor says the alamash (*Psidium nelly*) is not sold here in the market here, and the people here eat it, the flavor being too like the guayaba. He says the alamash is practically all seed, and says the people here use it, but it is not as good.

8 Plan showing location of Avocado
garden in Coban, Pineda, Coban



This afternoon I went to the house of Dona Inez Dieseldorff to get budwood of one of the aguacates selected by Mr. Cook two years ago. He cut buds from two trees, which, if I remember rightly, he called Dieseldorff No. 1 and No. 2. Dona Inez said that one of these trees was much better than the other, so I decided to cut buds from the best one - the largest tree in her yard, standing farthest to the west. On examining the fruits however, I decided that the variety was not satisfactory and discarded the budwood. The fruit is undoubtedly of excellent flavor and very thick-skinned, but it is of an attractive shape, and most important of all the seed is too large. I feel confident that the variety would not meet with the approval of avocado growers in the U.S. On the following page are outlines of some of the fruits. They are scarcely mature yet, but appear to be nearly full-grown. The flesh is of a good yellowish color, like the variety obtained in Pineda's yard here.



I gathered about 3 pinto of papaya seeds, some from the ground under the palms, some from the racemes on the plants. Some of the fruits had not yet turned black, but all seemed to be hard and mature when I cut into them.

Doña Inez gave me 3 guisquiles of a variety she considers the best of all. It is rather large, short and broad, green, with short soft spines on it. She says the pale green smooth ones have no flavor.

Doña Inez says the cogon is usually eaten by the Indians with tortillas and chile. Some times with the addition of salt. The Europeans and Americans do not "take to it" because of its stingingness, and she thinks the flesh is of very unappetizing appearance, because of its color.

The cogon is undoubtedly very popular with the Indians. The name here is sometimes pronounced cogon and sometimes keigo.

Thursday San Cristobal Verapaz, Guatemala Dec. 14, 1916

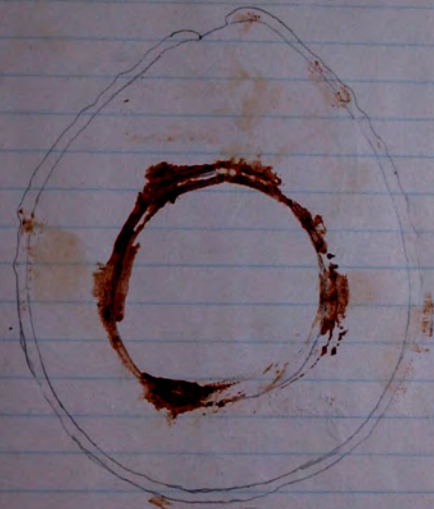
We left Cobán at 7 this morning and got here about 10:30. The road was very bad in some places and we could not travel rapidly.

San Cristobal is a town of probably two or three thousand inhabitants, and the trading center for a large part of the surrounding country. It has a number of general store houses, with inferior goods, but no hotel or cafe. Don Placido, who accommodated me in a room back of his house, and sent over my mail from San Cristobal house.

The place is a busy place this morning, as Wednesdays and Sundays are market days. There were no avocados on sale, but Staffords found some in the tienda. There were I could brought into the market, and I bought them at 1 real each.

The elevation here is 4650 feet, somewhat higher than Cobán. There are many more trees in the town than in Cobán, the aguacates being especially prominent and abundant. There is lots of fruit on the trees but it is not quite ripe yet.

Tree in capital of Vicente Caal



This and the following tracings represent fruits examined in San Cristobal.

It seems to me the aguacates here have considerably thicker skins, on an average, than those of Antigua.

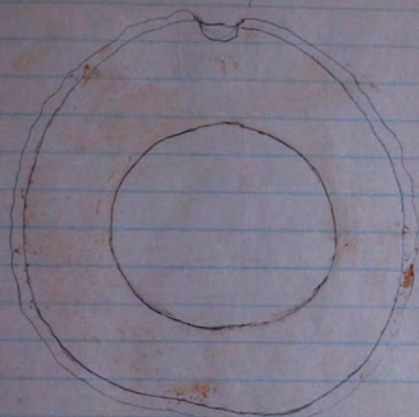
February is said to be the height of the season in this part of the country. There is a good crop in San Cristobal this season, a marked contrast to Cobán.



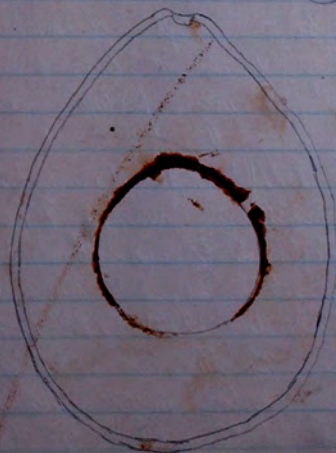
Tree # 2 Capital of Quinto Caal.



Tree in edge of town on road to Cobán



Tree in Capital, below Cobán road, edge of town



Avocado # 9 Budwood # 75.

Avocado

19

Baked

1/5

House

The grounds of an Indian in SW part of town, who refused to give his name.

Tree about 40 ft high, with equal spread. Trunk 2 ft thick at base, branched 15 ft from ground. A very prolific fruiter. Many fruits have already fallen.

Fruit ellipsoid pyriform, not distinctly necked, size below medium; weight 8 to 9 oz, length 3 1/2 in, breadth 2 3/4 in, base narrow, pointed. The stem inserted almost squarely, without depression, apex obliquely flattened though not conspicuously so. Surface nearly smooth, bright green in color, with numerous minute yellowish dots; skin 1/16 to nearly 1/8 inch thick, coarsely granular and woody, brittle;

flesh cream color, tinged with pale green near the skin, free from fiber, of smooth, firm texture; flavor nutty, agreeable, not so oily as in some of the later varieties; quality good; seed small in comparison to size of fruit, broadly elliptic to spherical, weight 1 oz, tight in the cavity, with both seed coats rather thin and adhering closely to the smooth cotyledone. Season commencing in November (?) and probably lasting until March at San Cristobal.

This is a first class little fruit - about the right size to serve a half pint as a portion, and has the advantage of being considerably earlier, apparently, than the majority of avocados here at San Cristobal. Like most of the small-fruited varieties, the tree is a tremendous producer.





Tree in SW part of town on bank of small stream



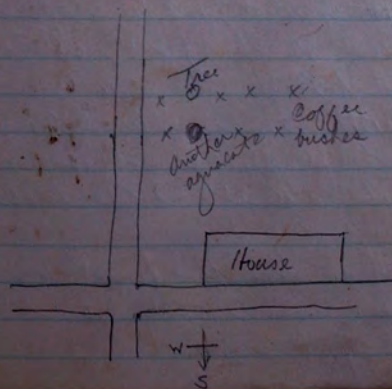
Tree on Calle Real in town

Locale #10 In yard of Diego Muns, in SW part of town

reduced #76



See also fig 40



Tree about 3 ft high, with trunk 8" thick. Probably not more than 8 or 10 yrs old. Bearing a good crop, answering that it is crowded in among other trees.

Leaf broadly oval, slightly oblique; size very large; width 3 1/2 ins, length 4 1/2 ins, broadest 1/2 in. base broadly flattened, the stem inserted into a deep basin; apex obviously flattened, slightly depressed around the ligament point, surface smooth or rather rough, deep green on both sides, with numerous rather large, reddish-brown spots 1/16 inch thick, slightly thicker over the surface of the fruit, coarsely granular and more or less of an unusually rich yellow color, changing to pale green over the stem, free from felt sides of fruit together; flavor ~~very~~ very rich quality, ~~very~~ ^{very} sweet, and very small in proportion to the size of the fruit, oblate, weighing only two ozs. kept in the cavity with both seeds and all other than and adhering closely to the somewhat rough (for this type) cotyledons. Probably ripens in February at San Cristobal.

This looks to me like the finest aguacate I have yet seen in Guatemala.

medium
melle

On the way over here from Coban I saw a plant in the forest fruiting heavily. Some of the fruits were about ripe. I found the flavor sharply acid, and almost free from the mucousness which characterizes *P. guajana*. It was scarcely agreeable, but I believe the fruit might be good for jellies. However, it is not a very meritorious thing. In some instances there were 3 fruits on a peduncle, but more commonly only one.



See p. 41.

Avocado # 11

Badwood # 77

Capital, de Don Eusebio Cruz toward Templo de Mission

Avocado # 10 Budwood # 76



From yard of Diego Muns,
Don Custodial Veracruz.

Weight of fruit, stone, 22 gms. Seed 9 gms.

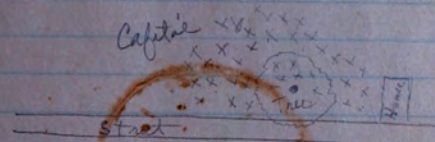
See pp 37 et seq.

Avocado # 11

Budwood # 77

From the capital of Don Eusebio Cruz
south of the plaza, near the road to
Templo de Minerva

Street to Templo de Minerva →



See also p 39

Tree tall and slender, about 40 ft high, with
bark 1/2 inch thick. Bearing a good crop of
fruit this year.

Leaves characteristically to become spiracular
at the apex, length 16 in. length 4 1/2 in.
broad 3 1/2 in. base pointed or blunt, with
lobes with the veins inserted obliquely; apex
rounded; surface very rough, almost
scabrous. Color first changing to
pale green, then to rather large (1/2 inch
diameter) dark green, 1/2 inch thick, coarsely
granular, evenly, fruit of rich cream yellow.
Color of the fruit is good quality, changing to green
mean skin, firm and free from fiber,
quite almost entire to be excellent, seed
about 1/2 inch in size of fruit,
oblong, a slightly oblate, weight about 1/2
oz., light in the early with the seed coat
rather thick and adhering closely to the
inner shell, cotyledons.

Probably ripe in January and February.
A first class rough-skinned fruit, to all
appearances. Too hard to get budwood
from.

Plants common in San Cristobal gardens:

quite Fairly abundant. I have seen both the *poeta* and
corona and the *amarilla*. Treats are on sale in the
plaza, both fresh and boiled.

rather Fairly abundant also, but less so than the
Now coming into bloom.

large There are quite a few trees here, but they are
not large in size. They look rather healthy, but
now in flower or fruit.

very Very common, - about equalling the *agave* in
abundance. I have seen 2 trees coming into bloom.

small Not common, but occasional. Seem to do fairly
well, but the trees are not as large as those
at Tactic. Now flowering.

very Very plentiful, but I have only seen one tree in
fruit. The season may have passed.

apple Good ones are grown near here, and I bought one
which was of a peculiar variety, very meaty, and of
fine flavor.

This little valley is a garden spot. It seems strange that there should be a peccanee town like this, surrounded by many others which have no claim to any importance. There is much more vegetation here than in a broad Colon. Most of the hills are in the fact that there are some steep mountains here, while nowhere else in the valley. I found many good ones. I found the superiority of them in the garden spot.

The most common one found in Cap. takes the form of a small tree for the coffee. It is a small, bushy plant with that light green. The majority of the trees produce round seeds, buds of small to medium size, with rather long seeds. Only occasionally is there a really choice seedling. I suppose not more than 1 or 3% are really good. It looks to me as though practically every seedling bears fruit contrary. I am not in a long time in doing it, about that I have little reliable data.

The soil here is clayey, especially on the hillsides around town. In the lower part of town it is more loamy.

Saturday Tacic, Guatemala Dec 16 1916

We left San Cristobal this morning at 7.40 and arrived here at about 10.45. The roads were very bad, the trip would probably not be more than 2 1/2 hrs with good roads.

The common tree Dahlia (*D. imperialis* I take it to be) is extensively used here to form hedges. The stout stems are cut and planted in the ground, projecting 3 to 4 ft. above it. They take root and grow, and after sending up stout stalks to a height of 12 feet, they produce quantities of lilac pink flowers, 3 to 5 inches across. I suppose they are in all their glory here and the town is literally encircled with them. This strikes me as being an unusually fine decorative plant, and one which should be more widely employed in the United States. Besides the typical form, single pink there is a double white form grown here, but it is not common. It may be a distinct species. I do not know. The people here say it is a wild plant. Like the pink variety, it grows to 10 or 12 ft., and has stout hollow stems up to about 2 inches in

diameter. The flowers are very double, pure white, and bunches or slightly more in diameter. They are well formed, and in my opinion fully equal to many of the cultivated varieties of northern gardens.

Our Indian friend says that the outer corolla is much as the inner (a small quantity of the latter is in the middle) is medicinal; it is said to be good for the stomach, and a good remedy for the throat for being.

There is obtained two varieties of corn which are represented as being very choice.

The first is a white flint corn, with ears up to 12 inches long and 16 to 20 rows of kernels. The kernels are hard & translucent.

The second variety is smaller, the ears being up to 9 inches long, stout, with 15 to 17 rows of kernels. It is a flint variety, bright brownish orange in color.

I have seen no better looking corn anywhere than that grown right here in Tactia. This is in reference to Guatemala, of course. It is now being dried in the sun here, preparatory to being stored.

The tree Dahlia is called Shikar in Potomchi. The white variety is much used to adorn the saints in the church and other places. The pink variety is not used for this purpose.

After walking over the town pretty thoroughly, I find three varieties of the tree Dahlia: the single pink, which is apparently the typical form, and by far the most common; the double white, not common, but seen in quite a few gardens; and the single white, apparently quite common. It is similar to the single pink, but pure white in color.

There are plenty of trees in this village, but only a few of them are carrying any fruit this season. It appears to be an "off" year, as it is in Coban.

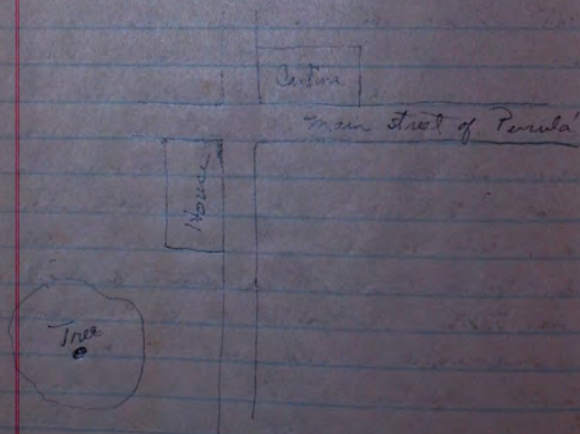
Write Prof. Spon for grass seed to be sent Mr. Hampstead.

Sunday Parulá, Guatemala Dec 17 1910

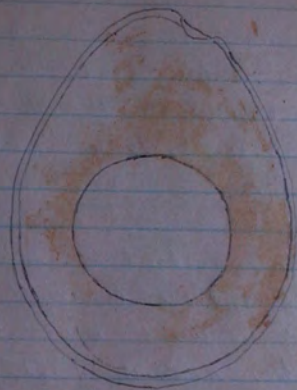
We left Ixcate at 7 a.m. and got here at 10.30. This small village lies at an elevation of 5150 ft. and has a great many agave trees. There are some about 3.

AVOCADO
No. 22

In the site of Santiago Mendoza I found an interesting new variety of avocado. It is small with a small seed, and the fruits ripening early and are a very heavy bearer. It is referred to the name of Dr. Mendoza. The tree is a small tree with a few leaves.



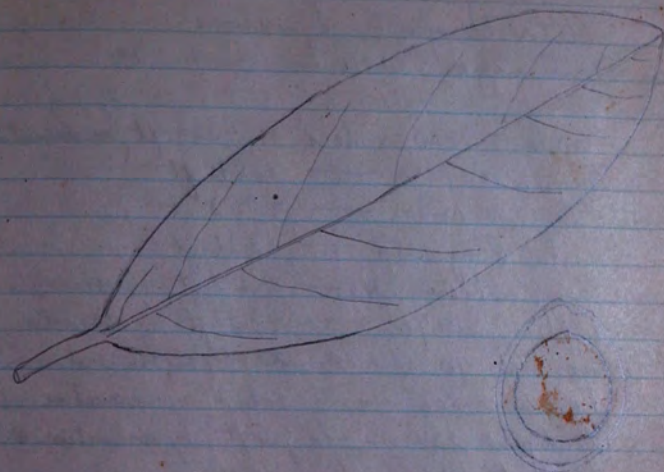
AVOCADO
No. 22



Form obovoid; size small; weight 6 ozs., length $3\frac{1}{8}$ ins., breadth $2\frac{1}{8}$ ins.; base narrow and rounded, with the stem inserted obliquely without depression; apex rounded, not flattened; surface slightly rough but not warty, dull purplish maroon in color, with numerous very minute pinkish dots. Skin $\frac{1}{16}$ to $\frac{1}{8}$ inch thick, hard and woody; flesh creamy yellow, changing to pale green near the skin, with slight fibrous colorations, of fine texture; flavor nutty; quality very good. Seed very small in comparison to size of fruit, spheroid or oblate, weighing less than 1 oz., light in the cavity with both seed coats adhering closely to the smooth cotyledons. Commencing to ripen early in December.

Tau I saw here in the garden of Santiago
Lindero. Mining a double pink two Dahlia. This
makes 4 varieties, - the single pink, double
pink, single white and double white.

Field This morning, 10 minutes after leaving
San Antonio, I saw some trees on the left,
a low but somewhat craggy tree bearing a
large number of small fruits which looked
like small berries. I thought it might
be a species of *Agave* so I got off to
examine them more and found that it had
every appearance of being a primitive form
of the Guatemalan *agave*. The leaves
were slightly thicker and more rigid than
the cultivated *agave*, but otherwise had
the same characteristics while the fruits
also had all the characteristics of this
type of *agave*, but very little flesh. I
inquired of a native who lived nearby and
he said that it was a wild *agave*,
which grew in the mountains but was
not good to eat. It looks to me like the
wild prototype of the Guatemalan *agave*.



The fruits are bright green in color, most of them
badly marked with corky scars. They are not yet
fully mature, but look as though they would
be so in two or three months. The flesh is
pale green throughout, at the present time,
and the seed coats are still soft and fleshy.
The tree was tall and slender, apparently old,
and was bearing a great number of these
fruits, of which the largest were the size of
the one shown above.
In many of the fruits the seeds are
wormy.

Alta Verapaz - Elevations in meters, from
Karl Sapper's Geologische Karte 1901.

Cobán	1320 meters	4329 ft (my observation 4350 ft)
Chamelco	1350	4526 ft
Chichén	1440	4723 ft
Santa Cruz	1380	4526 ft
San Cristóbal	1380	4526 ft (my observation 4550 ft)
Tactic	1470	4821 ft (my observation 4750 ft)
Tanahú	1030	3378 ft (my observation 3350 ft)
Tucurú	500	1640 ft (my observation 1600 ft)
Panajachel	225	738 ft (my observation 650 ft)
La Tinta	128	420 ft
Telemán	51	167 ft
Panjos	31 (outside)	101 ft
Sepacate	1020	3346 ft (my observation 3200 ft)
Purulhá	1560	5116 ft (my observation 5150 ft)
Chejel	930	3049 ft (my observation 3100 ft)
Xenahú	1000	3280 ft

(1 meter = 3.28 ft.)

Monday Guatemala City Jan 1 1917

Last Saturday, December 30th, I planted
in flats in Mr. Hagler's garden 800
avocado seeds of the Guatemalan type.

These seeds were taken from fruits
purchased in the Mercado del Sur, mainly
small and inferior in quality.

They were planted about 675 to 85 in
a flat (10 flats being used for the 800)
the soil being light sandy loam contain-
ing a good deal of humus. After
planting the flats were placed under
a bougainvillea arbor, where they will
have shade practically all day. They
will be watered every second day.

These seeds are planted to provide
stocks on which to base my selections. A
duplicate lot is being planted at Quir-
igua to be used in case these do not
succeed. It may be too cool here
in the city for best results in prop-
agating.

Wednesday, Quirigua, Guatemala Jan 3 1917

I today planted here 800 avocados seeds to be raised for stocks on which to bud any selections.

600 seeds were planted in 10 flats and placed near the water tank back of the hospital. They will have shade here all morning but get considerable sun during the afternoon. The soil used in the flats was a mixture of sandy loam and compost. Cow manure mixed with sandy loam was used as a fertilizer for the flats.

About 215 seeds were planted in the open ground in the garden west of the hospital. They were planted in rows about 3 1/2 ft apart, the seeds 5 to 7 ins apart in the rows, and covered with 1/2 to 1 inch of soil.

A few cayo seeds from Coban were also planted in the open, between two rows of avocado seeds. These are to be grown as stocks on which to bud superior varieties of cayo which will later be selected.

- ① Want logan budwood for Quirigua
Mango budwood for Quirigua
Pepaya seeds from Miami for Quirigua

Monday Tezapan Guatemala Jan 8 1914

Mr. Austin and I left Guatemala City on Saturday at 7.15 a.m. and arrived at Chimaltenango (5900 ft) at 4.45 p.m. We stopped there over night at the Hotel Petrus and left yesterday morning at 9 a.m. reaching Tezapan at 2.15 in the afternoon, putting up at the Hotel Gonzales.

There is plenty of aguacates in Chimaltenango. I did not see quite a few at La Laguna and at Patzún. The latter being slightly over 7000 ft in elevation, according to my barometer.

The country between the combes just after leaving San Rafael and Tezapan is a great corn region. Some beans also appear to be grown. There is a fine long avenue of Eucalyptus just before reaching Chimaltenango. The latter town seems to possess very little of interest from a horticultural standpoint. There are plenty of jacoties.

Tezapan lies on a rolling plain close to the mountains on the North and West. The altitude shown by the barometer is 7550 feet.

We visited a potato here behind the house of a ladino woman (almost pure Indian) in which there was an aguacate tree about 20 ft. tall with a trunk 5 ins in diameter. She said that it was at least 14 yrs old and had never fruited, being presented from long ago by the sold. There was a young aguacate close by, about 3 ft high, and the tender tips had been killed back two or three inches by a recent freeze.

In this garden they had some remarkable trees on which they had grafted pears, using an ordinary cleft graft. There were also peach trees and other guandilla vine. The tree tomato was in fruit, and strawberries in bloom. On a tree were four or five native orchids *Bougainvillea arborea* and *Fabiana umbellata*, *Tuckermia* sp. and many other flowering plants.

Outline of fruit from old tree photographed in east end of town.



This tree is now full of reddish new growth and is just coming into full bloom, having a great profusion of flowers. It has considerable dead wood and a rather stunted appearance. The dead twigs may be the result of a heavy frost but it is impossible to determine, as they have apparently been dead for some time.

The tree stands in the corner of a corn-field which slopes to the south and east. The soil is a good clay loam.

This is apparently an ordinary tree of the Guatemalan type, with a small fruit. It seems to be of no value.

Matasano is grown here, but almost as rare as the aguacate. I saw one tree about 30 ft high, not now in flower or fruit.

In the south side of town found an aguacate tree about 30 ft high with a trunk 9 ft thick at the base. No flowers or fruits. Many of the young branchlets died, looks like the effect of cold. Guatemalan type. Tree said to bear good crops some years, but nothing in others due to injury from cold.

One other large tree was seen, the largest of the lot, also in the south part of town. It was evidently of great age, having a trunk more than 9 ft thick, but the crown was small and rather stunted in appearance, on the extreme summit it appeared to have been badly scorched by frost and there was quite a lot of dead wood, perhaps up to 1 or 1 1/2 ins. thick. The tree was bearing a number of fruits on one side of the crown, and a few flowers just about ready to open. The fruits were about the size of that shown on the last page.

Peaches are very common in the gardens here in fact this is probably the commonest of all fruit trees here. They appear to be seedlings. Most of the trees are now in bloom. Some have a few fruits up to the size of pears. The trees are of fair size and seem to thrive here, though I have seen none that looked quite so good as some I saw in Teatec.

Pears are fairly common, and I saw a few fine large trees in one orchard. All the trees are severely devoid of foliage at this time and show no signs of flowering as yet.

Apples are grown in abundance, but the trees are exceedingly small. They seem to be vigorous as far as I can judge, but I have seen none more than 15 ft high. They are devoid of foliage at this time. Probably they are all seedlings.

The cherimoya does not appear to be grown here at all. I have not seen a single tree, & I assume it is too cold for it. The same may be said of the jocote. There are no bananas here, but a few badly scorched plants of Musa insata. The citrus fruits are also about, though I saw one tree which looked like an orange but was devoid of fruits. The tropical ornamentals are also wanting.

The agavate can not be considered over scarce here. I have seen in all 5 or 6 large (old) trees, all of them showing more or less injury from cold and not normal in development. They are said to bear good crops in fruit some years, in others to fail to produce anything due to the cold. In addition I saw perhaps two 5 years trees 3 to 10 ft high, one of them scorched by the frost.

The fact that the gustamelan type of agavate (all the trees seen were of this type) can be grown here at all argues strongly for the hardness of this type, however. As just noted, the citrus fruits

are not grown here, nor the banana. This absence can hardly be attributed to anything else than the fact that the climate here is too cold for them.

It seems, in short, that the agave and the native are about the hardiest of the so-called "tropical" fruits grown in Guatemala, since they have ascended above the zone of citrus, guava, and banana, the fruits of which are grown here at considerable elevations.

Bonadilla: The fact that the fruit can be grown here is a great surprise to me. It surely ought to do in California if it will succeed here.

The soil on this place is a good sandy loam, somewhat argillaceous in spots. It looks much like some of our California soils. Most of the timber on the surrounding hills is oak. The common "Cypress" grows here, and also Aracaria excelsa.

The mangonilla is said to be called ahnim in Quiché, and the native arepa capilla. The agave is called oh, as in Quiché.

In the small park in front of the Church are the following plants:

Juniperus sp. "cypress"
Grevillea robusta
Aracaria excelsa
Rosa banksii
Rosa sp. Tea roses
Sambucus sp. elder
Brugmansia arborea

Wednesday Panajachel, Guatemala Jan 10 1917

The elevation here is 5350 ft, according to the barometer. Panajachel lies in the mouth of a deep valley about $\frac{1}{2}$ mile wide, opening on the south into Lake Atitlan. It seems to have an unusually protected situation, and the soil is excellent. It is a great spot for onion, artichoke and produces a good deal of fruit.

Ceprie planted as cuttings in September and ripens so fast following June must have very rich soil and water every three days since not done for cool. Cuttings planted 4 in a hill.

Mango said not to bear well here. Flowers after fall without setting.

Bananas do only fairly well here.

Dryas only fair, not large.

The mango tree grows well here - much better than in Guatemala and some other places which are lower in elevation than this. The trees have a healthy appearance and are not so stunted as those are in Guatemala City, growing here to a height of 45 feet or more. They are not now in bloom.

Shinus molle, eucalyptus, and some other ornamental trees are grown here, and the faterna is occasional. Sweet limes are very abundant, and oranges common. The guava grows everywhere, but the fruits are full of worms. The white so-called perularis is grown here. There are a few peach trees in the gardens, and plenty of jostas, the fruit now being ripe.

The aguacate tree is very abundant here, many being used for shade in the coffee fincas, though not planted in regular order for this purpose. Most of the trees are coming into bloom, many in full bloom already. We examined quite a number of fruits and they were not of very superior quality. Many had large seeds and were splashed with yellow color. All of the Guatemalan type.

The most important thing observed here was the avocado maggot, which seems to be the same pest we have found once or twice in avocados purchased in Guatemala City. Here, however, it is so abundant as to be a terrible pest, for example, I purchased 14 avocados from a woman on the street this morning, and found every one of them infested with this insect, some so badly so that they were unfit to use, others still in condition so that they could be used after scraping out a few spots.

The larva is about $\frac{1}{2}$ inch long, appearing to have 12 segments composing its body, the brown head furnished with biting mouth parts. It works in the seeds of the avocado, making large tunnels and leaving behind it fine brown dust. ^{very soft in} It does not seem to work in the pulp of the fruit, but as it often works along the outside of the seed, it leaves the adjacent pulp lining the seed cavity discolored with its brown dust and sometimes showing grooves. Some seeds seen had been so thoroughly tunnelled that they were absolutely honeycombed.

The people here call this insect "gusano de aguacate" or simply "gusano". And know nothing about its habits nor any

means of preventing it from attacking the fruits. When an aguacate is opened and found to be badly infested, it is thrown away.

A few worms were found tunnelling in the pulp of the fruit, close to the skin, leaving behind them a smooth round tunnel.

I have not yet seen anything which enables one to determine from an external examination of the fruit whether it is infested or not. A few were seen in which there were smooth round holes in the skin, through which it looked as though larvae had tunnelled out.

There is a vine of *Antigonon leptopus* growing in the patio of the hotel here. The root is near the doorway, and the stems are trained along the corridor around two sides of the patio for a distance of 35 paces.

I have been watching the *Lisians* (*Quiches*) here in front of the hotel eating lunch. They have tortillas and aguacates, eating the latter with their fingers, without reasoning of any kind.

Wednesday Solola, Guatemala Jan 10 1917

The elevation here, according to my barometer, is 7200 feet.

We made the trip up from Panajachel in the 45 mins. It is said to be 14 leagues and is a stiff climb all the way.

Agave plants are abundant about Solola and appear to do well. It can not be so cold here as in some other and more exposed sections of equal elevation. The town has a southern exposure.

Solola is not an attractive place and rather barren in appearance. There are not a great many plants in the dooryards and fences about the town.

In the garden of the hotel I saw one peach apple (unripe) and grape (vine) roses, Hydrangea, *Staph. heliotropae*, Plumage, Capensis, *Barb. coccinea*, Begonias, fuchsia, *Chromolaena*, violas, and other flowers.

The cherimoya is abundant here and seems to be quite successful so far as growth is concerned.

The fig seems to grow well here, the tree reaching a good size. The guava and logan both look well also.

Thursday Totonicapan, Guatemala Jan. 11, 1917

We left Solola at 6 a.m. and arrived here at 3, riding 8 1/2 hrs to cover the distance said to be 9 leagues.

After leaving Solola we climbed a steep hill, finding frost on the meadows after reaching the summit. Further on we climbed a long and steep grade reaching a height of 9900 ft. Here we crossed a broad rolling plateau on which there had been wheat planted in places and where sheep were grazing in other parts. Oak and pine was forest, only the only timber. Puddles of water by the roadside had frozen the previous night and the ice had not yet melted in many places at noon.

The barometer shows the elevation here at Totonicapan to be 8400 feet. Mr. Hines, a missionary here, says he has always understood that it was 8700 ft. The Guian Official gives it as 7980, which is certainly erroneous. The town lies in a broad valley in which there are many grain fields.

AVOCADO
#12

The largest aguacate tree I found here, and the only one in bearing, is on a patio at the corner of Avenida Norte and Calle Cabanas, about 1 square from the plaza.



Form pyriform, rather slender, and slightly necked, size medium, weight 12 ozs, length $4\frac{3}{4}$ ins, breadth 3 ins. base tapering, narrow; the stem inserted almost squarely without depression; apex rounded, slightly depressed around stigmata.

point; surface smooth or nearly so, light green and almost glossy, with numerous yellowish dots; skin moderately thick, about $\frac{1}{16}$ inch, woody and brittle; flesh deep cream color, changing to pale green near the skin, free from fiber and of exceedingly rich flavor; quality excellent; seed rather small, conical, weighing about $1\frac{1}{2}$ ozs, tight in the cavity with both coats adhering closely. Season probably not earlier than May in this region.

This is a good aguacate, and must be somewhat harder than most varieties of its type for which reason it is worthy of trial in the U.S.

The parent tree is about 35 ft high, the top has apparently been taken out by cold, and the fruit this year is mainly on one side of the tree. It looks as though it would be a heavy bearer when not injured by cold.

In the market I found some small aguacates, said to have come from Solola, which I thought at first to be of the Mexican type. But on examining them I found the skin to be somewhat thicker and

they appeared to be nothing but an extreme form of the Guatemalan type. The seed was large and the quality only fair.

There are many few aguacate trees in Totomocan. On the hill on the north part of the town, which has a southern exposure, I found about 5 trees. Of these the large ones, 2, had been nearly killed by cold, having very little live wood left. The three smaller ones had been frost-bitten but were in perfect shape and had not been badly injured.

I did not see a single citrus tree in our walk over the town. The fruit trees are mainly peaches, the native cherry, and apples.

The naranjo is not rare, but I only saw one good large tree. The smaller ones showed much less injury from cold than the aguacates hence it seems safe to conclude that the naranjo is slightly hardier than the type of aguacate.

There are very few trees in this town. Gravelles, Jambouira and Eucalyptus are grown but not abundant.

Saturday Almolongo, Guatemala Jan. 13 1916

This village is about 2 1/2 miles from Guatemala on the road to San Felipe at an elevation of approximately 7700 feet, or about 150 feet lower than Guatemala.

Directly across the plaza from the Candelaria Local, behind a low mud wall stands a large aguacate tree. Below is a tracing of the fruit:



This looks like a fruit of good quality. It is medium sized, green in color, practically smooth on the surface.

the flesh fairly clean, and the seed not overly large. The skin is thicker than the average.

The tree is about 40 ft high, with a broad crown, and a trunk 18 inches or more in diameter. The crown shows evidence of having been touched by frost, some of the young branchlets having been killed.

The people say the fruit ripens about August 15th, and there are a few fruits of the old crop still hanging on the tree. The flowers for the next crop are now opening. There are only a very few fruits on the tree at this time.

Sunday Quezaltenango, Guatemala Jan 14 1917

The elevation here is approximately 7850 ft. according to the barometer, and apparently it gets very cold. Paul Burgess says he has been told that it goes as low as -6°C . There is very little vegetation about the town, save a few junipers, eucalyptus, and oak trees. I saw no agave-like trees and Burgess does not know of any.

The best place to stop here is the Hotel Modelo, \$40 a day.

Paul Burgess, in charge of the Evangelical Church, P.O. address Apartado #5 will help in any way possible.

Saturday Guatemala City Jan 20 1917

Sent in my accounts today for the
quarter October to December 1916. I
claimed a total of \$418.23 US\$

6 libras de cacao, tostado
si lo quieren muy dulce, 12 libras de
azúcar. El superior 8 libras.
1 onza de canela, tostada

Primero se muele la canela, y después
el cacao. Revuelve todo junto.

Se tuesta la cascara del cacao, y se
la muele a parte, y mézclala con
el chocolate. En un frasco tibio se lo
calienta, y se lo pone en las formas.

Pink flowered tree from Joaguina is
called matiliscuata

yellow flowered small tree is tecomasuala

Sunday Antigua Guatemala Jan 28 1917

Avocado This afternoon I rode to San Lorenzo del #6. Cuba to see Avocado #6, which is in the yard of Victor Garcia.

The tree has finished flowering and seems to have set no fruits for next year. The fruits in this year's crop are practically all picked, some 25 or 50 remaining on the tree. The señora de Garcia had a basket of about 100 fruits in the cantina, which she said were the last of the crop.

The season of this variety is, apparently October to February.

I brought home six specimens, whose average weight is 9 oz. The flesh is now a deep yellow in color and the quality much better than it was in October. The seed is small, and not placed quite in the center of the fruit.

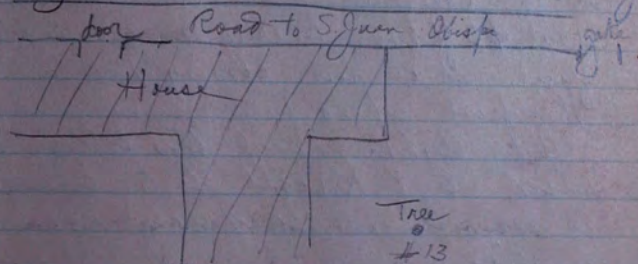
This is an excellent aguacate, and looks to me very promising as an early ripening variety.

Monday Antigua Guatemala Jan 29 1917

Went to the finca Jauja, Elvira Cuellar, Administrador, to see Aguacates.

Aguacate said to come into bearing at 6 to 8 years from seed.

Large tree next to house 60 ft high



Said to be 60 yrs old. Trunk 6 ft thick. Season of fruit January to May. Now coming into bloom. Fruits of this year's crop commencing to fall. Crop is not large for tree of this size, but is said to be common in some seasons. Cuellar says this is one of the trees from which E. C. Knight took budwood.

Avocado Tree in front of Estancia
#14 11/18/15

Road

grisea

Tree

grisea

This tree is younger than the last, perhaps 25 yrs old. The trunk about 1 ft thick at the base, the crown open and sparse; about 40 ft high bearing a good crop of fruit. It is now coming into bloom. The fruit ripens from January to May.

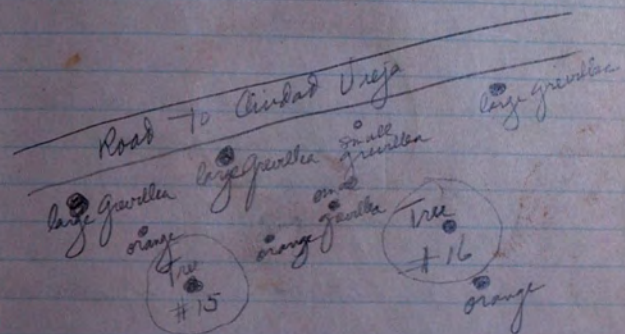
Don, Cordero says this is a tree of which E. & K. Knight took budwood. It is recommended as of very superior quality.

Finca Sta Lucia, 7a Calle poniente
near Alameda de Sta Lucia.

Avocado
#15

Tree in finca, close to road to Ciudad Vieja

Near #15, as below



Tree No 15 is 25 ft high, with trunk 6" in diameter and branches 40 ft from the ground. Crown open, scanty, 10 ft broad. Crop 300 yfts this yr. Not yet showing flowers.

Tree No 16 is practically same size as 15. Crop this year 100 fruits. Not yet coming in to bloom.

These trees are of unknown age, but are perhaps 6-8 yrs old.

Tuesday Antigua Guatemala January 30 1911

Avocado Description taken from prints brought from the
#6 tree in yard of Victor Garcia, at San Lorenzo
del Cobo two days ago:



General form oblate; size below medium, weight 9 gms. length $2\frac{3}{4}$ to 3 ins., greatest breadth 3 to $3\frac{1}{4}$ ins.; base slightly flattened, the stem very stout, about $\frac{1}{4}$ in. long, inserted without depression; apex flattened, the flattening often slightly oblique; surface pebbled to slightly rough, shining purplish black in color, with comparatively few minute yellowish dots; skin less than $\frac{1}{16}$ to almost $\frac{1}{8}$ inch thick, being thickest around apex of fruit, very coarsely granular, separating readily from the flesh when peeled off in sections, but brittle; flesh abundant, firm, oily, rich cream-yellow, changing to pale green toward the skin, slightly marked with fiber traces but not objectionably so; flavor rich, nutty, very pleasant, quality excellent; seed oblate, $1\frac{3}{8}$ in. long, $1\frac{1}{8}$ in. broad, often not placed in the exact center of the fruit, tight in the seed cavity, with both seed coats adhering closely to the nearly smooth cotyledons; season October to February, the tree flowering in November.

The first fruits turn color in October and are then at season; the majority of the crop is fully ripe in December and January, with the richness of flavor fully developed.

A large percentage - perhaps one half - of the aguacate trees around Antigua are now in bloom.

The current price for aguacates here is 8 to 10 pesos per 100 at the present. Sweet oranges are 5 to 7 pesos per 100.

Loganets are now out of season, and the trees show no signs of flowering.

Cherimoyas are nearly gone by, though there are a few left on the trees.

Jacotes are still fairly abundant. Some seem to be drying up on the trees.

Altogether, the dry season appears to be a very poor time for fruits at Antigua, with the exception of aguacates, and during the early part of the season, Cherimoyas. The market does not contain much good fruit just now.

Thursday Guatemala City Feb 7 1917

Descriptions of avocados brought from Antigua last week

From Finca Janga, Antigua. Large tree beside house #13



The fruit shown on preceding page is much smaller than the average.

Form slender pyriform, sometimes slightly curved. ^{to about medium} weight 13 to 16 yrs length $3\frac{1}{4}$ to $3\frac{3}{4}$ ins, breadth $3\frac{1}{2}$ ins, base tapering, the stem inserted somewhat obliquely without depression apex slightly pointed, surface almost smooth, deep green and almost glossy with numerous small dark red patches and a few minute yellowish subcutaneous dots, skin medium thick, averaging almost $\frac{1}{8}$ inch, granular; flesh, right creamy yellow, greenish very close to the skin, free from discoloration and of fine texture, rich in flavor, quality very good; seed rather large, oblong, consider $\frac{1}{2}$ ins long, tight in the seed cavity with both coats adhering closely. Season January to May.

Looks like a good fruit but the seed is a trifle large. This is bearing a good crop this year.

Locals Dr. Finca Janga, Antigua, fruit of the instance.



Above is a good specimen of this variety. Another is shown on the following page.



Form broadly obovoid; size very large, weight 90 gms, length $4\frac{1}{2}$ to $4\frac{3}{4}$ ins, breadth $3\frac{1}{4}$ to $3\frac{3}{4}$ ins; base slightly flattened, oblique, the stem inserted almost without depression; apex somewhat flattened, usually oblique. Surface undulating, dull green in color, with rather numerous, minute, yellowish dots; skin very thick, $\frac{1}{8}$ to $\frac{1}{4}$

rich, coarsely granular and brittle, but separating from the flesh fairly readily; flesh rich cream color but rather noticeably marked with fiber traces, and tinged pale green close to the skin, the texture smooth and firm, the flavor exceptionally rich and pleasant, quality good; seed rather large weighing between 6 and 8 gms, roundish oblate in form 2 ins long, with both seed coats adhesion closely, and fitting snugly in the cavity. Season January to May.

The tree is a good bearer.

This variety is of remarkably fine flavor and has an unusually thick skin. But the flesh is rather badly discolored by fiber streaks and the seed is pretty large. All together it looks like a good fruit, but not perfect. I believe some of the other selections are more valuable.

Avocado From the finca St Lucia; Antigua.
#15



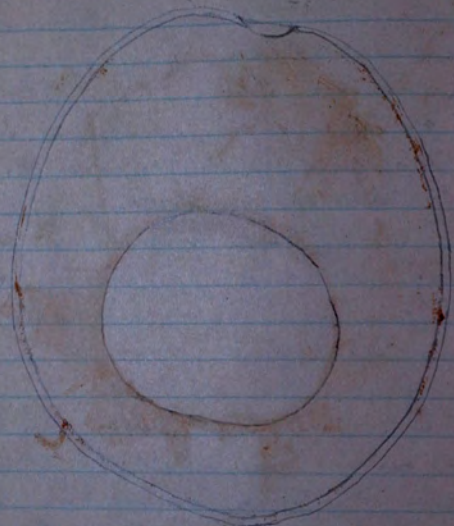
Form almost spherical; size below medium weight 10 oz., length ~~3 1/2~~ 3 1/2 ins. breadth 3 ins.; base slightly pointed, the stem inserted almost squarely without depression, apex rounded, with a slight depression around the stigmatic point; surface undulating to finely roughened; dull green in color, with numerous very minute yellowish dots; skin not very thick, scarcely up to 1/8 in over any portion of the fruit, separating readily from the

flesh, coarsely granular and brittle in texture; flesh yellowish cream color, greenish towards the skin, almost free from discoloration, of firm, smooth texture, and rich flavor; quality excellent. Seed rather small, nearly spherical, weighing slightly over 1 oz. and measuring $1 \frac{1}{8}$ inches in length, tight in the cavity with both seed coats adhering closely. Season February to June.

Tree very prolific.

This is an excellent fruit, with a good proportion of clean flesh of excellent quality. Its productiveness and other good points combine to make it seem an unusually promising variety.

Amado From the Finca Santa Lucia, Antigua
#16



Fruit oblong-spherical, size above medium to large, weight 15 to 17 lbs., length $4\frac{1}{4}$ ins., breadth $3\frac{3}{4}$ ins.; base flattened, with the stem inserted slightly to one side in a shallow, flaring cavity; apex obliquely flattened; surface smooth to insulating, deep purple in color, almost shining, with numerous rather large yellowish

dots; skin moderately thick, slightly over $\frac{1}{8}$ inch, coarsely granular, separating readily from the flesh, but very brittle; flesh pale cream color, tinges pale green toward the skin, very slightly discolored with fiber traces, of firm texture and mild, pleasant flavor; quality good; seed much in comparison to the size of the fruit, decidedly oblate, weighing about $2\frac{1}{2}$ ozs., tight in the cavity, with both seed coats adhering fairly closely. Season February to June.

At this time the fruits do not seem to be fully mature. If they become richer when fully mature the variety should be a good one.

Quirigua Orchard

Row 1

McCarty
grapefruit

Row 2

Key Lime

Row 3

King
Orange

Row 4

Red Cayman
Orange
→ N

McCarty

Key Lime

King

Red Cayman

marsh
grapefruitNavel
Orange

King

Red Cayman

marsh

Navel

Lucy Ling
OrangeTane-Nashi
Persimmon

Broadfruit

Navel

Broadfruit

marsh

McCarty

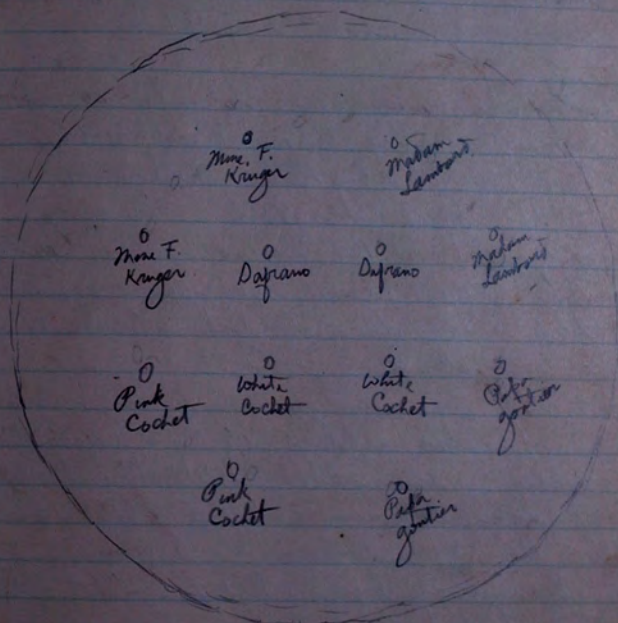
Lucy Ling

marsh

McCarty

Lucy Ling

McCarty

Rose Garden at Quirigua Hospital
Planted Feb. 12 1914.

Concrete Drain



Monday Quirigua, Guatemala Feb. 12, 1917

Today I planted the small orchard of which a plat is given on p. 96, also the rose garden shown on p. 97.

The Avocado seeds planted on Jan 3rd are germinating; those in the boxes seem to be very slightly ahead of those in the open ground.

The anac seeds are also germinating, tho they do not yet show above the ground.

I planted a box of papaya seeds which Dominick sent me from the Miami Garden, - S.P.I. #28533 (2)

Examined buds put in last Tuesday, Feb. 4, but it is too early yet to tell what they are going to do.

Tuesday Guatemala City Feb 16 1917

No 87a Avocado # 15 from Finca Sta Lucia, Antigua (Oraceo variety)
286 seeds

No 88a. Avocado from El Marabon, Antigua. 100 seeds

No 89a Avocado # 16 from Finca Sta Lucia, Antigua (Lager variety)
85 seeds.

The above lots of aguacate seeds were dispatched to Washington today, and New Orleans. They were all in good condition when packed, and an examination only showed one to be attacked by the Lepidopteran larva. This one was thrown out.

These seeds were sent in to be grown for distribution as seedlings. They are all selected stock, of excellent parentage, and should be worth growing as seedlings.

Monday Antigua Guatemala Feb 19 1911

Today, in company with Mr. and Mrs. H. D. Austin and Mrs. D. C. Rees, I climbed the Volcan de Agua.

We left the house in Antigua at 5:30 a.m. on horseback. At 7:30 we reached Santa Maria de Jesus, distant $9\frac{1}{2}$ kms. from Antigua. Here we had to wait half an hour to obtain two muzzos and to obtain some corn for the horses. We were furnished two Indian boys, who were to show the road and carry water and corn.

We left Santa Maria at 8: from here the trail (an excellent one clear to the crater) goes up the slope of the volcano for half a mile without a turn, and then commences to wind around and zigzag. The slope of the volcano is especially fertile and is cultivated in corn, peas, potatoes and a few other vegetables, between about 7300 ft (400 ft above Santa Maria) and 8500 ft. There is also some forest in this region, extending above it for some distance perhaps, but I was unable to take altitude readings.

About a thousand feet below the crater we left 3 of the horses taking along on to

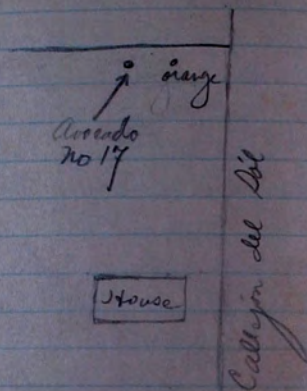
carry the baggage, and climbed the rest of the way on foot. The slope is very steep, but the trail good. From Antigua the upper part of the cone appeared to be yellow rock or sand, but on getting there we found it to be covered with dry grass which gave it its yellow appearance. There are a few pine trees along the upper slope close to the summit.

We arrived at the crater at 12. It is large and well formed, but the volcano has evidently been extinct for a very long time, as the bottom of the crater is filled with soil. The rim is about 300 ft higher than the bottom, and is broken down on the side toward Antigua. From this break wind and clouds enter the crater, taking a circular course after entering and maintaining a cyclone in the crater. The bottom of the crater is 300 ft across, broadly oval in outline.

We left the Crater at 2, reached Santa Maria at 5, and Antigua at 6.15. The distance from Sta Maria to the crater is called three leagues, making it 5 leagues (15 mi) from Antigua to the crater.

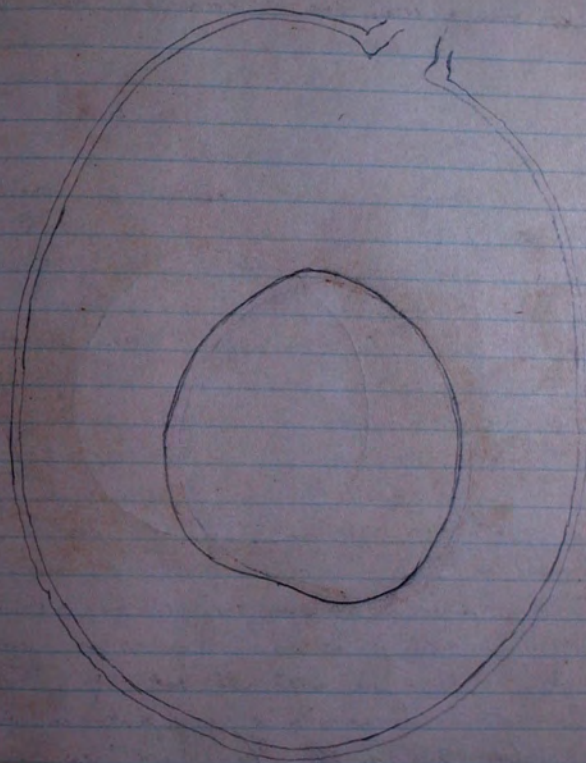
Avocado
#17

Tuesday Antigua Guatemala Feb. 20 1977
In site of Trumbas Hernandez, Calle Concepción



#20
Calle de Concepción

The tree is perhaps 10 or 12 yrs old. It is bearing all the fruits it can carry, some of them not having attained full size. The tree is now coming into flower and is full of reddish new growth. Crop this year seems to be between 200 and 400 fruits.



Avocado No. 17. Specimen weighing 2 lbs 14 oz



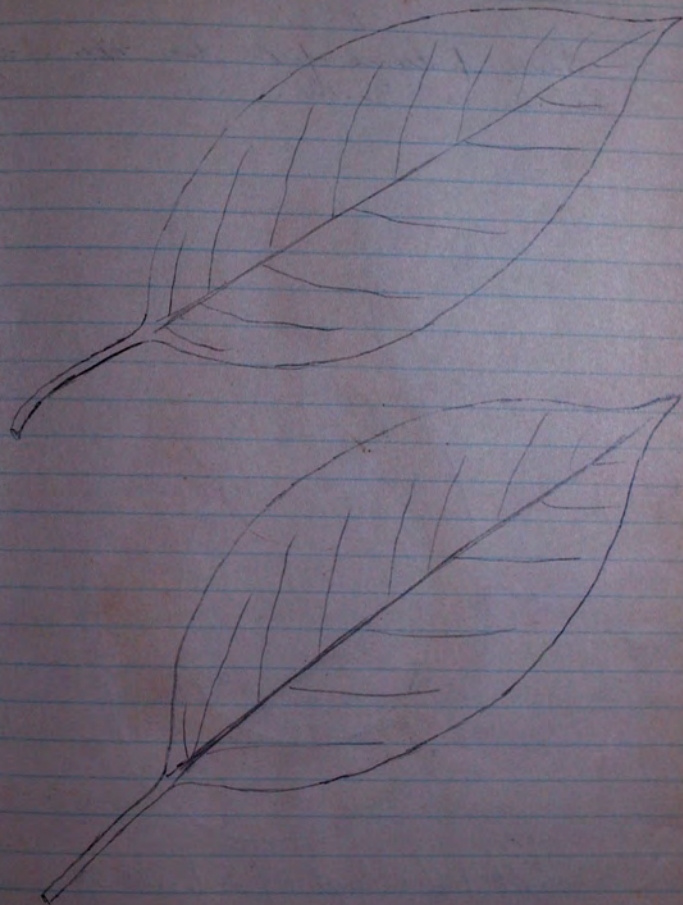
Avocado #17

Form broadly oval, sometimes oblong-oval, and always somewhat oblique; size extremely large, perfectly developed fruits weighing $2\frac{1}{4}$ to $2\frac{3}{4}$ lbs, and measuring $5\frac{1}{2}$ to 6 ins in length by $4\frac{1}{2}$ to 5 ins in breadth; the stem is rather short and very stout, inserted obliquely without depression; base obliquely flattened but not decidedly so, apex rounded to obliquely flattened; surface heavily pitted in most cases, sometimes lightly so, deep green in color, with numerous, irregular, large yellowish dots; skin moderately thick, $\frac{1}{8}$ inch toward base $\frac{1}{4}$ inch at apex; peeling readily but often breaking toward apex, coarsely granular and brittle; flesh firm, oily, smooth, rich cream-yellow, tinged with green toward skin, free from fiber discoloration, and of very rich, pleasant flavor; quality excellent; seed medium sized, roundish cone or oblate cone, weighing 4 ozs, tight in the cavity with both coats adhering closely; season February and March at Antigua Guatemala.

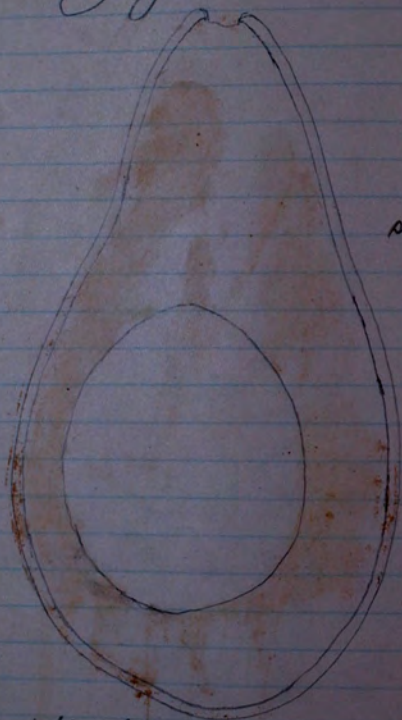
Tree exceedingly prolific, carrying more fruits than it can bring to normal size.

Wednesday Antigua Guatemala Feb. 21, 1911

Outlines of leaves of Mexican type of aguacate
from tree near Santa Maria de Jesus

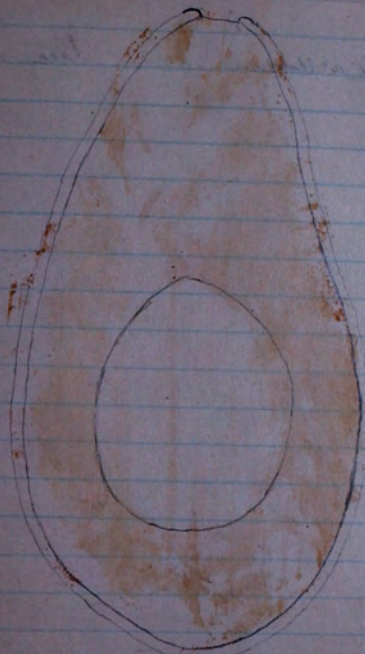


Thursday Antigua Guatemala Feb. 22 1911
 Avocado No 13 Two specimens from tree near house,
 at Finca "Jauch".



skin $\frac{1}{8}$ to $\frac{1}{16}$ in
 thick
peels.

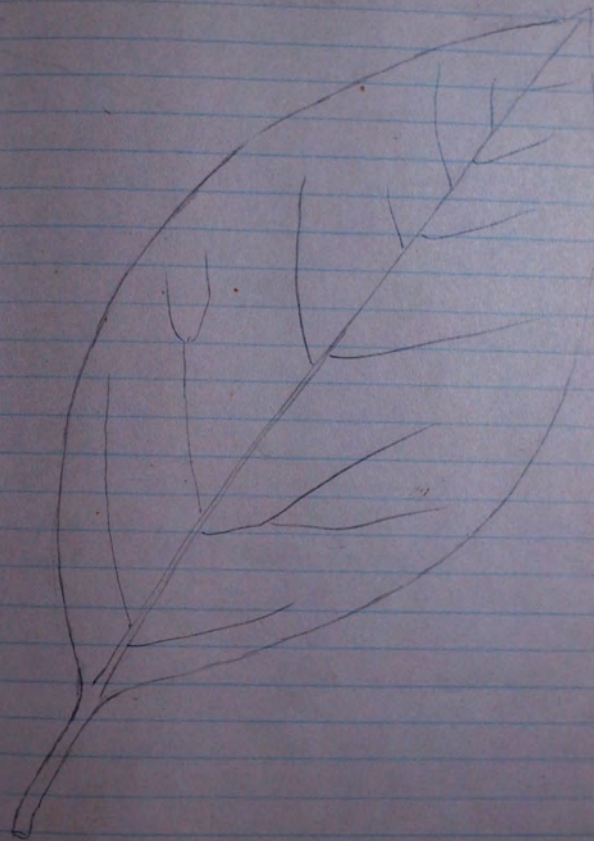
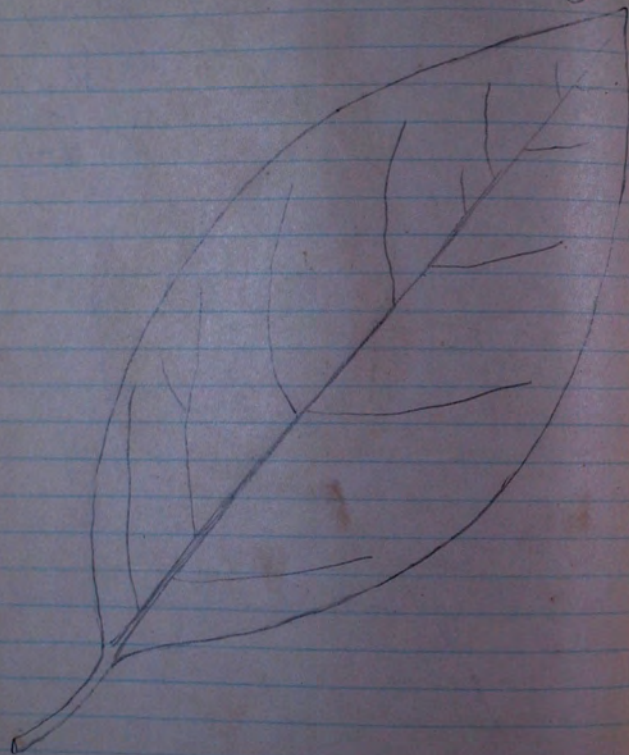
weight 1 lb; length $5\frac{1}{8}$ ins; breadth $3\frac{3}{8}$ ins; seed 4 oz

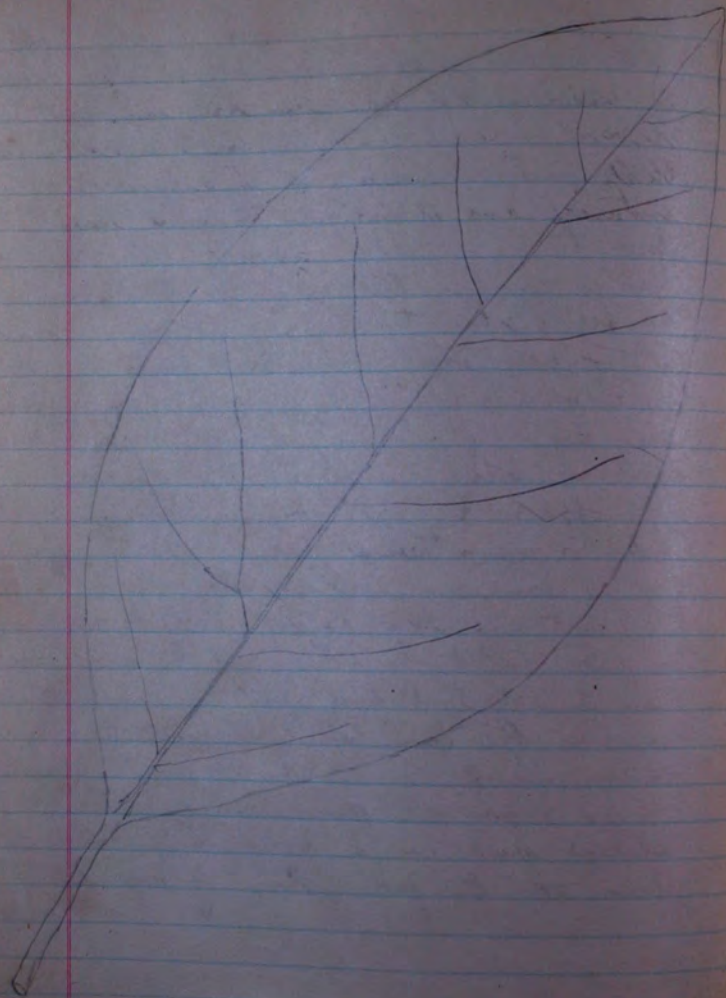


skin $\frac{1}{8}$ to $\frac{1}{16}$ inch
 thick
peels.

weight 14 oz; length $5\frac{1}{4}$ ins; breadth 3 ins; seed 2 oz

Outlines of leaves of young avocado tree, in
 patio of Barillas residence. Guatemala. Type.





It seems to be the general opinion here in Antigua that avocates are ripe and ready to be picked when the tree comes into bloom. I have verified this in a number of instances and it looks as though it may prove to be a valuable guide.

It is said here that avocates should only be picked when the moon is waning. I cannot get find out what phase this means.

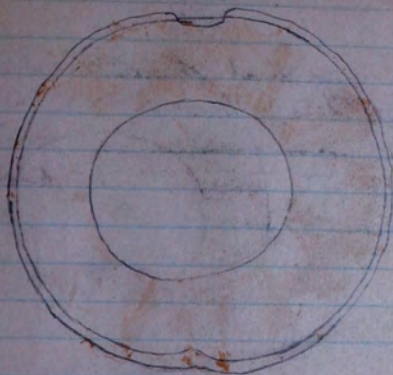
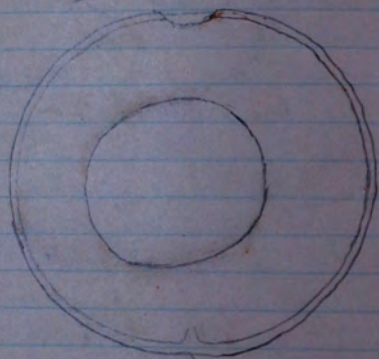
Several trees which have refused heavy crops this year have bloomed and dropped their flowers. While it is not admitted by everyone it appears practically certain that it is the habit of many trees at least to rest a year after producing a heavy crop.

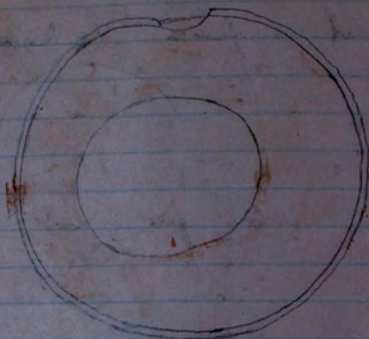
Knight says the "hard-shells" do not peel. I have tested this and found it to be false. They peel at least half way to the apex, the skin on the lower half of the fruit being thicker and often breaking when an attempt is made to peel it from the fruit. Many of the "hard-shelled" fruits can be peeled very readily, if taken at the proper stage of ripeness.

Friday Antigua Guatemala Feb 23, 1917

This morning I went to San Lorenzo del Cibo to see Avocado #6. There are still 20 or 30 fruits hanging on the tree. We picked several. They are outlined below. Six fruits weighed 3 lbs. 150g.

Avocado
No. 6.





Saturday Antigua Guatemala Feb 24 1917

Went to finca "La Palovera" to select aguacates for propagation

Locado
No 18

Tree has single trunk 18" diam at base, first branch 13 ft from ground. Tree 45 ft high, bearing good crop. Now in blossom and fruits commencing to drop.

aguacate

No. 18

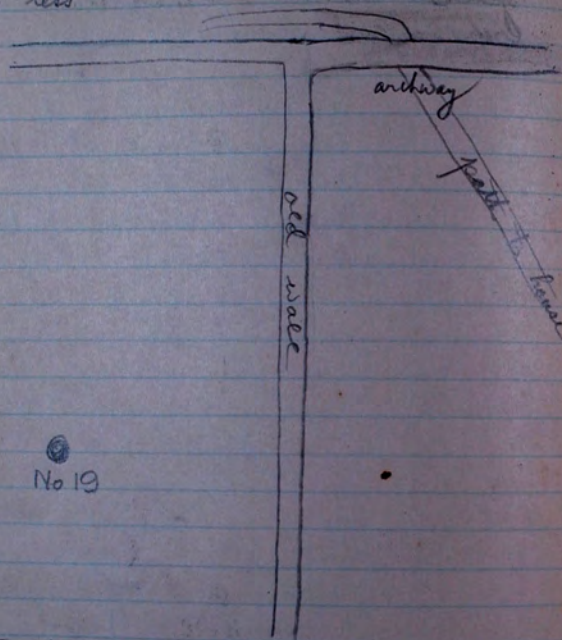
aguacate
aguacate
aguacate

aguacate

Tree perhaps 100 yds back from road to cemetery.

Avocado
No. 19

Tree is west of house some 100 yds or perhaps less



No 19

This tree is low and spreading in form, about 15 ft high, branched 12 ins from the ground, with two main branches 8" thick. Bearly fair crop of fruit, and now in bloom.

Avocado Tree 30 ft high, very slender, trunk 6" diam at ground. Branching at 6 ft above ground. Tree not yet showing bloom. Crop 125 fruits.

← 40 ft → gets opening in cleared Sta Lucia

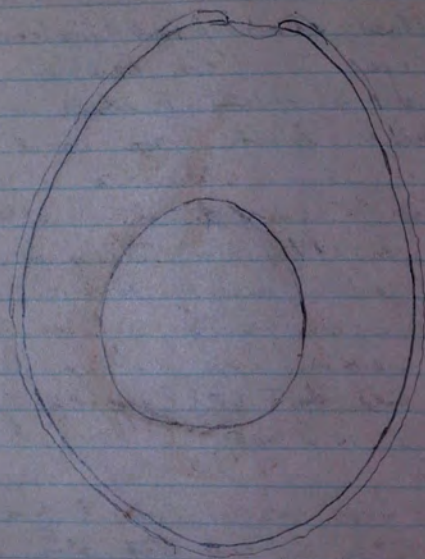
56 paces

avocado (young)
No 20

avocado (young)

avocado (old)

Avocado
No 18



Form obovoid, slightly oblique at apex; size about medium to large, height 15 to 18 cps, length $4\frac{1}{2}$ ins, breadth $3\frac{1}{2}$ ins, base rounded or obscurely pointed, the stem stout, 4 ins long, inserted obliquely without depression; apex obliquely flattened, depressed around stigmatic point; surface heavily pitted to rough, green to yellowish green in color, with

numerous small, rounded, yellowish dots; skin thick, about $\frac{1}{8}$ inch throughout, not thicker toward apex than near base, as in many avocados, apparently too thick to peel, woody, very brittle; flesh firm, smooth, rich cream-yellow in color, with no fiber and very slight fiber discoloration, tinged with green near the skin, the flavor very rich and pleasant, quality excellent, seed medium sized or rather small, roundish convex in form, weighing 2 cps, tight in the cavity, with both coats adhering closely. Season January to March.

This looks like an excellent fruit. It is characterized by very thick skin, a rather small seed, and the rich yellow color of flesh which seems to me to be a very important characteristic.

The fruits are now beginning to drop, hence must be fully ripe. The tree is bearing a good crop, considering the size of the fruit.

Avocado
No. 19



Form obovoid to oval; size extremely large, weight $1\frac{1}{2}$ - $1\frac{3}{4}$ lbs, length 5-6 ins, width 4 ins, base rounded the very short stout stem inserted without depression, slightly obliquely; apex rounded, very slightly depressed close to the stigmatic point, surface almost smooth to lightly pitted, dull

? purple in color, with numerous, minute, yellowish dots; skin thick, $\frac{1}{8}$ inch toward apex of fruit, slightly less near base, coarsely granular, brittle; flesh firm, creamy yellow in color, changing to pale green toward the skin, free from fiber, and with very slight fiber traces, flavor
quality; seed oblong, cone, rather rounded weighing but 2 ozs, thick in the cavity with both seed coats adhering very closely; season rather late, probably March to May.

This is a fine large fruit of very attractive appearance. While it is not bearing a heavy crop this season it may be the "off-year" and it is now setting fruit for next year's crop. Altho the tree is already gone out of bloom, the fruit is not commencing to fall, and scarcely seems to be ripe.

Avocado
No. 20



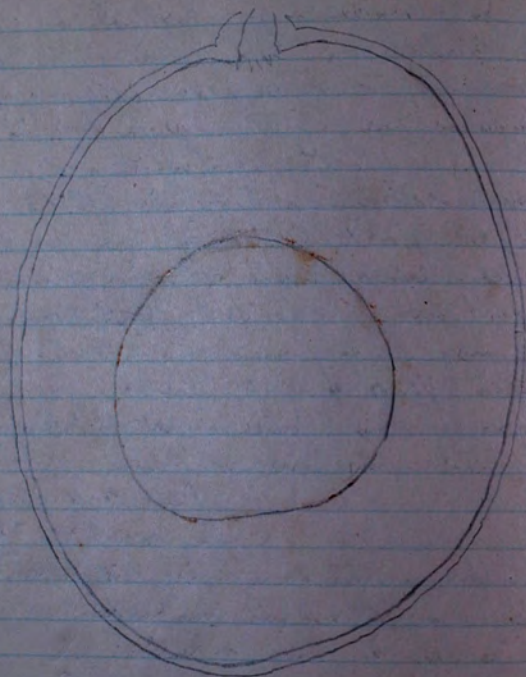
showing both extremes in size of seed, - small & large



Form oblate; size medium to above medium, weight 12 to 15 lbs, length $3\frac{1}{4}$ ins, breadth $3\frac{3}{8}$ to $3\frac{5}{8}$ ins; base rounded, the very short, stout stem inserted without depression and almost squarely, apex flattened, not depressed; fruits come in clusters of two to six, or sometimes singly; surface almost smooth, very lightly pitted, dull purple in color, almost glaucous, with very numerous, minute, yellowish dots, skin thin for this type, $\frac{1}{16}$ inch at apex and slightly less toward base, pliable, feeling readily; flesh firm, smooth, not cream color, changing to pale green near the skin, free from fiber or discoloration, flavor quality; seed rounded oblate, medium to medium large in size, weighing $1\frac{3}{4}$ to 3 ozs, light in the cavity with both seed coats adhering closely; season March to May?

An enormous producer, and a fine looking fruit of the Thapp form. The seed is sometimes rather large, but on the average it does not appear objectionably so.

Avocado
No. 14



Sunday Guatemala City March 18 1917

Jose made a trip to Jalapa while I was in Quirigua and Cobán, and reports that the avocado trees from which E. S. Knight took budwood are in the aldea del Rodeo, about 4 leagues to the northwest of Jalapa, on the property of Conrado Roman, who was at one time alcalde of Jalapa. One of the trees, called "El rey de los aguacates" by Dr. Roman, is doubtless the one which Knight has named Rey Roman. Jose gave \$25 just to strip him the last and offered him budwood at \$1.00 for each branch cut from the tree. Jose says the fruit was picked in December. There is none left on the tree at this time.

There are two more trees at the same place from which Knight took budwood. These varieties, however, do not seem to have been established in California, as Knight only catalogs one from Jalapa.

Jose thinks El Rodeo is somewhat lower in elevation than Jalapa.

Tuesday Guatemala City March 20, 1933

Prepared the following shipments of *Cardinalis*

No. 92. Avocado #15

Tube 1. 6 sticks in moss. Standard system

" 2. 5 sticks ditto

3. 5 sticks in moss. Sticks soaked 10 min. in sol. 10% formalin to 1 pt. H₂O

4. 5 sticks in moss. Sticks soaked 10 min. in sol. mercuric bichloride 1-500.

5. 3 sticks in glass tube, air not burned out plug wet cotton & plug dry cotton

6. 3 sticks in glass tube, air burned out plug wet and plug dry cotton

No. 93. Avocado #20

Tube 1. 6 sticks in glass tube, air not burned out. Plug moist & plug wet cotton

" 2. 7 sticks in moss. Standard system

3. 5 sticks in moss. Sticks soaked 10 min. in sol. 10% formalin to 1 pt. H₂O

4. 5 sticks in moss. Sticks soaked 10 min. in sol. mercuric bichloride 1-500.

No. 94. Avocado #17

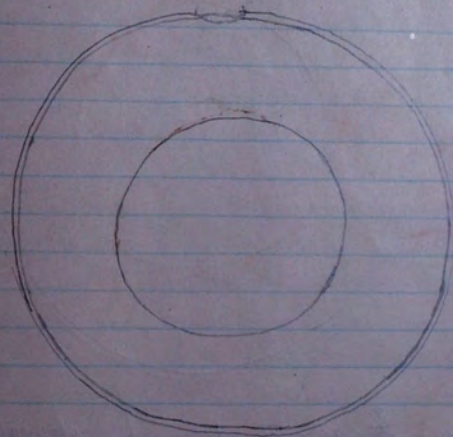
Tube 1. 10 sticks in moss. Standard system

" 2. 7 " " "

3. 5 " " "

Sticks soaked 10 min. in sol. 10% formalin to 1 pt. H₂O

4. 5 sticks in moss. Sticks soaked 10 min. in sol. mercuric bichloride 1-500.



Weight of fruit 15 gms. Seed 2 gms.

Thursday Guatemala City March 23 1914

Avocado. From a tree in the finca "La Palovina", on the road to the cemetery at Antigua.



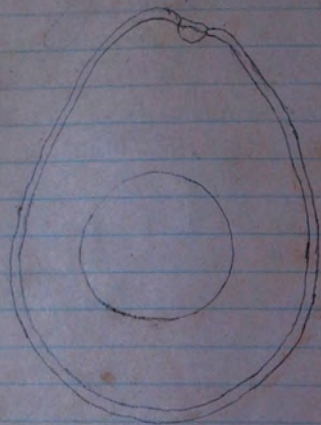
Form broad-pyriform to obovoid; size very large, weight 20 ozs. length 5 ins, greatest breadth $3\frac{3}{4}$ ins. base pointed, the stem inserted obliquely without depression; apex rounded, slightly depressed immediately around

stigmatic point; surface pebbled to rather rough, deep purplish maroon in color, almost glossy, with few, inconspicuous, lighter colored dots; skin rather thin for this type, about $\frac{1}{16}$ inch, fairly pliable and peeling from the flesh when fully ripe, and of purplish maroon color clear thru to the flesh; flesh rich cream yellow in color, changing to pale green close to the skin, firm, of rich flavor, quality excellent; seed medium size, weighing about 3 ozs, tight in the cavity with both coats adhering closely. Season commencing in February, when the first fruits fall, and lasting probably until April or May at Antigua.

An attractive fruit of fine quality. The parent tree is bearing a good though not heavy crop this season. When cut, the contrast of the purplish maroon skin with the yellow flesh is very attractive. The purple of the skin intensifying the yellow of the flesh.

Tuesday. Purula, Guatemala

Mar. 27

Arocno
No. 22

Agave from the site of Santiago Mendoza



From site of don Ernesto the Alcalde

Thursday Tacic, Guatemala Mar. 29 19

Wild This morning we climbed the mountain to the north of Tacic in search of the wild agave. After reaching the crest of the range near the Cumbre de Tacic, we obtained the assistance of two Indian boys, and commenced a search in a small bit of forest which crowned a dome shaped prominence about 6300 ft in elevation. All around this prominence the forest had been cleared off by the Indians, and was either in cultivation or covered with brush and the beginnings of a second growth of timber. The original forest on this peak, and on others in the near distance, appeared to have been left intact.

On the slope of this small peak, growing in deep shade beneath a heavy canopy of figs, we found scattered here and there with a distance of some 200 yards, about 10 young agave trees. We were unable to locate the parent tree from which the seeds had come due to the thick undergrowth which prevented one from obtaining a good view of the trees above. The young trees were 3 to 8 feet in height and were agaves beyond the possibility of a doubt.

On arriving here, I find that some (by no means all) of the cogo trees are in flower. I had already seen and described the foliage and fruit of this tree, but had not yet seen the flowers. Since my material is now complete it seems feasible to make a description of the species since it appears to be as yet undescribed, so far as we have been able to determine.

A large semi-deciduous tree 35 to 45 feet in height, usually stiffly erect with an oval or sub-conical crown, but occasionally short and spreading, with a dense, choppy crown. Bark rough, with narrow, irregular channels, gray-brown with a slight reddish tinge. Branchlets stout, terete, brownish pubescent when young, the growths 10 to 20 cm long, producing leaves only toward their apex, or when ^{terminal and} arising from old wood often not more than 3 cm long and producing leaves throughout their length. Lenticels purplish on young, vigorous shoots.

Leaves alternate, stipulate, petioles entire, semi-deciduous just before the time of flowering, the new leaves appearing almost immediately. Blades oblong-elliptic to elliptic-lanceolate, 14 to 22 cm in length, 8 to 11 cm in breadth (sometimes even larger).

stiffly chartaceous.
 Shortly acuminate, acute, or sometimes almost
 blunt at the apex, rounded to subacute at
 the base, bright green and glabrous, with the
 venation impressed above, glaucous, and ferrugineous
 pubescent, with the venation conspicuous below.
 The young leaves are covered with a ferruginous
 tomentum on both surfaces. Petiole stout,
 terete, 1.5 to 3 cm. long, heavily ferruginous
 pubescent when young, but at length glabrate.
 Sometimes narrowly canaliculate close to the
 base of the leaf blade.

Flowers produced on short stiff racemes 4 to 12 cm. long,
 base of the new growth. Pedicels stout, pubescent.
 Pedicels about 1 cm. long, pubescent, subtended by
 slender bracts up to 5 mm. long. Perianth division
 6, lanceolate, about 6 mm. long and all of even
 length, heavily pubescent, with age turning ^{pale greenish yellow} crimson
 at their bases. Stamens 9 in 3 series, the
 filaments pubescent, at first pale greenish but with
 age turning crimson, like the bases of the
 perianth divisions; anthers oval, opening by valves.
 Ovary 6, oval, bright orange in color, borne upon
 short stalks about the dot of the ovary, the
 stalks pubescent and turning crimson with age.
 Ovary ^{stamens 3} conical or ovoid, like the style
 densely pubescent, 1-celled. Ovule 1. Style and

For description of the fruit see pp. 7-10 and 17-19
 of this volume.

Flowers produced November to March; fruit ripens
 July to October.

This species is easily distinguished from
P. americana Miller by the heavy ferruginous
 pubescence present on the young shoots and young
 leaves, and by the reddish coloring of the
 perianth lobes and filaments when old. The plant
 is also somewhat coarser throughout, the young
 shoots being much stouter than in *P. americana*.

Branches sometimes as much as 40 cm. long on strong shoots.
 Leaf blades sometimes obovate, shortly acuminate, up to 30 cm.
 long and 16 cm. broad.

Racemes sometimes as much as 15 cm. long.
 Outspread flowers 14 mm. broad; perianth lobes 6 mm.
 long and 3 mm. broad at base. Color of base of
 lobes and of filaments so old flowers sometimes not
 as deep as crimson, but light rose.

Contrasting the distinguishing characteristics of the avocados (Guatemalan type, at least) and the cayo, we have

A. Young shoots and under surfaces of the leaves heavily ferruginous pubescent; flowers greenish yellow, when old the bases of the perianth lobes and the filaments turning rose to crimson.

--- P. sp. (cayo)

AA. Young shoots and under surfaces of the leaves slightly grayish pubescent; flowers pale green, not changing color with age.

--- P. americana

Or, better, perhaps

A. Leaf blades not crenate, but smooth; young shoots and under surfaces of the leaves finely grayish pubescent; flowers pale green, not changing color with age.

--- P. americana

AA. Leaf blades slightly crenate; young shoots and under surfaces of the leaves heavily ferruginous pubescent; flowers greenish yellow, when old the bases of the perianth lobes and the filaments turning red.

--- P. sp. cayo

Sunday San Cristóbal Verapaz, Guatemala April 11, 1917

We left Tactic this morning at 6.45 and reached here in a little less than three hours.

The ride between Tactic and San Cristóbal is one of the prettiest I have seen in Guatemala. One might almost imagine that he was in New England, so similar is the appearance of the country to some which I have seen around Boston. The hills are covered with timber, oak, liquidambar and pine being the dominating features of the forest, and there are some intervening meadows on which cattle graze. Occasionally there is a small house with corn fields close by, and a few avocado and injerto trees scattered about.

At San Cristóbal we found the market in full swing. It is one of the best markets in Guatemala, due, undoubtedly, to the fact that the country hereabouts produces a large variety of fruits, vegetables, and other products. There are not a great many fruits in season now, but I saw pineapples, sweet limes, aguacates, avocados (*Annona reticulata*), injertos, papayas.

Names of plants in Quekchi' and Pokomchi
according to José Cabral

	QUEKCHI	POKOM
pineapple	chops	chop
guava (<i>P. Guajava</i>)	patá	patá
" (<i>P. mollis</i>)	chamach	
avocado	oh	oh
<i>Ochradelepha viridis</i>	raytul	raytulul
<i>Passiflora ligularis</i>	granish	kashlen chun
<i>Cydonia oblonga</i>	extranger's fish	fish
tomato	fish	fish
sweet orange	kii'ichin	kii'laran
sour or bitter orange	aranch	aranch
sour lime	lamunish	limunish
sweet lime or sweet lemon	lima	lima
peach	duragno	duragno
apple	malagana	malagana
pear	pera	pera
loquat	mispero	mispero
watermelon	sandia	sandia
papaya	papaya	papaya
white sapote	matasano	matasano
cayó	kat'yoh	kat'yoh
cherimoya	pap	pap
jocote	rum	rum
mango	mango	mango

pepino	pepino	pepino
banana		
plantain	tul	tulul
fig	higo	higo
strawberry	pusa	pusa
sapote (<i>Lycium mammosa</i>)	saltul	saltulul
napodilla	chico	chico
sour sop	kopf	kopf
<i>Almona reticulata</i>	tzimung	tzimung
sugar cane	utzal	shikik
chicaya	kup	kup
Indian corn	ichin	ichin
peanut	manich	manich
cacao	cacao	cacao
vanilla	cheebik'	cheebik'
wild blackberry	tokan	tokan
<i>Bahia imperialis</i>	tyoloh	shihor
guinea	membrillo	membrillo
brejuela	ruuk	ruuk

gumming stone (matatle) is called káa

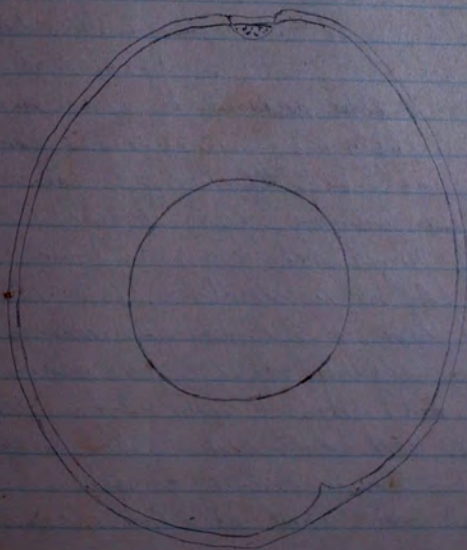
A contribution to our knowledge of the methods employed by various peoples utilizing the seed of *Theobroma cacao* L., — being a brief account of the preparation of the beverage known as batido by the indigenous inhabitants of the Department of Alta Verapaz, Republic of Guatemala.

The cacao bean, with the outer integument left on, is toasted and then ground upon the *hacha*. One half of the beans are ground fine, the other half left coarse. The ground beans are then put in a gourd, a little tepid water is added, and it is beaten with the hand for some minutes, until the batter stands on top in white flakes. If the batter does not come out readily the mass is heated a trifle.

The batter mass which is a thin paste, can be kept about 1 day. It is seasoned with a little black pepper. Sometimes with cinnamon also and colored with red ochre. Occasionally it is seasoned in the orthodox fashion with *ajonjolí*. A quantity of the paste equivalent to a large teaspoonful is added to a gourd of hot water, the quantity of water approximating a breakfast. A few take it with sugar, but usually it is taken without. Sometimes a little vanilla is added for seasoning in place of pepper. The drink is served to visitors in the Alta Verapaz, the way coffee is in some other sections. Called *bebido cacao* - *cacao molido*.

Altitude of San Cristóbal 4650 ft. In spite of the elevation it is very apparently a warmer spot than Iactic.

From the capital of Vicente Castell (outline of No. 24) first on p. 32 of this volume, marked "no. 2")

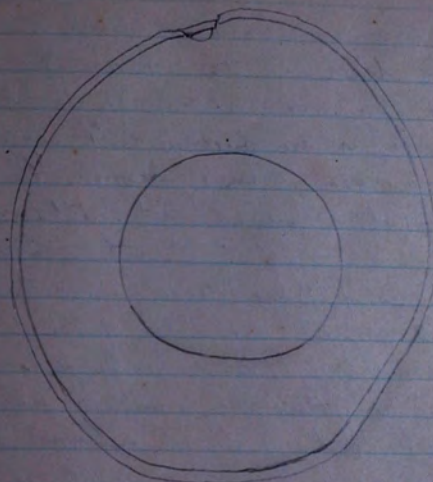


Weight of this specimen 18 gms.
Length $4\frac{1}{2}$ ins. breadth $3\frac{1}{8}$ ins.
Weight of seed 2 gms.

Monday San Cristóbal Verapaz, Guatemala Apr 2

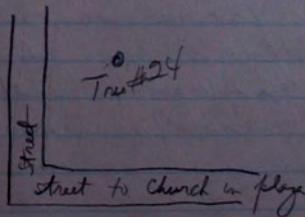
Avocado Description of Avocado No 24, from Capital of
No 24 Oriente, Caud.

Form broadly obovoid or broadly oval to round,
size medium to large, weight 14 to 18 oz., length
4 to 4½ ins., breadth 3¼ to 3¾ ins.; base rounded,
the long, rather slender stem inserted slightly
obliquely without depression; apex obliquely
flattened though not markedly so, depressed around
the stigmatic point; surface pebbled and slightly
irregular, color rich; dark maroon when the
fruit is fully ripe, with numerous large russet
spots; skin thick, ⅙ to nearly ⅙ in.,
hard and woody; flesh of light yellow color
faintly tinged with green near the skin, free
from pits or discoloration, firm and of rich,
oily flavor; quality excellent; seed spher-
ical or slightly oblate, comparatively rather
small, not weighing over 2 oz., light in the
cavity with both seed coats adhering closely
to the nearly smooth cotyledons; season
March and April at San Cristóbal.



Avocado No 24, specimen weighing 14 ounces

This tree stands in a small cafetal in the Barrage
of Santa Ana, two blocks (approximately) north of the
church. It is near the corner of the cafetal.



The tree is about 30 ft high with a trunk a foot thick at the base. The first branch about 10 ft from the ground. The crown is rather thin; it is now putting forth red new growth and is just coming in to bloom. The crop this year was not immense, but quite satisfactory.

Avocado
No. 10

In yard of Diego Muus. This tree is slender, about 30 feet high, the first branches 10 feet from the ground. The fruits have all been picked from this tree, and it has made its new growth, but I do not see any sign of flowers or young fruits. It probably is not going to bloom this year.

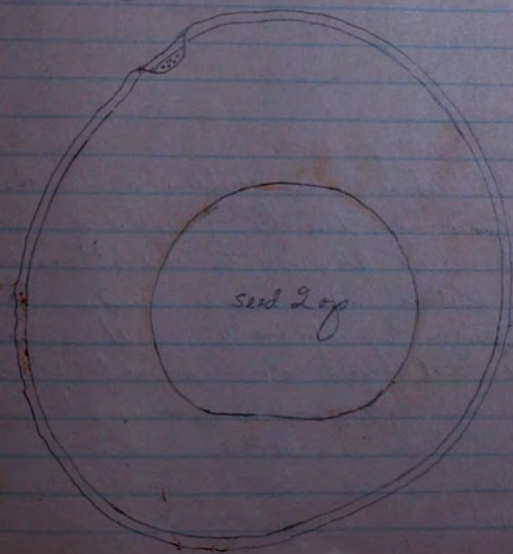
The tree is growing among coffee, in a favorable situation, the soil around its base being kept mulched and receiving some fertilization through litter and refuse from the house. The soil is a fine red loam. Its crown is well up in the air but is somewhat crowded by another avocado tree 10 feet to the west. Francisco Muus thinks the tree is 7 or 8 yrs old. It has only been in bearing 2 years.

Dined with Francisco Muus and family

Orejuela. They use this flower only for batido. One petal is ground with the cacao for a batch of batido. The people of Orejuela say a great deal from here, but Muus does not know how they use it over there.

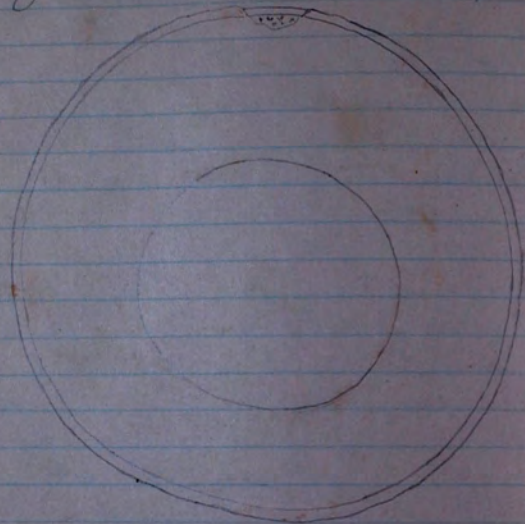
Avocado. Muus gave me the specimen of which an outline is below. It weighed 20 ozs and was a magnificent fruit.

AVOCADO
No. 25



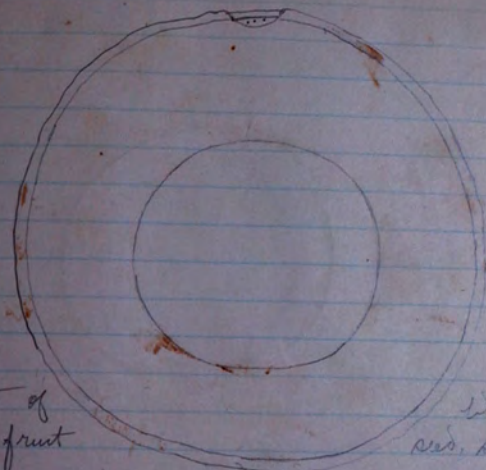
Tuesday San Cristobal Verapaz, Guatemala Apr 3 19

AVOCADO
No. 11.



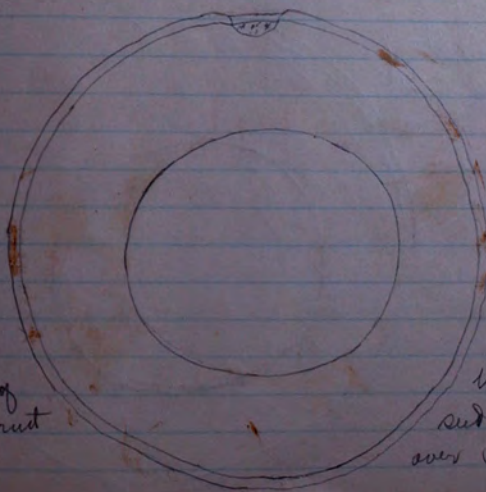
The above is an outline of the best specimen obtained from this tree (capital of Escuintla City). It weighed 23 ounces, the seed 3 ounces. This is a fruit of fine shape, medium to large size, attractive in appearance, with clean flesh of deep yellow color and rich flavor. The tree is very large, and is bearing a fine crop this year. The seed is comparatively small for an oblate avocado, but in some of the smaller specimens is a trifle large.

AVOCADO
No. 11.



Weight of
entire fruit
18 ozs.

Weight of
seed, slightly
over 2 ozs



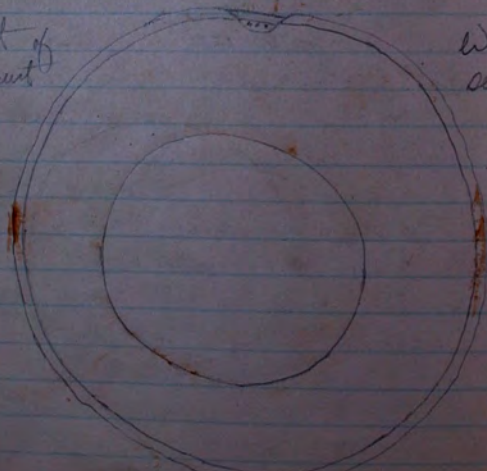
Weight of
entire fruit
20 ozs

Weight of
seed, slightly
over 3 ozs

AVOCADO
No. 11
Weight of
entire
fruit
12 1/2 oz



Weight of
entire fruit
19 oz



Weight of
seed, 3 oz

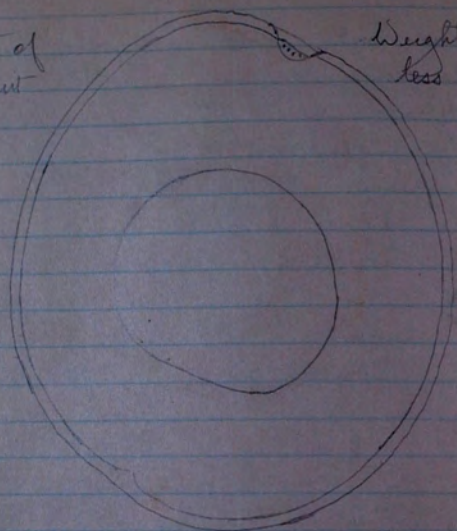
Weight of
seed, 3 oz

Description of fruit:

Form spherical to oblate; size large to very large, weight 17 to 24 oz, length 3 1/4 to 4 1/4 inches. Breadth 4 to 4 1/2 inches; base rounded, the stem ^{about 5 lines} inserted slightly obliquely without depression; apex slightly flattened; surface uniformly pitted, somewhat coarsely so, deep green to yellow-green in color, with numerous large pale yellow-green dots; skin moderately thick for the type, varying from 1/16 to 1/8 inch, hard and woody; flesh rich cream-yellow to yellow in color, changing to pale green near the skin, free from pitting or discoloration, not watery but very oily, and of rich, very pleasant flavor; seed oblate, medium sized, 2 to 3 oz in weight, tight in the cavity with both seed coats adhering closely to the cotyledons, which are slightly rough for the type. Season February to end of April or May at San Cristobal.

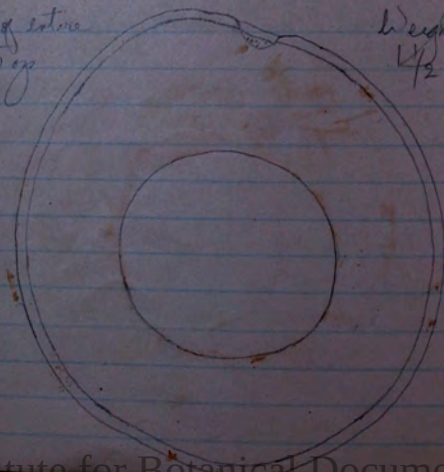
The parent tree is 50 feet or more in height with an enormous, spreading crown and a trunk about 4 feet in diameter at the base. The fruits are commencing to fall at this time (April 2nd) and the tree is in full bloom.

Avocado
No. 24
Weight of
entire fruit
16 ozs



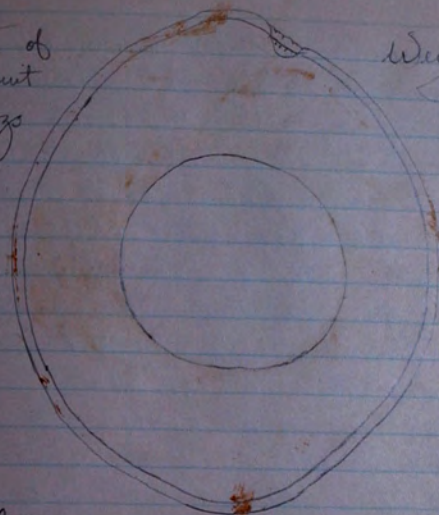
Weight of seed,
less than 2 ozs

Weight of entire
fruit 15 ozs



Weight of seed
 $4\frac{1}{2}$ ozs

Avocado
No. 24
Weight of
entire fruit
 $15\frac{1}{2}$ ozs



Weight of seed
2 ozs

Weight of
entire fruit
 $14\frac{1}{2}$ ozs



Weight of seed
slightly less than
 $4\frac{1}{2}$ ozs

Injerito

The injerto (called here ray tul) is abundant in the markets here at this time. Small ones sell at 2 for 1 real, large ones a real each.

This fruit strongly resembles the sapote (*Lucuma mammosa*), but is by no means so coarse, either in texture or flavor. The flesh is smooth, and sometimes soft and melting, as in the specimens I have seen in San Cristobal it is firm and meaty, and just a trifle dry. In color it is orange brown. The flavor is sweet, and is unobscurable. It is very similar to that of the sapote, but not so strong nor so squash-like as the latter sometimes is.

The fruits seen here vary from slender to broadly turbinate in form, pointed to flattened at the base and sharply pointed to blunt at the apex. The skin is green or yellow green on the ripe fruit, thin, adhering closely to the flesh. The fruits are commonly about 3 inches in length.

The tree is sparingly productive but is said to require a long time to come into bearing. I doubt if it would meet with favor on the American market, though it might successfully be raised in Florida. It is probably somewhat harder than the sapote as it grows here at higher elevations.

Orejuela

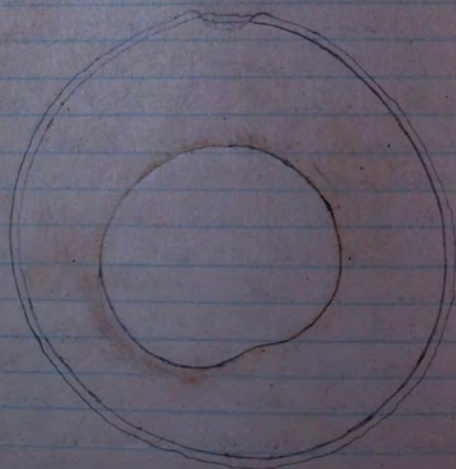
This morning I photographed some flowers of the orejuela (*Cymbopetalum procumbens* (L.f.)) which I obtained from a tree in the southwest part of town, near the ^{edge of the vegetation} ~~border~~. There are two trees here, growing among coffee bushes and each about 20 feet high, slender in habit. They are now coming into flower but do not have as yet many mature flowers. The principal season for flowers is said (by Francisco Alvarez) to be June, at which time they are picked and the petals removed and dried in the sun, after which they can be kept a considerable length of time.

In the mature flower the petals, which are 3 in number (rarely 4) and each shaped like a small ear, are deep orange in color and very thick. They are somewhat leathery in texture, but break with a clean fracture upon bending, and are strongly aromatic to the taste, though not strongly perfumed. Their flavor is somewhat similar to that of black pepper, with the addition of a resinous tang.

The orejuela appears to be very little used at San Cristobal, and up to the present I have only seen the two trees mentioned above.

AVOCADO In situ of Francisco Muns, called "Chiguitop"
No 25 (Tree Chorrás in Spanish) beyond tannery of
Don Alfonso. Tree stands among coffee
bushes, about 50 paces from the road. It is
about 40 feet high, the trunk 18" thick at
base, dividing 12 ft from ground, with the
first lateral branches at 18 ft from the
ground.

The property is on the road to Chifay, on the
outskirts of San Cristóbal.



Description of fruit.

Form obliquely spherical, sometimes slightly
narrowed toward base; size medium to
very large, weight 14 to 20 ozs., length $3\frac{3}{4}$
to $4\frac{1}{4}$ ins., breadth $3\frac{3}{4}$ to 4 ins., base slightly
flattened, oblique, the stem insertion oblique,
without depression; apex obliquely flattened;
surface pebbled, most pronouncedly so around
base, deep green to yellow green in color, almost
glossy, with numerous, small, more or
yellowish dots; skin moderately thick $\frac{1}{16}$ to
 $\frac{1}{8}$ inch, hard and woody; flesh cream yellow, without
fiber or discoloration, firm, deep, rich in
flavor; quality excellent; seed medium sized
weighing about 2 ozs., light in the seed
cavity, with both seed coats adhering closely
to the smooth cotyledon. The seed is some-
times epicarpic. Grown at San Cristóbal
February to May.

A fruit of exceptionally fine quality. In
some specimens the seed is a little too large,
but I believe under good culture there
would be no difficulty on this point.

Francisco Munos says the injerte begins to bear at about the same age as the aguacate, which would be 5 years, more or less.

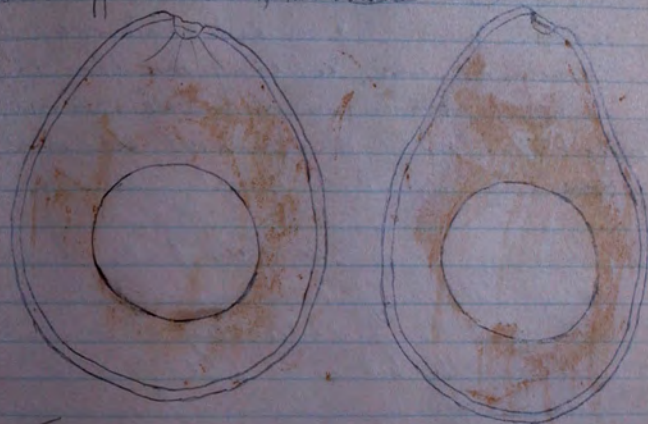
He says a large part of the aguacates seen here are volunteers, from dropped seeds, but when the natives eat a good fruit, they sometimes plant the seeds. He thinks many of the trees in the capotales are from seeds intentionally sown. He says any kind of soil suits the aguacate.



The above outline is of an aguacate from Santa Cruz given me by Don David Priore. As the thickest skinned I have seen in this country, the skin being $\frac{1}{8}$ to $\frac{3}{16}$ inch thick, very coarsely granular.

Wednesday Tacic, Guatemala April 4 1917
We returned here from San Cristobal today, and found that the fruits of Avocados nos. 22 and 23 which I had left here to ripen were ready for sampling.

From the Outine of Santiago Mendocino in Purulhi
see also pp. 51 and 132, this volume

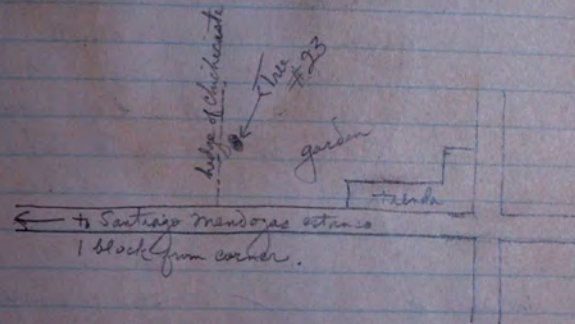


Form broadly obovoid to pyriform; size small, weight 5 to 6 oz. length $3\frac{1}{4}$ to $3\frac{1}{2}$ in. breadth $2\frac{3}{8}$ to $2\frac{3}{4}$ in. at base. Tapering, the moderately stout stem, which is $5\frac{1}{2}$ in. long, being inserted slightly obliquely without depression; apex rounded or almost imperceptibly obliquely flattened; surface rough, deep dull purple in color when fully ripe, with rather few small russet dots; skin thick $\frac{1}{16}$ inch at base to nearly $\frac{1}{8}$ inch at apex.

coarsely granular and woody, peeling readily in the ripe fruit; flesh rich cream yellow, changing to pale green near the skin, objectionably marked with fiber traces but without any tough fibers, melting and buttery in texture; exceedingly rich and agreeable in flavor, quality good; seed roundish oblate, small to medium in size, weighing less than 1 oz., tight in the cavity with both seed coats adhering closely to the smooth cotyledons. Season December to April at Purula.

This is a remarkable little fruit. It is very rarely that one finds a small fruit of this type with a proportionately small seed, but in this one the seed is of about the same comparative size as in the good larger varieties. The flavor of this fruit is excellent; it has the valuable characteristic of ripening earlier than most other varieties of the region, and the tree is very prolific. The only visible defect is the discoloration of the flesh by fiber traces, - quite objectionable in some specimens examined, not so bad in others.

From a sitio in Purula, Baja California, owned by Arcadio Saguirre, but now occupied by Eusebio Cuzman, who keeps a small carpenter shop and tienda on the property. The tree is located as shown in the diagram below.



The tree is tall and slender, apparently not very old, about 40 ft high, with a trunk about 1 foot thick at the base. The crop this year is heavy, and is just commencing to ripen April 1st. The fruits are of desirable size and form, with a rather small seed, and clear flesh of most excellent flavor, - very rich, oily, and not the least bit watery. It looks to me like a very valuable aqueduct. It has an unusually thick skin, which separates readily from the flesh at the right stage of ripeness.

AVOCADO
No 23

Weight of entire
fruit $13\frac{1}{2}$ ozs



Weight of seed
 $1\frac{1}{2}$ ozs

Weight of
entire fruit
15 ozs



Weight of
seed .2 ozs

AVOCADO
No 23

Weight of
entire fruit
 $15\frac{1}{2}$ ozs



Weight of seed
2 ozs

Description

Form spherical to roundish-obovoid, sometimes slightly oblique; size medium to above medium, weight 13 to 16 ozs, length $3\frac{3}{4}$ to 4 in, breadth $2\frac{1}{2}$ to $3\frac{3}{4}$ in, base rounded to obscurely pointed, the stem rather slender, inches long, and inserted obliquely without depression; apex rounded or slightly flattened obliquely; surface decidedly rough, greenish purple to dark purple in color in the ripe fruit with numerous, large, greenish yellow dots; skin very thick, varying from as much as $\frac{3}{16}$ inch near

the stem, where it is thickest, to somewhat more than $\frac{1}{16}$ inch near apex, where it is thinnest, coarsely granular, woody, but separating readily from the flesh at the right stage of ripeness; flesh rich cream yellow in color, without green discoloration except in a very slight degree, pale green near the skin. Firm, fleshy, of rich, pleasant flavor, quality excellent; seeds white, spherical to spherical in form, medium sized, weighing $1\frac{1}{4}$ to 2 ozs., light in the cavity with both seed coats adhering closely to the smooth cotyledons. Season rather late, not ripening until the end of March at Purulh.

This is an avocado of exceptionally good quality, the flesh rich cream yellow, free from discoloration, and very attractive in appearance. It is firm, & cuts nicely. The skin, while thick, is pliable, and does not break when cut.

Friday Chiefl Guatemala

April 6 1914

Through the courtesy of R. W. Hempstead I have obtained the following records of rainfall at Caban:

Lluvias mensuales en milímetros, medidas en Chimap de Sapper y Cia.

	1913	1914	1915	1916	1917
Enero	201.8	148.0	120.1	182.5	92.2
Febrero	25.9	104.0	176.4	170.2	26.6
Marzo	259.6	114.9	126.8	110.1	52.1
Abril	182.2	110.5	151.5	290.8	
Mayo	353.5	109.7	175.9	186.3	
Junio	271.0	352.2	197.2	245.2	
Julio	263.0	313.4	229.8	269.0	
Agosto	201.1	88.1	228.7	476.0	
Septiembre	281.9	255.1	202.8	185.7	
Octubre	264.0	282.3	464.5	244.7	
Noviembre	184.0	276.6	283.7	484.8	
Diciembre	166.0	137.2	173.3	146.9	
TOTAL	2654.0	2292.0	2530.7	3022.2	

The Encyclopedia Britannica divides the climate of Central America into three zones, viz.

tropical zone (tierra caliente) sea level to 1500
temperate zone (tierra templada) 1500 to 5000 ft
cold zone (tierra fria) above 5000 ft

In same work the climate zones of Mexico, after H. H. Bancroft, are given as follows:

tierras calientes sea level to 3280 ft
tierras templadas 3280 to 5577 ft
tierra fria 5577 to 8200 ft

Rainfall at Chejel, in inches, from January 1913 to March 1917.

	1913	1914	1915	1916	1917
Enero	4.12	1.76	0.62	12.47	2.72
Febrero	12.13	8.23	1.42	3.79	1.97
Marzo	3.14	2.25	1.65	1.63	0.38
Abril	9.20	5.50	2.06	5.15	
Mayo	21.03	12.86	1.20	13.69	
Junio	24.12	21.47	11.01	21.95	
Julio	18.22	12.38	13.88	18.28	
Agosto	11.02	15.25	15.13	16.77	
Septiembre	27.35	8.48	13.44	16.25	
Octubre	11.96	12.78	15.09	4.81	
Noviembre	8.83	8.50	10.43	9.83	
Diciembre	7.05	3.58	3.86	3.11	
TOTAL (INCHES)	158.17	113.04	89.79	127.73	

158.17
113.04
89.79
127.73
4488.73
122.15

Temperatures at Chiefl, Fahrenheit
1915

	6 AM	12 M	6 PM	6 AM	12 M	6 M
January	68	82	74	60	74	70
February	69	84	77	63	78	70
March	60	68	63	68	82	72
April	60	78	70	64	78	69
May	64	82	70	68	84	76
June	78	83	73	68	75	72
July	68	80	72	67	82	72
August	66	80	72	65	80	70
September	64	78	70	66	80	71
October	68	80	71	67	78	74
November	62	73	70	66	78	72
December	60	80	70	62	76	71

Average daily temperature during each month, at 6 a.m., 12 n., and 6 p.m.

Monday Tactic, Guatemala April 9 1917

Besides batido, there are two other drinks prepared from cacao by the indigenous, viz., pinol and tiste.

Pinol is a hot drink resembling chocolate. It is said that before the introduction of coffee into this country the natives used maize and batido in its place.

Pinol is especially good for nursing mothers, producing an almost supply of milk.

2 lbs of Indian corn $\frac{1}{2}$ lb of cacao, if it is to be of good quality. Both ingredients are toasted (the corn until it pops) and are then ground very finely on the *haci*, a little cinnamon a little anise, a little vanilla, and a little cardamom are added for flavoring, and ground with the cacao and corn. Sugar or dulce is sometimes added, either at the time the mixture is prepared or when it is mixed with water for drinking.

For use, 2 to 4 teaspoonfuls of the powder are added to a cup of hot water. The resultant drink is to my mind

much preferable to batido, but the corn gives it a gritty feeling in the mouth which is not entirely agreeable to me.

José says in parts of Alta Verapaz, north of Colón, where coffee is not grown, porcel is still used rather extensively, but where there is coffee it is not so common.

Porcel José says there is a variation of this drink called porcel, which is made on the Rio Negro and Rio de la Pasión. The "mass"-ground corn—which is used to make tortillas, and put about 4 oz of ground cacao to 2 or 3 lbs of this mixture. The cacao is mixed well with the mass, and the latter is then made into a ball or loaf to carry on journeys. A little of the mixture is added to a cup of hot water, and a little dulce used to sweeten it. It takes the place of coffee on journeys, when coffee can not be obtained.

Tortillas Take lbs or thereabouts of corn, a hand ful of lime (large one); the corn is placed in water and the lime added, after which it is necessary to stir the corn occasionally, and as soon as it is found that the skin can be loosened with the fingers, the corn is removed and put to one side. This is usually done in the evening, and the following morning the corn is washed thoroughly. It is then ground 5 times, the tortillas being pinched with the hands after the third grinding.

Agave José says that the Torapay Indians say eating agave cactus is very good for the voice. They also say that eating agave cactus brings a cold "to a head" very promptly. For inflammation of the bowels the ground agave cactus seed, mixed with water, is considered efficacious.

The Indians say that young girls should not eat agave cactus. For males it is said to be all right, but as it is somewhat "spicing" it is not considered suitable for young girls.

It is said that song birds in cages learn to sing more rapidly, and sing better, when they are fed aguacates daily. Young birds, recently brought and caged, are fed thusly that they may learn to sing quickly and well.

The Cobanceros say that the aguacate should not be eaten too freely or it may injure one, as it is very "cold" and may injure the digestion.

Poor people frequently make a meal off of one aguacate, 4 tortillas, a little salt, and a cup of coffee. The salt is put in the seed cavity of the aguacate. This is the common diet of the very poor classes. Four or five aguacates can be bought for two reales. A whole meal such as this does not cost over 4 reales, and if the cup of coffee is small, the cost is about $2\frac{1}{2}$ reales. The value of 4 reales is $1\frac{1}{4}$ cents U. S. G.

Tuesday Tacic Guatemala April 10 1917

Avocado Four specimens of avocado No. 11, from San Cristobal, which I left here last week, are now ripe.

11 There are all small specimens of the variety. In three of them the seed is larger than desirable. It seems to be noticable that the seed is about as large in small specimens of a variety as in large ones, hence it may appear large when seen in small fruits and medium sized when seen in large fruits of the same variety.

These fruits also have the skin so thick and woody that it is cut with difficulty, frequently breaking away from the knife. This apparently is not due to its thickness so much as its texture.

The flavor and quality are beyond criticism. The flesh is rich yellow, not the least bit watery, and without the least discoloration. Its flavor is dry, rich, and very pleasant.

The only point I can find against this fruit is the size of the seed, which is often slightly too large, especially in small specimens.

AVOCADO
No. 24

This fruit is not so dry and rich in flavor as No. 11. Two specimens left here with those of the latter number have not ripened perfectly, but as far as I can judge the flavor is going to be satisfactory. I found them in specimens examined at San Cristobal. The color of the flesh is rich yellow and the seed is comparatively rather small. The external color of the fruit is a deep, dull purple.

Tuesday San Cristobal Verapaz, Guatemala April 10 1919

Vicente Chal says the seed of the aguacate is used to cure dysentery. The seed is cut in small pieces and boiled, after which the water is taken internally.

He says in his experience the aguacate has always come into fruit 6 to 8 years from seed.

He also says that he has seen soap made of the aguacate.

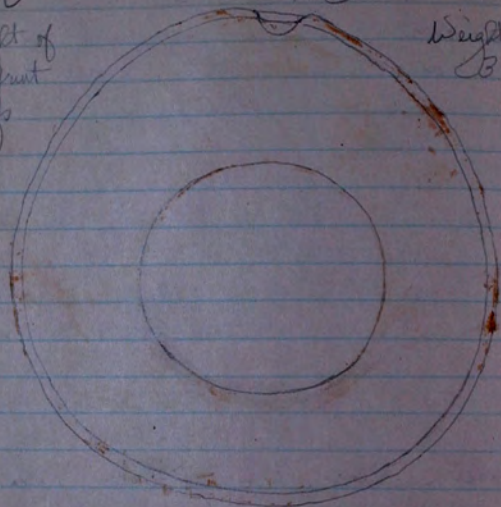
AVOCADO No. 11 Don Eusebio Cruz says he does not know how old the tree is. He bought the entire in which it stands ten years ago and the tree was just as big then as it is now.

He says the tree bears every year. Some years he thinks it has borne as many as 1500 fruits. He believes it to be the best aguacate in San Cristobal. I paid him 20 pesos for the privilege of cutting some balsa wood and a few fruits. He says the fruits sell at about 15 pesos a hundred. Ordinary avocados bring about 10 pesos a hundred. Very few avocados are sold here by the hundred, however.

Wednesday San Cristobal Verapaz, Guatemala Apr 11 19

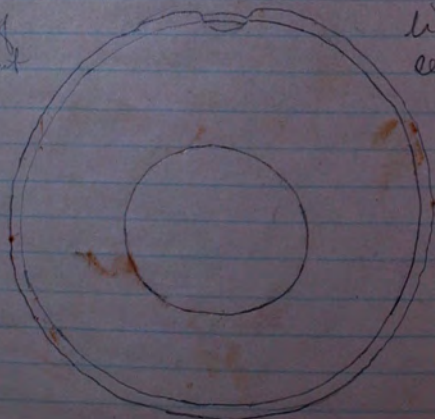
AVOCADO
No 11

Weight of
entire fruit
21 gms



Weight of seed
3 gms

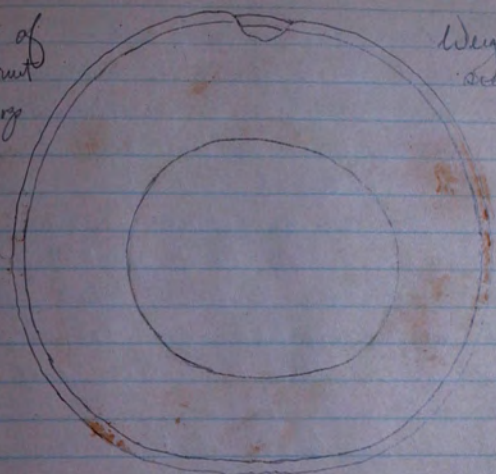
Weight of
entire fruit
12 gms



Weight of
seed 1 gms

AVOCADO
No 11

Weight of
entire fruit
18 1/2 gms



Weight of
seed 3 gms

Weight of entire
fruit 18 gms



Weight of seed
2 1/2 gms

Avocado
No. 11

The four outlines on pp. 176-177 are from four fruits picked at random, and represent practically the entire range of variation within this variety, as far as I am able to judge from an examination of some 50 specimens.

Taking an average of all, the seed is not unduly large. In the oblate fruit it is, in fact, quite small. The two fruits on p. 174 represent about the average; the upper one has the seed a little larger than the average, probably.

Size. It appears to me that the size of the seed in the avocado is not dependent so much on the extent upon which the tree is supplied as is the size of the fruit. I have noted that practically all avocados growing in pastures or waste places have small fruits, but seeds as large as avocados growing in cafetales or back yards where the conditions are much more favorable for growth and where the fruits are often much larger than those on "wild" trees. Small-fruited and large-seeded varieties are however often found in cafetales and cultivated places as well as in waste places. A good variety is very rare anywhere.

It seems to me that some of the principal factors in the evolution of the avocado have been the following:

1. Good trees are preserved and poor ones cut down. I have often noted that where there is a very large and old aguacate tree apt to be of a good variety. The natives, in cutting it down, to plant coffee or for other purposes, doubtless cut down many aguacate trees. But when a tree is known to produce an especially fine fruit it would be spared. Francisco Orma confirms this belief, and the presence of occasional very old trees in cafetales, trees which must have occupied the ground long before the coffee was planted, shows that they have been left when the land was cleared, and most probably for the deliberate purpose of preserving a good variety of aguacate.

2. Good fruits only are brought to market, and thus the dissemination of the poor ones is checked. Many trees produce fruits of such inferior quality that they are not even picked, but are left for the

zapalotes. The best fruits are the ones to reach the market, from where they are carried by the natives to near localities and the seed then dropped, giving rise to a tree with better parentage and hence better chances of producing good fruit than if it were from a seed of a very poor avocado.

The first factor must be considered conscious selection on the part of the people. The second is conscious selection also, but is not done so much for horticultural motives as from gastronomic ones. That is, the best fruits are selected because they are the best to eat, and not because their seeds, when planted, will produce better seeds. In those rare instances where a person sows an especially choice avocado and plants the seed in his garden with the deliberate intention of reproducing the variety, the proposition assumes a different aspect. But from all that I have seen in Guatemala, I am of the opinion that the vast majority of avocado trees in the Republic are from seeds thrown aside after eating the

fruit, and an avocado tree which has been deliberately planted is rare. The avocado is greatly assisted in maintaining its existence, as a species, by the facility with which its seeds germinate, under favorable climatic conditions, even when lying on the surface of the ground. In this respect the avocado is like the orange.

Aside from the factors above considered, the effect of culture - increased food supply and limiting the struggle for existence, - upon the fruit must be considered. When brought out of the forest and planted in gardens, where the food obtained in the soil is artificially increased by manure and where the struggle for existence which holds sway in the forest no longer exists, or is at least much less intense, the fruit is almost certain to be increased in size.

Summing up, then, it seems that the improvement of the avocado may likely have been brought about, first, thru bringing the tree into cultivation, and 2nd, through selection of the best fruits for propagation and dissemination, and 3rd, preservation of the trees yielding the best fruits and destruction of those giving worthless fruit.

Certain towns, among which the most prominent are Antigua, San Cristóbal, and Panajachel, are famous for their aguacates. It seems almost, that the best aguacates of the Republic are concentrated in these and a few other places.

The superiority of the aguacates in these places is, I believe, easily explainable. In the first place, the three points mentioned are unusually fertile and climatically favored, and in consequence are intensively cultivated in various crops. Along with an abundance of other fruit trees, they all have an abundance of aguacates. It appears to me that under reasonably good culture, there will ^{ordinarily} be a certain number of good aguacates out of every 100*. The foresting is not large, and therefore the chances of finding a good aguacate among a limited number of trees are very remote. When unfavorable conditions of growth are also present, in addition to a small number of trees, then I would expect to find no choice varieties whatever, or at most too few to pay for hunting them.

But when we have the combination of

* Provides the seed is not ate from very inferior fruit? - that is, in the ordinary conditions which obtain in Guatemala.

an immense number of trees and reasonably favorable conditions of growth; such a combination as exists in Antigua, San Cristóbal, and Panajachel, then the chances of finding an occasional choice tree are considerable, and these chances probably increase in exact proportion as the number of trees is increased.

We would expect, then, to find the best aguacates in those places where there are the most trees, and where the climatic and cultural conditions are at the same time reasonably favorable. In Guatemala the favorable sandy loams of sheltered valleys between 4000 and 6000 feet in elevation seem to be the places in which the avocado finds conditions for growth most nearly ideal, and when men assist by fertilizing the soil and attending to a few other cultural needs, the aguacate seems to reach its optimum so far as fruiting is concerned.

Perhaps it would be clearer to state the matter thusly: The exceptional fertility of soil, coupled with favorable climatic conditions, of certain sheltered valleys in Guate-

made has resulted in an extensive horticultural development in these regions. Coffee, fruit and vegetables are all grown more extensively in such spots than in less favored regions. Among other fruit trees which abound, the aguacate is one of the commonest.

Since an occasional seedling aguacate is of superior quality, at least when grown under favorable cultural conditions, it is not strange that in such spots as Antigua, San Cristobal, Orizaba, and Parí, where the climatic conditions are unusually favorable and where there are many trees, there should be found a larger number of good aguacates than in other places where the environment is less favorable, and where there are a smaller number of trees, or in other words, from chance.

The Indians and agriculturists. Cook and others have spoken of the intimate knowledge which the Indians of tropical America often possess concerning the plants which they live among, and have used. A closer association with the Indians on the part of botanists ^{has been used} in order to gather from them what their long experience has taught them.

It has seemed to me from a brief association with the Indians of northern Yucatan, that their knowledge of wild plants had not been overestimated by Cook. They had a name for nearly every tree in the forest, knew much concerning its habits, and frequently possess well defined beliefs concerning the medicinal or other uses to which the plant can be put.

Their knowledge of horticultural methods and practices, however, is not so deep as their knowledge of wild plants and their uses. Along agricultural lines they have their well established practices, which seem largely to be traditional, and still prepare the ground, plant, and cultivate their corn by the same methods employed before the conquest. Their horticultural practices seem even less clearly defined than those pertaining to agriculture. The production of the great staple crop, corn, naturally receiving more attention than

that of the fruits.

Above from a more or less conscious process of selection, to which is probably due the improvement of some of the native fruits, horticulture, in our understanding of the thing, is almost unknown. Even questioning of a number of intelligent Indians who owned considerable numbers of fruit trees failed to bring out any detailed cultural information. In regard to the aguacate, it does not appear that the Indians till the soil around the tree, apply fertilizing from the tree, or destruction any care upon it whatsoever. Some regarding the age at which seedling trees come into bearing are nearly always vague and rarely based upon accurate observation of a single instance. It is rather remarkable, in fact, that an agricultural people should have so few definite ideas regarding the culture of a crop which plays so important a part in their daily life as the aguacate. This notwithstanding the fact that their civilization may be found lower for they are an intelligent and in many ways capable people. The art of grafting appears to have been unknown before the advent of the Europeans, and is almost unknown at the present day.

Conditions are scarcely better among ladinos.

Thursday. San Cristobal Verapaz, Guatemala Apr 12 1919

ACACAO No. 8

This morning I went to Cobán to obtain kindwood of avocado No. 8. I found the tree in fine condition, with the growth farther advanced than on most of the trees here in San Cristobal. That is the flush of growth which produces the flowers, but before the flowers had all fallen. As far as I observed, the trees were not setting much fruit this season.

Taste

The following is Mrs. David Quiroz's receipt for taste:

- 4 lbs sugar
- 1 lb cacao
- $\frac{1}{2}$ lb toasted rice
- $\frac{1}{3}$ egg cinnamon
- 1 oz achote (Bixa orellana)

Vanilla to suit the taste.

Toasted french bread can be used in place of rice if desired. All the ingredients are mixed together and ground to a fine powder. About 2 tablespoonfuls of the powder are put in a glass of water, and mixed thoroughly with the molinillo.

Tuesday Guatemala City April 17 1914

Prepared for shipment to Washington the following material from the Verapaz.

No. 95. Avocado #8, from site of Tuluze, Pineda, Coban.

1 tube, moist moss & waxed paper

1 tube, ditto

1 tube, moist newspaper & waxed paper.

No 96. Avocado #10, from site of Diego Muniz, San Cristóbal.

1 tube moist moss & waxed paper

1 tube ditto

1 tube moist newspaper & waxed paper.

No 97. Avocado No 11, from capital of Escobedo de la Cruz, San Cristóbal

1 tube moist moss and waxed paper

1 tube ditto.

1 tube moist newspaper and waxed paper.

No. 98. Avocado #22, from site of Santiago Menoza, Pineda.

1 tube, moist moss and waxed paper

1 tube ditto

No 99. Avocado #23, from site of Escobedo Guzman, Pineda.

1 tube moist moss and waxed paper

1 tube ditto

1 tube moist newspaper & waxed paper.

No 100. Avocado No 25, from capital of Diego Muniz, San Cristóbal.

1 tube moist moss & waxed paper

1 tube ditto

No. 101. *Persea* sp. "Coyi" from site of Don David Puerrri, San Cristóbal.

1 tube moist moss and waxed paper

1 tube ditto

No. 102. 'Chupak', purple-fl'd shrub from Chitgahai (6000 ft) near Tactic

No. 103. Pink fl'd shrub from Chitgahai

Monday Guatemala City Apr 23 1916

Sent in my accounts today, claiming a total of \$544.90 U.S. Cy.

According to memorandum rec'd from Washn dated March 23, my account after settlement of last quarter 1916 stands as follows:
Balance due the United States \$ 1520.17.

Subtracting the amount claimed this quarter

$$\begin{array}{r} 1520.17 \\ 544.90 \\ \hline 975.27 \end{array}$$

The sum due the U.S. on April 1st would be, therefore, \$975.27.

The following varieties of avocado must all be introduced to the U.S. if possible:

- No. 3. Angel Samayoa, Amatlán
- No. 6. Víctor García, San José de Caba
- No. 8. Siladelfo Pineda, Caba
- No. 9.
- No. 10. Diego Muns, San Cristóbal
- No. 11. Eusebio Cruz, San Cristóbal
- No. 12. Cantina, Totomixtlahuacán
- No. 15. Finca Sta. Lucía, Antigua
- No. 17. Trinidad Hernández, Antigua
- No. 18. Finca La Palovera, Antigua
- No. 20. Finca La Palovera, Antigua
- No. 21. Finca La Palovera, Antigua
- No. 22. Santiago Méndez, Padula
- No. 23. Eusebio Lugo, Padula
- No. 24. Vicente Caba, San Cristóbal
- No. 25. Francisco Muns, San Cristóbal

Give me three avocados - ke oshibak in oh
 Have you any avocados? ma kwan li oh
 Yes I have gwan
 No, I have not ma k'ai
 No good ingkai us
 Yes us
 No ingkai
 I do not want ushe na kwan
 Where are these avocados from? Bark sha li oh d'ne
 From far off Tokk nakh shin chal
 Good bye, then ing gwan li
 Where is the tree of the avocados? Bark gwan li ohtonal li oh
 Where do you come from? Bark shachal?
 What do you call this? K'arruch kabai in
 Come here kis m'arrin
 Is the horse ready aket yaloh li cawai
 Good day, Sir wachin
 " " m'arrin nachin
 Look at this elai in
 It is cold mas li ke
 It is hot mas Tig
 You have la'at gwasa' quokin
 I want la'in Ta k'wa
 I will give you la'in tin ke a kwach

Where is - Bark gwan
 There is - le' gwan
 Here is - arlin gwan
 Bring me - kam chak
 Give it to me ke kwach
 How much is this? kominal toat a
 Where are you going bark uin to d'ne
 I am going to the market shi bark toat a
 Just over there le' d'ne
 One hum
 Two ka'ib
 Three oshib
 Four kahit
 Five oot
 Six wakim
 Seven wukub
 Eight wakshakib
 Nine beleb
 Ten laheb
 Five chaabil
 Pretty - chinai us
 Good - us
 House - li kap - li ochoch
 Girl - po'at
 Little girl chinash ka'el
 " Boy al
 Blanket is

Schedule of Avocado Sizes

Very small	Below 5 ozs
Small	5 to 8 ozs
Below medium	8 1/2 to 10 ozs
Medium	10 1/2 to 14 ozs
Above medium	14 1/2 to 16 ozs
Large	16 1/2 to 19 ozs
Very large	19 1/2 to 24 ozs
Extremely large	Above 24 ozs

LISTA
de los Departamentos y Cabeceras de cada uno.

DEPARTAMENTOS	CABECERAS.	Altura sobre el mar Pies Ingleses	Distancia de la Capital. Millas Ingles.
GUATEMALA	Guatemala	4877	00
Escuintla	Antigua Guatemala	3214	22
Chimaltenango	Chimaltenango	3900	31
Amatitlán	Amatitlán	2872	34
Escuintla	Escuintla	1111	47
Santa Rosa	Barberena		
Solola	Solola	6874	73
Totonicapam	Totonicapam	7964	90
Quetzaltenango	Quetzaltenango	7363	120
Suchitepéquez	Marathon	1165	124
Retalhuleu	Retalhuleu	740	135
San Marcos	San Marcos	7125	150
Huehuetenango	Huehuetenango	7963	155
Quiché	Santa Cruz del Quiché	5402	86
Tajá Verapaz	Retalhuleu	2887	90
Alta Verapaz	Cobán	4519	130
Yucatán	Progreso	677	275
Yucatán	Yucatán	45	204
Chiapas	Chiapas	200	130
Chiapas	Chiapas	200	110
Chiapas	Chiapas	200	70
Chiapas	Chiapas	200	70
Chiapas	Chiapas	200	70

VOL. III, GUATEMALAN EXPLORATIONS.

Wilson Popocate.

United States Department of Agriculture

Washington D.C.

EE UU.

Tuesday Guatemala City

April 24 1917

Tentative outline of a bulletin on the
Avocados of Guatemala.

Introduction

General statement re the importance of the
avocado among Guatemalans, range of climate zones
in which it is found, diversity of forms, and what
American growers can learn from a study of the subject.
Brief mention of the various races of avocado found
in Guatemala, and regions they occupy.

Horticultural history of the Guatemalan Avocado

Thick-skinned type only on which has attracted
^{evolutionary} attention, introduced to Hawaii & California, &
then greater attention called to it by Collins. Intro-
duced to Florida, Cuba, Porto Rico, etc.

The Guatemalan Race

Where found in Guatemala; Abundance
Climate & Soil of Best Avocado Regions
Planting & Culture - size & form of trees
Bearing age & life of tree
The Crop - Season in different
climatic zones, methods of harvesting -
how to tell when fruit is ripe - length

of time fruit can be kept, marketing
The Fruit & Range of variation in
size, form, color, quality, size of seed,
Interesting Beliefs Relating to the Avocado
Uses of the Avocado in Guatemala

The Coyo
The Coyo

Monday Antigua Guatemala April 30 1917

Donna Matilde de Barillas tells me that
there is a belief current here to the effect
that the avocado is an excitant, and for this
reason it is thought inadvisable to eat too
much of it. Its effect upon children is more
marked than upon adults, hence very little
avocado is given them at one time. Its
purgative effect does not seem to be well understood
by Donna Matilde. She only knows that it is con-
sidered very "exciting".

Avocados are considered excellent food for laying
hens, since they stimulate the production of eggs.

Dogs also thrive on avocados. In America
accustomed to 50-cent avocados, this may seem
to be an expensive diet for dogs. But here
in Antigua, where superior avocados sell for
3 pesos per 100, and the best ones at 5 to 8
pesos per 100, and where lamb is 9 pesos a
pound and pork $4\frac{1}{2}$ pesos a pound, it might be
a profitable investment to fatten dogs on avocados.

I bought a cake of "Cacao de Avocado" in a
drug store today, at 6 pesos. It is made by J.
Díez and Co. of Guatemala, and is recommended as
especially good for the hair.

AVOCADO
No. 6.

Walked to San Lorenzo del Cuzco this morning to cut budwood of Avocado No. 6. The new growth has now matured sufficiently to make first class budwood, in my opinion. There is no longer any brassy colored foliage, with a very few exceptions. This budwood is good budwood; the eyes being large and not dropping the cuticles. I believe No. 6 should be a good variety to propagate. The eyes do not seem to drop from the leaf apices early. This tree is growing in very loose sandy soil, and evidently volcanic, black in color. There are practically no fruits on the tree for next year's crop.

Victor Garcia says when the tree bears only a few fruits they are of much richer flavor than when there is a large crop, as there was this past season.

~~There are no large, any fruits on the tree.~~
The season of this variety appears to be as follows: First fruits turn purple and are ripe in October. Bulk of crop is fully ripe in December and January. Last fruits hang on until April or a few until May. Tree flowers in November; fruits should, therefore, be mature in that month.

AVOCADO
No. 17.

This tree, in the site at No. 28, Calle de Concepcion, has matured its spring growth sufficiently, I think, to yield good budwood. The wood may reach a better stage of maturity a month later, but it appears that the buds are already falling from the leaf apices.

It looks to me as this tree variety is going to furnish four budwoods, as being to that group which are rather hard to propagate. The buds are not so large as in some varieties, especially those distant from the apex of the new growth. The outer bud scales have already fallen from many of the buds, and in some cases the buds themselves have fallen from the apices.

The crop has all been picked, and there are only a few fruits coming on for next year's crop. The season of this variety appears to be February and March; the fruits would probably hang on the tree through May if given an opportunity. Since the tree flowers so early, the fruits are probably not fully ripe before that time.

Prepared for shipment to Washington via
diplomatic pouch following avocado bulbwood.

Papene No. 109. Avocado No. 6, from El Palo.
3 tubes in moist moss. young wood

Papene No. 110. Avocado No. 17, from Antigua.
2 tubes in moist moss. young wood

Papene No. 111. Avocado No. 8. Antigua.
2 tubes in moist moss. young & old wood

Papene No. 112. Avocado No. 21. Antigua.
2 tubes in moist moss. young & old wood

Papene No. 113. Avocado No. 20. Antigua.
2 tubes in moist moss. young & old wood

Papene No. 114. Avocado No. 19. Antigua.
1 tube in moist moss. young wood.

Above material carried to Guatemala City on
May 1st by José Cabral, could leave O. to
Barro Colorado 3rd, arrive in New Orleans May
7th, and be in Washington the 9th or 10th.

Tuesday Antigua Guatemala May 1 1917

The mayordomo at finca Santa Lucia says
that aguacates which are picked in the wrong phase
of the moon ripen unevenly, becoming rotten
in spots while other portions of the fruit still
remain hard.

Effect of ^{avocado} ^{on women} He also says that aguacates are considered
injurious to children, but not to adults.

A man with whom I talked at the finca
Jauja told me that neither women or children
could eat liberally of aguacates without in-
jury. He said that women are greatly
debilitated by the aguacate, but that for
men the fruit is strengthening and very
beneficial.

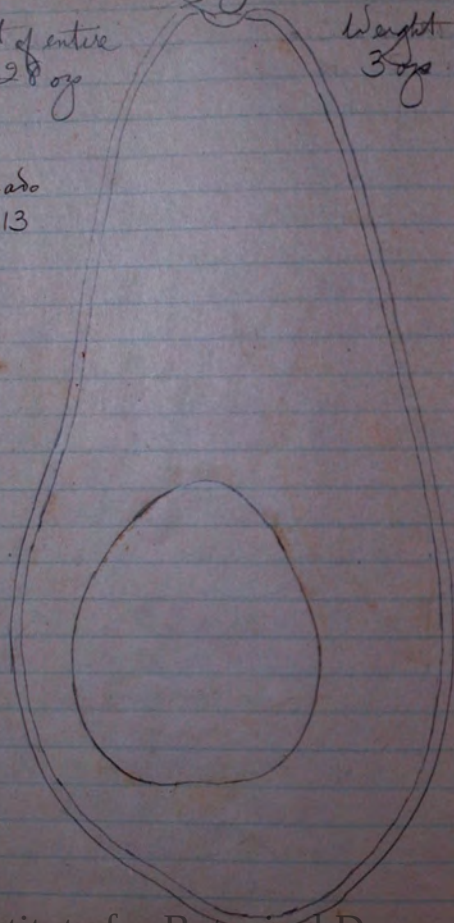
Avocado ^{oil} The same man told me that one of his
relatives makes aguacate oil, and that it
is fine for cooking purposes. I do not
place much confidence in this statement.
He says to make oil the ripe fruit is cut
into bits, allowed to ferment a bit,
and the oil is then attracted by pressure.

Avocado from finca "Gauja", tree near house

Weight of entire
fruit, 28 oz

Weight of seed
3 oz

Avocado
#13

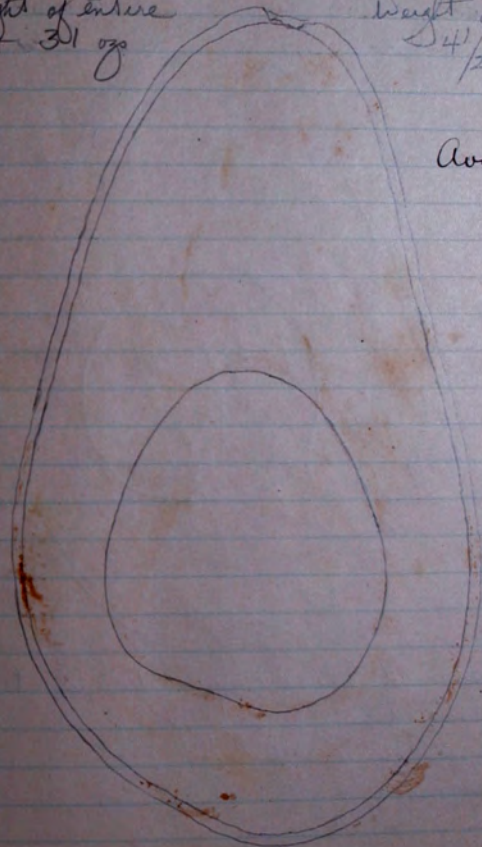


Avocado from finca "Gauja", tree near house

Weight of entire
fruit 31 oz

Weight of seed
4 1/2 oz

Avocado #13

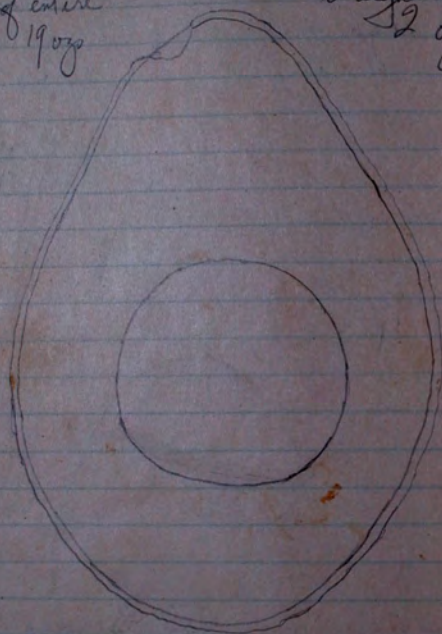


AVOCADO
No. 21

From finca "La Polvora"

Weight of entire
fruit 19 ozs

Weight of seed
2 ozs



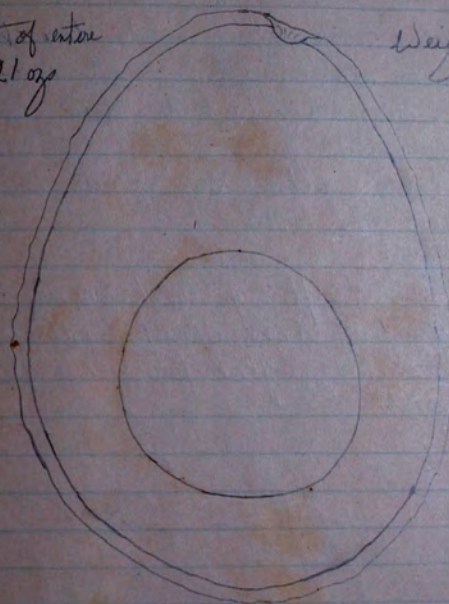
Season of this variety February to April;
probably fully ripe by March 15; a few
fruits remain on the tree until May. Tree
blooms early in March.

AVOCADO
No. 18

From finca "La Polvora"

Weight of entire
fruit 21 ozs

Weight of seed
2 ozs



Season of this variety February to May; flowers
in early March, fruits probably fully ripe by
March 15th, a few commencing to fall at
that time.

Finca La Palmona

The following are notes made during a canvas of all the trees in this finca. Each tree was examined, and a note made as to whether it is bearing fruit this year. In cases where there are still fruits on the tree the form, size, color, surface, size of seed, and color of flesh are noted.

1. Tree 40 ft high, trunk 20 ins diam. Bearing. Fruit pyriform, 8 ozs, almost smooth, green, seed medium sized, 1/2; flesh pale yellow green. Fair



2. Tree 35 ft high, slender, trunk 1 ft diam. Bearing heavily. Fruit oblate, 12 ozs, smooth to pebbles, green, seed medium large, 1 1/2 ozs, flesh pale green-yellow to greenish yellow. Fair



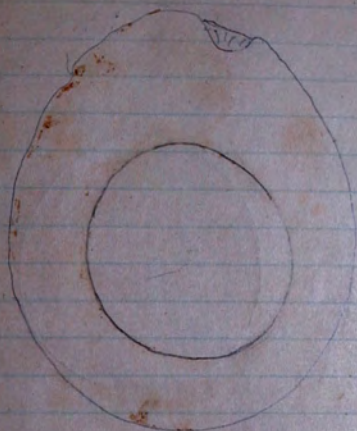
3. Tree 25 ft high, trunk 18 ins diam. Bearing. Fruit pyriform, 8 ozs, almost smooth, green, seed medium large, 1/2, flesh greenish yellow. Fair
(See over for diagram)



4. Tree 20 ft high. trunk 8 ins diam.
Apparently not bearing this year.

5. Tree 25 ft high. trunk 8 ins diam.
Bearing very few fruits.

6. Tree 25 ft high. trunk 9 ins diam. Bearing.
Fruit obovoid, 8 ovs. almost smooth to undulating
green, seed rather large, over 1 ov. Flesh rich
cream color. Fair



7. Tree 25 ft high. trunk 10 ins diam.
Bearing a few fruits. Fruit nearly oval,
13 ovs. smooth dull maroon on above, seed
rather large, 2 ovs. Flesh greenish yellow. Fair



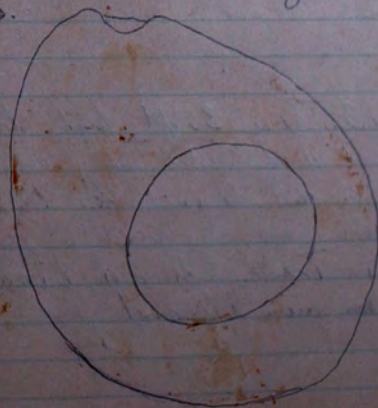
8. Tree 30 ft high, trunk 5 ins diam. Apparently not bearing.

9. Tree 30 ft high, trunk 5 ins diam. Bearing heavily. My No. 20. Good

10. Tree 20 ft high, trunk 6 ins diam. Bearing well. Fruit oblate oblique, 12 segs, almost smooth, green, seed large, 10g, flesh yellow green to greenish yellow. Fair



11. Tree 40 ft high, trunk 20 ins diam. Branches fruit pyriform oboid, 8 segs, slightly rough, deep green, seed rather small, 1g, flesh yellow. Fair to good.



12. Tree 20 ft high, trunk 10 ins diam.
 Bearing fruit oblate-oblique, 12 ozs, smooth
 green, seed slightly oval 1 oz, medium size,
 flesh rich yellow tinged green, Fair to Good



13. Tree 35 ft high, trunk 15 ins diam.
 Fruit all harvested. Many volunteer seedlings
 on ground beneath tree.

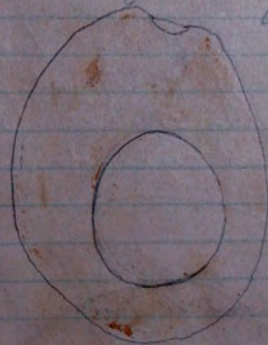
14. Tree 25 ft high, trunk 10 ins diam.
 Fruit all harvested

15. Tree 25 ft high, trunk 8 ins diam. No fruit

16. Tree 30 ft high, trunk 12 ins diam. Crop
 harvested.

17. Tree 30 ft high, trunk 12 ins diam. Crop
 harvested? No fruit.

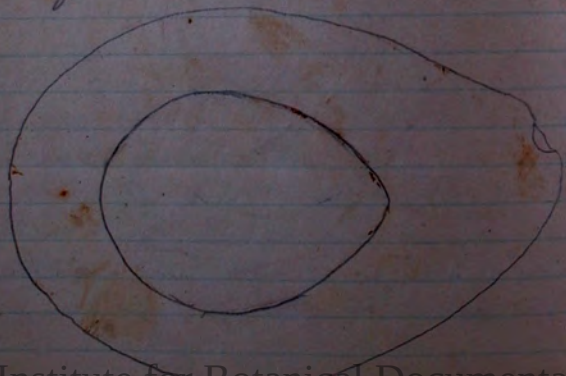
18. Tree 15 ft high, trunk 4 ins diam.
 Bearing fruit obovoid 3 ozs smooth, pale
 pink, seed small, $\frac{1}{2}$ oz. flesh light green Fair



19. Tree 30 ft high, trunk 12 ins diam.
 Bearing seed fruit obovoid, 7 oz, smooth, green,
 seed large, $1\frac{1}{2}$ oz, flesh pale cream color. Poor



20. Tree 25 ft high, trunk 10 ins diam.
 Bearing few fruits. Fruit pyriform, 12 ozs,
 smooth, green, seed medium large, 2 ozs. flesh
 pale greenish cream color. Fair



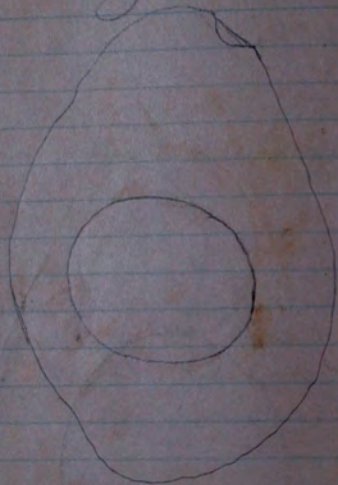
21. Tree 25 ft high, trunk 12 ins diam.
 Crop harvested, heavy set for next year.

22. Tree 30 ft high, trunk 14 ins diam.
 Bearing. Fruit pyriform, 11 ozs. green quite
 smooth, seed large, 2 ozs, flesh yellow green
Poor



23. Tree 45 ft high, trunk 20 ins diam.
 Crop nearly all harvested. Pyriform green

24. Tree 30 ft high, trunk 6 ins diam
 Bearing fruit pyriform 8 oz, corrugated,
 purple, seed medium size 1 oz, flesh greenish
 yellow. Fair to good.



25. Tree 25 ft high, trunk 9 ins diam
 Bearing a few fruits. Fruit obovoid, 8 oz,
 smooth, green, seed rather large, 2 oz, flesh greenish
 yellow. Poor



26. Tree 20 ft high, trunk 6 ins diam
 Bearing a few fruits. Fruit obovoid, 8 oz,
 smooth, green, seed rather large, above 1 of flesh
 pale greenish cream color. Fair



27. Tree 35 ft high, trunk 14 in diam.
 Bearing heavily. Fruit obovoid-pyriform, 8 ops.
 smooth, green, seed medium size, 1 oz, flesh
 greenish cream. Fair



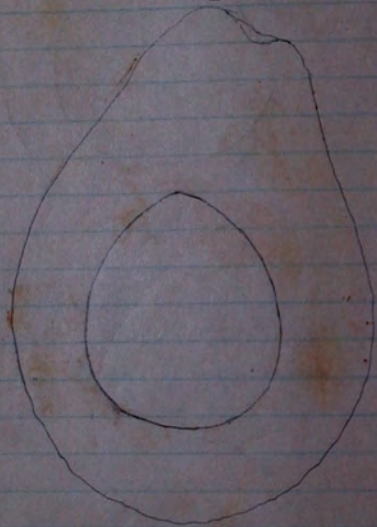
28. Tree 30 ft high, trunk 14 in diam.
 Bearing. Fruit globose, 10 ops. pitted, green,
 seed large, 2 ops, stem very thick, flesh rich
 greenish yellow. Poor.



29. Tree 35 ft high, trunk 14 in diam. Bearing
 heavily. Fruit pyriform-obovoid, 4 ops, slightly
 rough, green, seed large, 1 oz, flesh pale green. Poor



30. Tree 30 ft high, trunk 6 ins diam.
 Bearing. Fruit pyriform, 10 eggs corrugated
 and somewhat rough, purple, seed medium large,
 over 1 oz, flesh pale yellowish green.



31. Tree 20 ft high, trunk 8 ins diam.
 Bearing. Fruit pyriform, 8 eggs, smooth, purple,
 seed rather small, under 1 oz, flesh greenish
 yellow good.



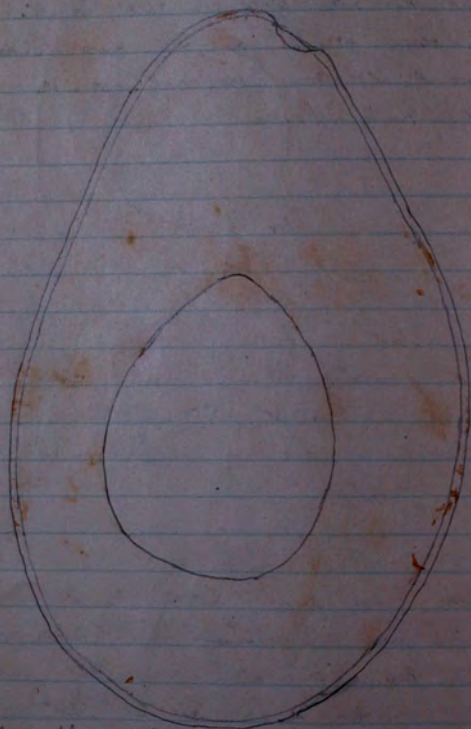
32. Tree 35 ft high, trunk 12 ins diam.
 Crop all harvested. Heavy set for next year's
 crop, already as big as pigeon eggs.

33. Tree 20 ft high, trunk 5 ins diam. No
 fruit.

34. Tree 20 ft high, trunk 6 ins diam.
 No fruit.

35. Tree 30 ft high, trunk 6 ins diam.
 Bearing a few fruits. Fruit oblong pyriform,

23 oz, smooth but obscurely ribbed, maroon purple,
seed small, 2 oz, flesh very rich yellow. Fine



Flesh of this variety is deep yellow, perfectly clear. Skin
not very thick. Only 3 fruits on tree and 2 of
these appear to be abortive.

I note that the fruits on some trees in La
Polvora have not fallen to the ground when
fully ripe, but have dried on the tree when
picked they are dry and hard, the skin brittle but
not easily broken, and the seed decays, though
retaining its form, and nothing within the dry
shell when shaken.

Round avocados which have large seeds appear
also, in some cases at least, to be character-
ized by a large opening in which the stem is
inserted. Some times this opening is more than
 $\frac{1}{2}$ inch in diameter. It is worth further obser-
vation; perhaps it may be possible to distinguish
large seeded varieties simply by glancing at
the point of insertion, to see whether it is large
or small.

The soil at La Polvora is the same friable,
sandy loam as at Santa Lucia. At the latter
place I saw this morning some holes prepared to
plant coffee, and there was no change in
the character of the soil at three feet below
the surface.

Wednesday Antigua Guatemala May 2 1917

Butter I notice that aguacates with deep yellow flesh
taste in sometimes have a bitter taste. This was
avocado the trouble with avocado No. 24 in San
Cristobal and I have just noticed it here
in a variety which was otherwise very attractive
we, - a round purple fruit of about 6 ozs.
with a small seed.

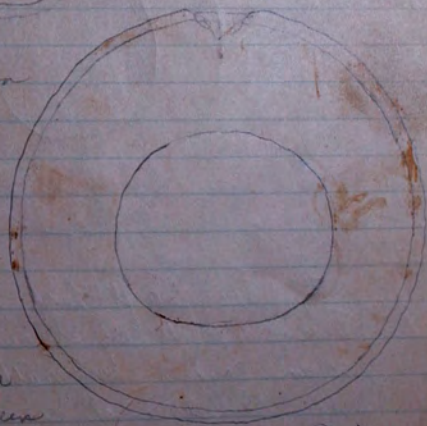


Fruit from tree on Guatemala road.



Fruit from tree on
Guatemala road -
worthless

Fruit from tree on
Guatemala road.
Weight 15 ozs.
seed about $\frac{1}{2}$ ozs.
surface strongly
pebbled, dull green
in color. Skin $\frac{1}{8}$
inch thick. Flesh
yellowish cream color
changing to pale green
near the skin. Seed
small for an oblate fruit

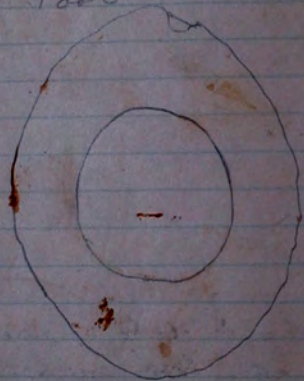


Good

Finca La Polvorai

Continued the work begun yesterday of making a canvass of all the avocado trees.

36. Tree 25 ft high, trunk 10 ins diam
Bearing. Fruit obovate-elliptic, 4 oz, green,
rough, seed medium, about $\frac{1}{2}$ oz, flesh greenish
yellow. Poor



37. Tree 20 ft high, trunk 8 ins diam
Bearing a small crop. Fruit pyriform, 12 oz,
green, rough, seed rather small, less than
1 oz, flesh greenish cream color. Very Good



38. Tree 25 ft high, trunk 10 ins diam
Bearing. Fruit obovoid, 12 oz, purple, rough
seed large, 2 oz, flesh greenish cream color.
Poor.



39. Tree 25 ft high, trunk 10 ins diam.
No fruit. Tree does not seem to be bearing.

40. Tree 35 ft high, trunk 14 ins diam.
Bearing heavily. Fruit obovoid, 10 yrs green
slightly rough, seed medium, $\frac{1}{8}$ lbs, flesh
greenish yellow. Fair.



41. Tree 35 ft high, trunk 18 ins diam. Bore
good crop this year and has set another for
next year. Young fruits already nearly as
large as hen's eggs. Fruit pyriform. 11 yrs
green slightly rough, seed medium, 1 oz.
flesh yellowish cream color. Fair.



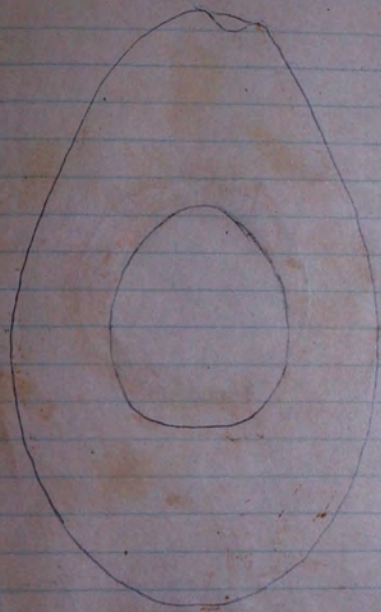
42. Tree 30 ft high, trunk 14 ins diam.
Bearing. Fruit obovoid, 12 oz, green,
almost smooth, seed medium large, over 1/2,
flesh yellow. Fair to Good



43. Tree 35 ft high, slender, trunk 6
ins diam. Bearing heavily. Fruit obovoid,
12 oz, green, slightly rough, seed rather
small, about 1/2, flesh rich yellow.
Very Good



44. Tree 35 ft high, trunk 15 in
diam. Bearing. Fruit elongated pyriform
12 oz, green lightly pubes. seed small
about 1/2 oz, flesh dull cream yellow.
Time



45. Tree 30 ft high trunk 12 in diam
Bearing. Fruit obovoid, 13 oz. purple, rough
seed slightly large, over 1/2 oz, flesh cream
color. Time



46. Tree 25 ft high, trunk 10 ins
diam. Bearing. Fruit pyriform, 14 ovs,
green, almost smooth, seed slightly large,
 $1\frac{1}{2}$ ovs, flesh rich yellow. Fair to good.



47. Tree 25 ft high, trunk 6 ins diam.
Bearing a few fruits. Fruit oblong oval, 10
ovs, green, smooth, seed large, above $1\frac{1}{2}$ ovs,
flesh deep cream color. Poor.



48. Tree 30 ft high, trunk 12 in diam.
Does not seem to have borne fruit this
year but has set a tremendous crop for
next year

49. Tree 30 ft high, trunk 6 in diam.
Bearing. Fruit slender pyriform, 10 ovs,
green, pitted, seed medium, 1 oz, flesh
cream color. Fair to Good



50. Tree 40 ft high, trunk 15 in diam
Bearing heavily. Fruit slender pyriform,
11 ovs, green, nearly smooth, seed rather
large, 1 1/2 oz, flesh yellowish cream color
Fair



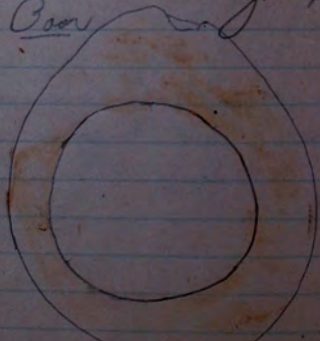
51. Tree 25 ft high, trunk 6 in diam. Bearing a few fruits. Fruit pyriform, 15 ozs, purple, almost smooth, seed large, about 2 ozs, flesh deep cream color. Poor



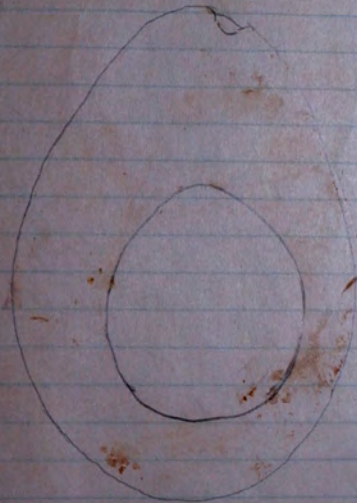
52. Tree 45 ft high, trunk 14 in diam. Bearing. Fruit oblong-oval, 12 ozs, green, lightly pitted, seed large, $1\frac{1}{2}$ ozs, flesh cream color. Poor to Fair



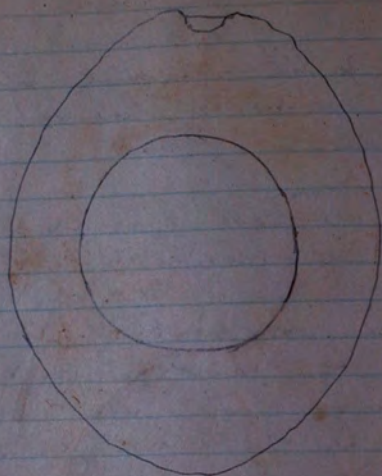
53. Tree 35 ft high, trunk 12 ins diam.
Bearing heavily. Fruit broadly obovoid, 5" op.
green, almost smooth, seed large, $\frac{1}{2}$ op. flesh
pale green. Poor



54. Tree 25 ft high, trunk 8 ins diam.
Bearing. Fruit ellipso-pyriform, 8" op.
purple, almost smooth, seed large, over 1
oz. flesh cream color. Poor



55. Tree 25 ft high, trunk 6 ins diam.
Bearing. Fruit oval, 10" op. purple,
rough, seed large, $\frac{1}{2}$ op. flesh yellowish
cream color. Poor



Thursday. Antigua Guatemala May 3 1917

Went to the finca called "El Pentado", owned by Doña Victoria de Cofino, on the road to Ciudad Vieja.

There are a good many aguacate trees growing in the finca, just as in La Paloma. I asked the administrator if they had been planted or whether they had sprung up from dropped seeds. He replied that with the exception of the few planted along some of the avenues leading through the finca, all were from dropped seeds. They had to be pulling up young seedlings constantly, he said, to keep them from taking up too much space in the finca.

The administrator says that aguacates come into bearing at about 5 years from seed. He thinks it depends on the kind of soil they are growing in. He says they do not come true from seed, and you can never tell what you are going to get.

I asked him if it was true that aguacates were not good for women and children. He replied that a belief of this nature was formerly held by some people, but

that he did not believe there was anything in it. He thinks the aguacate is wholesome food for anyone.

He says that an oil is made from the aguacate, but he does not know the process of its extraction.

The soil in this place is a fine black sandy loam, fertile and moist. The aguacate trees in the place are in fine condition, about the finest lot I have seen. They are commonly 30 to 40 ft high, with no limbs close to the ground (as demanded of trees intended to shade coffee), and with crowns spreading from 20 to 35 feet. The fruit has now been picked from all the best trees, and only remains on the poorer ones. The abundant crop March and April are the big months for aguacates. A few commence to ripen in January and February, and some remain on the trees until August, but the main season is March and April.

It is now very dry here in Antigua, there having been no rain to speak of since last October. It is about time for the rainy season to set in.

This morning I noticed in La Polera that orange trees were showing the effect of the drought considerably, the foliage drooping and having an unhealthy color. Coffee bushes also showed it. It was notable, however, that the aguacate trees did not appear to be suffering from the drought in any way whatever, and the same was true of the Chiricaya trees. The aguacates have bloomed and set fruit for next year during the dry season. Holes dug to plant coffee bushes show the subsoil but a depth of about 2 feet, to be fairly moist in spite of the long dry season. Probably at the depth the thick aguacate roots penetrate it is fairly moist.

Sunday Antigua Guatemala May 4 1911

Tricocco
No. 27

This tree is growing in the seto of Atamacia Salazar, on the Guatemala road, just beyond the log board marking the 1st kilometer from the center of Antigua.

None of the fruits seem to be dropping as yet, but they all seem to be fully ripe.

Weight of
entire fruit
16 ozs



Weight of
seed 1 1/2 ozs

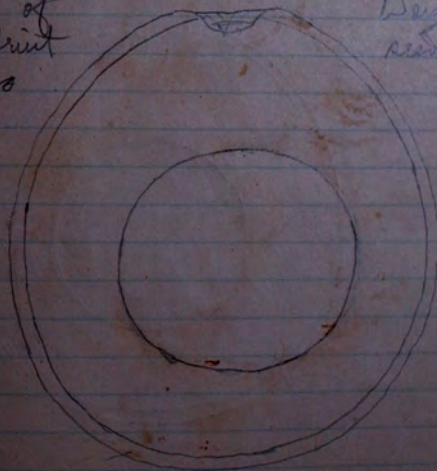
This is a rather large specimen of the variety, and probably for that reason the seed is comparatively somewhat smaller than in some other specimens. Especially

Weight of
entire fruit
12 ozs



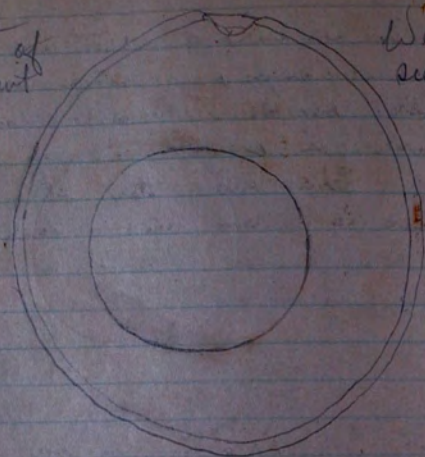
Weight of seed
slightly more
than 1 oz

Weight of
entire fruit
16 ozs



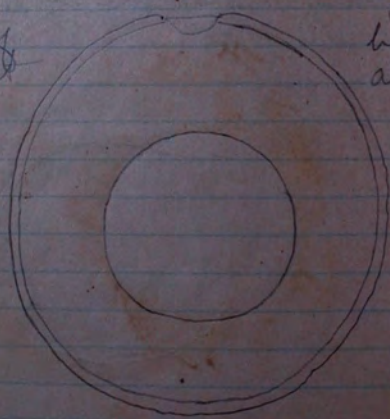
Weight of
seed 2 ozs

Weight of
entire fruit
13 ozs.



Weight of
seed 1 oz

Weight of
entire fruit
10 ozs



Weight of seed
about $\frac{3}{4}$ oz

The five specimens of No. 27 shown on the preceding 3 pages are random samples of this variety. They show the approximate range of variation in regard to size of fruit and size of seed. Either the latter character is more variable in round than in pyriform fruits, or else the variation is more noticeable. Probably it is simply more noticeable.

Donna Matilde states that the agave, like the onion, is considered by Aztecs to be a pronounced aphrodisiac. For this reason it is commonly eaten by old men.

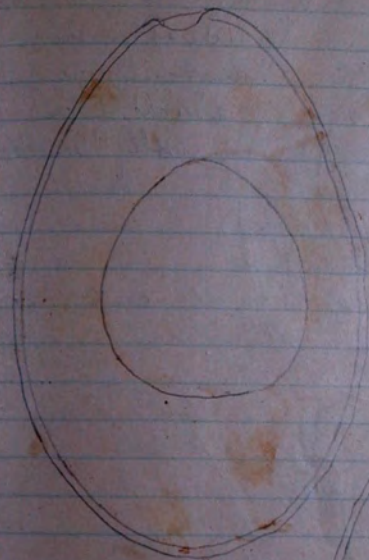
In order to test the aguacate as a food, I am commencing an experiment on myself as follows: I propose to eat nothing but aguacates for two or three days, and note the effect of this diet. I will take notes of the quantity taken at each meal, the state of my appetite, and so on.

May 4th. Breakfast 7:30 a.m. One aguacate weighing about 12 oz, not of particularly good quality and having a large seed. Prepared with salt and vinegar. No other food taken during the morning except the juice of three small oranges, and this can scarcely be considered as food.

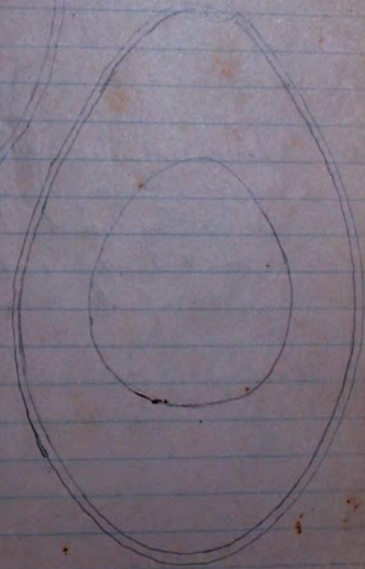
Dinner 12 m. Appetite keen. Ate one 10 oz aguacate, broken to the one I had for breakfast.

3 p.m. Went down to the Almacén Americano and bought a box of Lorna Dome biscuits. Consumed half the box on the spot. Experiment postponed to some later date.

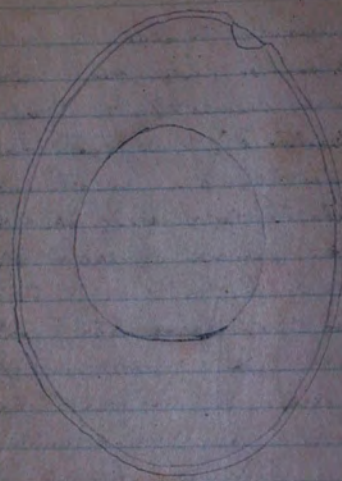
From finca La Polvora
May 26



Weight of entire fruit
10 oz
Weight of seed
1 oz



Weight of entire fruit
12 oz
Weight of seed
slightly over 1 oz

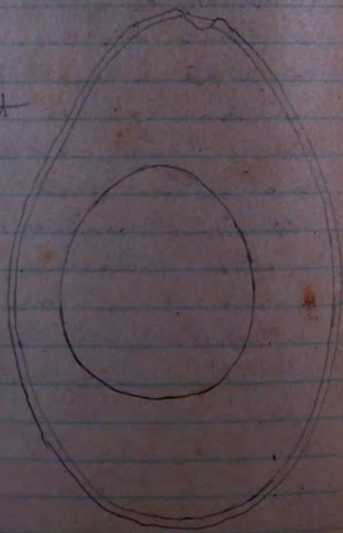


Weight of entire fruit
9 oz.

Weight of seed
slightly less than 1 oz.

Weight of entire fruit
8 1/2 oz.

Weight of seed
about 1 oz.



Description of avocado No. 26

Form oval to elliptic-pyriform, size below medium to medium, weight 8 1/2 to 12 oz., length 3 3/4 to 4 3/4 ins., breadth 2 3/4 to 3 3/4 ins., base rounded to pointed, the stem inserted slightly to one side without depression; apex rounded to broadly pointed; surface sparsely pubescent uniformly so, bright green on above, darker on beneath, few small yellowish dots; skin not very thick for this type, 1/4 inch more or less and slightly thicker toward apex of fruit, hard and coarsely granular; flesh rich cream-yellow in color, free from fiber and with very little discoloration, firm and unusually dry, of rich pleasant flavor; quality very good; seed broad-conical, medium sized, weighing one ounce more or less, tight in the cavity, often somewhat apertured, with both seed coats adorning closely. Season commencing in February, at its height in March and April and extending into May.

Selected for its productivity combined with attractive appearance and excellent quality of fruit.

The fruit is more variable in form and also in size of seed than many varieties.

AVOCADO
No 28

Saturday Antigua Guatemala May 5 1917

This variety is growing in the finca La Candelaria, mayordomo Federico Torres.

The tree is young, - perhaps 6 years old, and has been planted to furnish shade for the coffee. It is tall and slender, about 20 ft. high with a trunk 6 ins thick at the base. As is customary in fincas the tree has not been allowed to branch low, the first open being some 6 ft. from the ground. The growth looks strong and healthy, the young branchlets without badwood, with good strong apillary lvs.

On finding the tree today, there were only 3 fruits on it. It may have borne more this year, as the crop has already been harvested from many trees in the finca, or it may just be coming into bearing and only producing a few fruits. The character of the fruit is so unusual that I believe the variety is worth a trial in the U. S. on the chance that its productiveness may prove to be satisfactory.

Weight of
entire fruit
16 gms



Weight of
seed 1 g

Description of Avocado No 28.

Form oblate; size medium, weight 16 gms, length $3\frac{1}{2}$ ins, breadth $3\frac{3}{4}$ ins; base slightly flattened, the long slender stem seated without depression, about in the longitudinal center of the fruit; apex flattened, slightly depressed around stigmatic point; surface pubescent, slightly roughened, deep yellow green in color, with numerous minute yellowish dots; skin not very thick for this type, $\frac{1}{16}$ inch or slightly thicker, hard, granular toward the inside; flesh cream color around seed, becoming

very pale green near the skin, very slightly discolored with brown fibers tracing but with no fiber, flavor quality seeds very small for a fruit of this form, oblate, weighing scarcely 1 oz. half in the cavity with both seed coats showing closely, season March to May or perhaps June.

Sunday Antigua Guatemala May 6 1917

The wild cherry of the Guatemalan high lands is now commencing to open. There is a tree between 25 and 30 ft. high here in the patio of the Baird's residence. One limb is now opening its fruits, while the other side of the tree is full of young fruits not yet half grown, and there have been a few flowers. I photographed flowers and open fruits from the tree today.

This cherry impresses me as possessing considerable merit. The fruits are as big as a small English Morella, and of the same color. They are sweet with a better taste. I had some at the hotel last night, stewed, and they were good.

While this is probably not to be considered a tropical cherry, it is certainly a subtropical one, and might be used to advantage in the extreme Southern U. S. I have seen it now between elevations of 5000 and 9000 feet. The tree is very productive, the fruit being produced on racemes of 3 to 6 or more. There are many more fruits on the racemes at first but that majority seem to fall before maturing.

Ducenas This morning I rode to Ducenas, about 9 1/2 miles from here. The cherimoya tree from which I cut the wood last fall is now in full bloom and pretty well leaved out. There are still two or three small fruits hanging on the tree.

Ducenas is full of fruit and other trees that the taste of the Indians are scarcely visible. Every tree contains a number of trees, mainly orange, ficus, guava, cecropia, cherimoya, and *Quercus pubula* which coffee is grown. In addition there are guava, maguey, granadilla vines, vegetables of various kinds, and flowers. The place is a sugar jungle, but the growth is not very high, - perhaps 30 or 35 feet in most places.

The country between Antigua and Ducenas is some of the prettiest in Guatemala. Corn fields, coffee fields, and pastures on which cattle and horses graze, combine to make a scene of great attractiveness.

Description of Avocado No. 27

Form spherical; size below minimum to above measuring weight 10 to 16 ozs, length 3 1/2 to 3 3/4 ins, breadth 3 1/4 to 3 3/4 ins; base rounded, then slender stem inserted slightly to one side without depression, apex flattened and slightly depressed around stem at point; surface pebbled, usually reddish heavily or dull green in color with few small yellowed dots; skin thick, about 1/8 inch, coarsely granular toward flesh, base pinkish rich cream yellow in color without fiber and very slightly discolored, tinge pale green near the skin, fairly dry and of moderately rich nutty flavor; quality very good; seed round or oblate, medium sized, 1 to 2 oz. in weight, light in the cavity with both seed coats adhering closely. Season apparently March to May, fruit probably hanging on longer if allowed to do so. Size rather variable in size, small in some specimens, in others a trifle larger than desirable. Average size of seed not objectionably large. Flavor suggests coconut.

Monday Antigua Guatemala May 7 1917

Prepared for shipment to Washington, in cold storage the following lots of avocado budwood:

Popene No 115, Avocado No. 6.

4 tubes in moss. All new wood, but fairly well matured.

Popene No. 116. Avocado No. 17.

3 tubes in moss. All new wood, rather tender. Ages drop badly from this variety.

Popene No. 117. Avocado No. 27.

2 tubes in moss. Mainly last year's wood, not very choice.

Popene No. 118. Avocado No. 27.

4 tubes in moss. All new wood, some of it fairly well matured.

Popene No. 119. Avocado No. 21.

2 tubes in old moss: All new wood, not very mature.

Popene No. 120. Avocado No. 20.

3 tubes in old moss. Some old and some new wood, rather very good.

Popene No. 121. Avocado No. 18.

3 tubes in old moss. All old and new wood, none of it very good.

Popene No. 122. Avocado No. 28.

4 tubes in old moss. All old and new wood, the latter rather better.

Avocado
#27

Avocado No. 27, in the citro of Betanoso Salazar. Tree over 30 ft high, the trunk about 18 in thick and first branch at 10 ft. Crown rather broad, mostly on one side of trunk. Branchlets erect and rather stiff. Budwood excellent. Seem to be a strong grower. Bearing good crop now ripe, and has quite a lot of fruit as large as walnuts for next year's crop. Fruits singly, not in clusters.

Avocado
#17

Avocado No. 17, Callejon de Concepcion #28. Tree about 25 ft high, trunk 14 in thick at base, first branches at 12 ft from ground. Crown of good form, rather dense. Looks like the variety might be a rather different grower when young, with long heavy shoots inclined to droop. Budwood very fine, the eyes having their bud scales or falling early. Tree badly attacked by leaf gall, and with some scale insects. Soil heavy loam. Branches sometimes descending.

Avocado
#28

Avocado No. 28. In finca La Candelaria. Tree stands in rear end of finca. It is about 35 ft high with a trunk 6 in thick at base, the first branches 8 ft from the ground. The crown is slender, quite erect, not yet dense as the tree is young. The budwood is good. The tree shows no signs of bearing. The drooping habit and is probably a strong grower.

Avocado
#29

Avocado No. 29, in finca La Pasa of Don Anacleto Herrera. Tree 25 ft high, trunk 10 in thick, first branches at 8 ft. Crown erect, rather slender, growth short, budwood fairly good. Looks like a strong grower. Bearing a good crop of fruit, now fully ripe. Some fruits have fallen. No young fruits for next year's crop visible from the ground, though the tree must have flowered if it is going to do so, as it has made its flush of growth. The tree is growing among coffee bushes on heavy loam.

Uses of Avocado. Dona Matilde tells me that aguacates are excellent food for cows, making the milk very rich. She has just purchased 100 aguacates at \$3.00 and fed her two cows. Chickens and pigs also do well when fed on aguacates. I have found by experience that dogs are very fond of them, as Dona Matilde's dog which has entered my room on several occasions and walked off with all of my bananas when I left.

The use of the aguacate seed. The mark brown and cotton must not be overlooked. It makes an indestructible light brown mark.

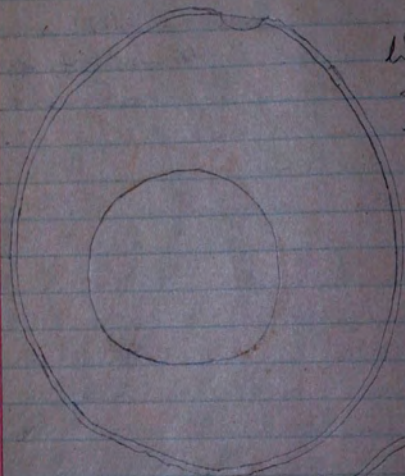
Avocado No 20. La Paloma. Tree over 20 ft high, very slender, trunk 6 ins thick, first branches at 8 ft. Bark is good, but not yet assessed sufficiently. Apparently not going to flower this year. Growth short.

Avocado No 21. La Paloma. Tree about 35 ft high, trunk 18 ins thick, first branches at 12 ft. Crown round, dense, of good form. Few fruits still hanging on tree. Good set for next year. The young fruits now as large as pigeon's eggs. Growth rather short, otherwise bud wood is good, the eyes being well developed and not losing their bud scales.

Avocado No 18. La Paloma. Tree 45 ft high, trunk 20 ins thick, first branch 15 ft from ground. Crown not very broad, open, limbs inclined to droop. Few fruits still on tree. Growth short, otherwise bud wood good, the scales too tender for best results. No fruit for next year.

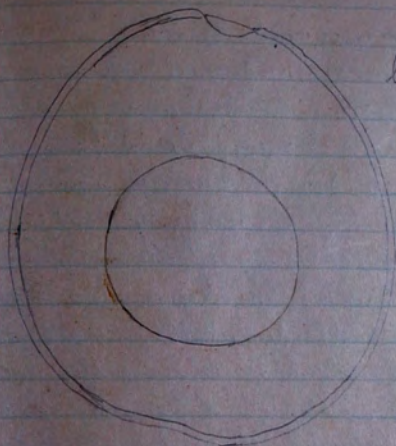
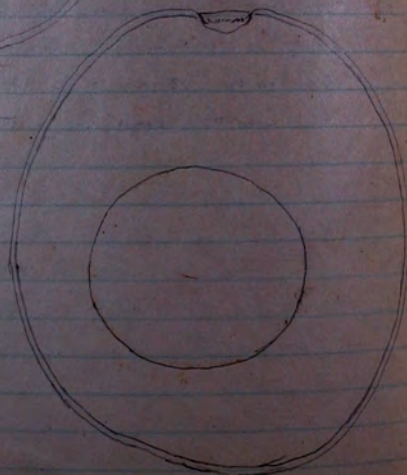
AVOCADO
No. 29

From the place "Santa Rosa"



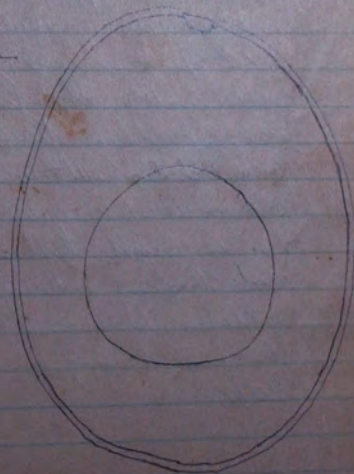
Weight of entire fruit
14 gms
Weight of seed
under 1 g

Weight of entire fruit
14 gms
Weight of seed
1 g



Weight of entire fruit
18 gms
Weight of seed
under 1 g

Weight of entire fruit
18 gms
Weight of seed
about 1 g



Description of avocado No 29

Form broadly obovoid, oval, or oblong-oval; size below medium to medium, weight 10 to 14 lbs., length $3\frac{1}{2}$ to 4 ins., breadth 3 to $3\frac{1}{2}$ ins.; base rounded to bluntly pointed, the stem inserted somewhat obliquely without depression; apex obliquely flattened, though not markedly or slightly depressed around stipitate point; surface nearly smooth to lightly pitted, glossy purplish black in color, with numerous small to large yellowish dots, skin rather thin for this type, $\frac{1}{16}$ inch at most, commonly less, less coarsely granular than in many varieties; flesh of an unusually rich yellow color, almost golden yellow, changing to pale green near the skin, free from fiber or discoloration, and of fairly rich flavor, with trace of bitterness; quality fairly good. Seed small to medium in size, spherical not over 1 oz. in weight, light in the cavity, the seed coats thin and adhering closely to the smooth cotyledons. Season March and April, some of the fruits hanging on until May or perhaps later.

Monday Amatitlan, Guatemala May 14 1917

avocado
No. 3

This tree, in the site of Angel Panayoa, has bloomed since I was down in January and set a very heavy crop of fruits which are now as large as pineapples. The young growth is perfectly un-structured and seems to be in more or less permanent for budwood. The age of the tree shows no tendency to die.

The season of this avocado is probably primary to March but the quality of the last crop were cut in December.

The man now living on this place tells me that bearing avocadoes are common bearing at 2 years of age if the cotyledons are removed when the plants are 8 or 10 inches high. He says he knows this from experience. If the cotyledons are not removed the trees do not bear until they are 5 to 8 years old.

Matasanos are abundant in Amatitlan just above Managua. Many have a strong taste, but occasional trees produce good sweet fruits.

The azarola is now in full bloom and setting fruit. June to August is said to be the principal season for the fruit. I am told that seeds from fruit eaten will not grow. The entire fruit must be sown. This does not sound very probable.

Avocado There are avocados left on a few trees still, but not many, in most cases. December to January to March seems to be the principal season here.

Tuesday Guatemala City May 15 1917

Prepared and shipped to Washington per the Diplomatic pouch, following material:

Popocatepec 123a. *Annona testudinea*.
124a. Flor de mico (*Leguminosae*)
125a. *Persea* sp. "Chute" 3 seeds from Zacapa.

126. Avocado No. 3, from chacra of Angel Samayoa, Amatitlan. Two tubes and one paper package of budwood. The wood was all of recent growth but well matured, and seemingly in fine condition.

127. Avocado No. 7, from the patio at #4, Callejon Manchén, Guatemala. Two tubes and one paper package of budwood. Wood in trunk tender, but large. All young wood.

Shipped May 17th

128a. *Prunus salicifolia*

Friday Chimaltenango, Guatemala May 18 1914

We left Guatemala at 6 this morning, reached Mixco at 7.30, Santiago Sacatepéquez at 9.15, Sumpango at 11, stopped shortly thereafter for about 45 minutes for breakfast, and arrived Chimaltenango at 1 p.m.

The elevation here, according to my barometer, is about 6100 ft.

In the afternoon I made a search for agaveates, in the course of which I ran across a young tree of the mepear type. This is here called matul'oj', in the Cachiquel dialect. It appears to be matul'oj' or in Spanish as agaveates and I have also heard the name agaveates de mico applied to it. The name matul'oj' seems to be better known than any other. Some times it is pronounced matul'oj'.

Only one tree was found. This was said to be five years old, and now carrying its second crop. The tree is about 15 ft high. The fruits are now about $1\frac{1}{2}$ ins long. Probably they will ripen in October or November. There is a good crop on the tree, the fruits being in clusters, but some of the fruits are passing each cluster may fall before they

reach maturity.

The owner of the tree says he brought the seed from which it was grown from the neighborhood of Palen, where the matul'oj' is found growing wild in the mountains. He says there are also some trees in the barranco near El Tajon. The seeds for the tree here are said to be from the same place.

There are a great many varieties of the Guatemalan mepear (or type) in this country. It seems to be equal to Antigua, with the exception of the trees in franco (around the latter place, for there are in franco here. There are coffee bushes in a good many of the sitios, however, so it is not altogether too cold for the plant.

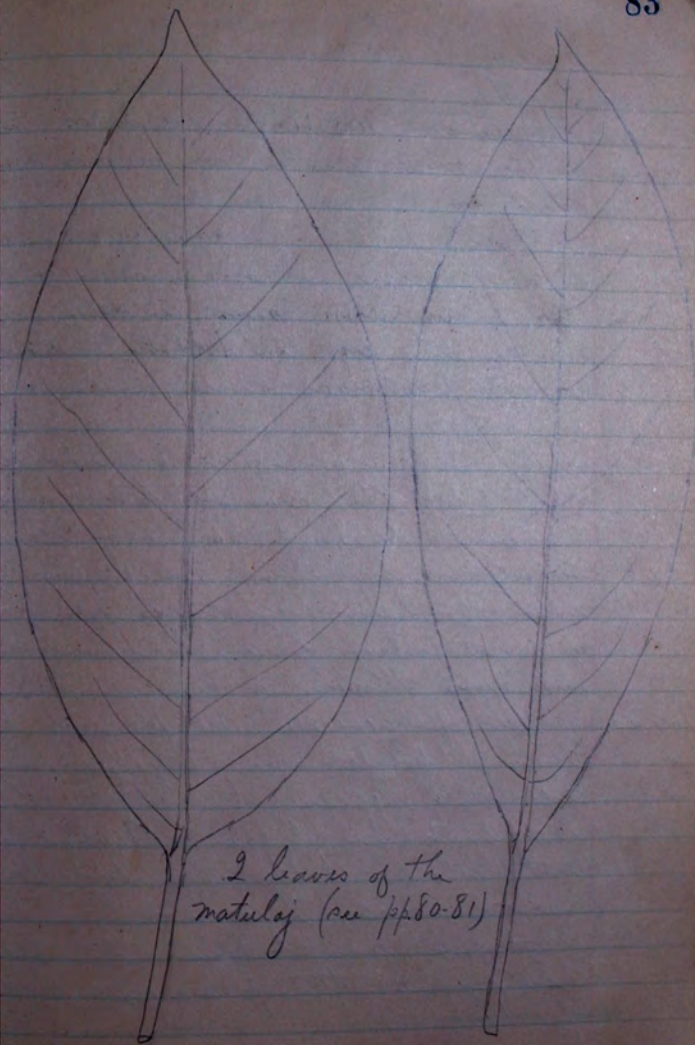
The agaveates which I examined appeared to be of good quality in some cases, but scarcely worthy of introducing into the U.S.

The season here is apparently a little later than at Antigua. I am told that the principal months are April, May and June. This would put the main season about a month

later than at Antigua. I think there are more fruits on the trees here than at Antigua at the present time. - That is, less have been picked here.

I have seen no trees here which were still in bloom. The young fruits for next year's crop are small, the largest I have seen is about one inch long & possibly a trifle larger. Some are considerably smaller.

There are very few fruits in market here at this time. An abundance of matoceros and cacaoteros, a few oranges, a few mangoes brought up from the hot country, and that is pretty nearly all. Tomatoes are the commonest articles in evidence. They seem very abundant just now.



2 leaves of the
matulaj (see pp 80-81)

Sunday Solola, Guatemala May 20 19

Elevation 7100 ft. ap. my barometer.

Solola This town presents a much more attractive appearance than it did when we passed thru in January. At that time everything was dry and brown. The rains have now commenced, the grass is springing up, and the place is really beautiful.

I have spent an entire day here, which has given me ample time to look over the aguacate trees, which are very abundant. It seems to me the trees here are more uniform in shape than I have seen them elsewhere, - a great many have dome-shaped, subglobose crowns.

Avocados Very few aguacates were found in fruit. Four of five were seen carrying large crops, which appeared to be ripe as a few fruits had dropped. Several people with whom I talked said that the reason more trees were not in fruit now was because the season had passed, the principal months

being February and March. I am strongly inclined to doubt this. Most probably the aguacates which fell the winter here in February were those from Panajachel. I cannot be sure however.

I saw no aguacate trees in flower here, but one which had just gotten out of bloom. Its tree trunk and young fruits were most green and could soon be seen. It looks just the thing as tho' the tree was about to be bearing at all well down the tree. I have seen in fruit one growing here to June in Sierra, and perhaps one later, but there are so few I do not feel safe in drawing any conclusions.

The aguacate is called aj in Quiché.

Solola appears to be too cold for coffee, but the sweet orange grows here. It is not common and the trees I have seen did not look very healthy. Jap, cherimoyas, loganberries, pasachas and metasanos are very common.

Tuesday Quezaltenango Guatemala May 22, 19

This afternoon I went to Almolonga to see the avocado trees there. When I saw the trees in January there were fruits on several of them, today I found only one with fruits, and this tree only had half a dozen on it.

Two trees out of the 5 or 6 of fruiting size which were examined, were in bloom. It seems to me the avocados ought to bloom quite late at this elevation (7850 ft) and I suspect the fruits which have been picked from these trees were picked prematurely. I found a few fruits from last year's crop still hanging on one of the trees in January. The fruits for this year's crop did not seem to be fully grown at that time.

Almolonga is a great place for frogs, the trees growing to large size. There are also peaches and natsasanos. Alfalfa and vegetable growing are important industries. The avocado trees are well very few specimens, small and apparently young.

The avocados seen in the Quezaltenango market at the present time are said to come from Solola, which most probably means Panajachel. There are very few in the market today.

The most conspicuous fruits in market at present are from the highland region: cardenas, papaya, etc. The highland fruits are in short supply. Bananas, peaches, papayas, wild cherries (only a few seen) and berries.

Coming here from Solola we left Solola at 8:40, reached Nahuala at 12:30, and Quezaltenango at 4 pm. After leaving Nahuala there is a terrific climb which brings one on to a plateau at 10,500 ft elevation. Nahuala itself is about 8500 ft. The country just before reaching Nahuala is very fine - large forest of pine, oak & cypress, - and the Nahuala valley is one of the finest agricultural regions I have seen in Guatemala.

Wednesday San Francisco
El Alto

May 23, 1917

This is the highest town I have yet seen in Guatemala, the elevation being 9000 or 9500 feet, as my barometer shows 4 leagues to Quetzaltenango, 3 to Memos tenango, and $1\frac{1}{2}$ to Totonicapán.

I have made a thorough census of the town to see if there are any avocado trees, but I have failed to find a single one, not even a small one. Fruit trees are very scarce here, aside from the peach. In my walk over the town I noted the following:

Peach. Quite abundant, but the trees are small and look stunted. They are full of green fruits.

Motacasa. I noticed 4 trees altogether 3 of which have been badly frozen. They are cut back to wood as large as other trees, but are sprouting vigorously. One tree about 20 ft high, appears unhurt.

Cereza. The wild cherry is common here both in dooryards and along

hedgerows. I am told it is called tup in the lingua of this region (Quiché) and two varieties are distinguished, a dark red one, ek-i-tup, and a pale one, sak-i-tup (white tup).

Musa erecta. I saw one large plant in a dooryard.

The principal crops here seem to be corn and potatoes. The cigu is fairly common, and a coarse-looking Santus (?) is much used for hedgerows. There are some geraniums in the dooryards. Beyond the plants mentioned there is very little in cultivation. A few roses are seen in some of the dooryards.

Thursday Momostenango, Guatemala May 24, 1911

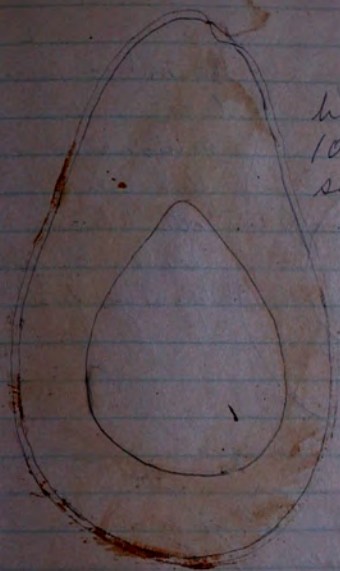
Elevation approximately 7500 ft (barometer 22.7)

Season
avocado

Avocado trees are very abundant here, and the fruit is now plentiful in the market. Quantities are carried to other parts. The trees here are in bloom now, or just going out of bloom. Their season of flowering can be said to be May. I have seen a few trees which have bloomed earlier, and now have fruits as large as previous eggs, but the majority seem to be in bloom and setting fruit.

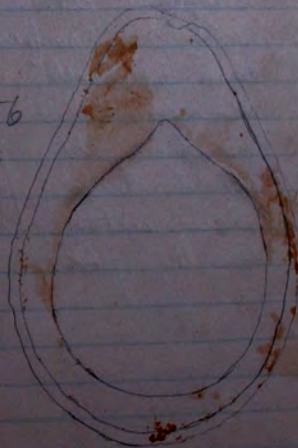
Soil

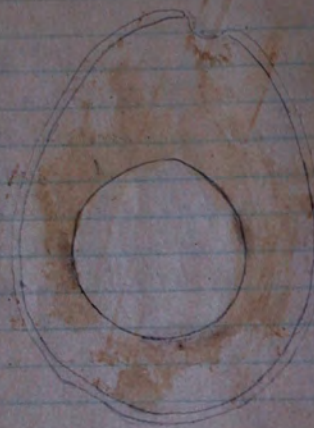
The soil here is different from that of most other avocado regions in Guatemala being a red clay, sometimes mixed with pumice. In spite of its elevation, which is equal to that of Tecpan, the spot does not seem to be very cold. It is not wind-swept like many other towns at this elevation, but lies in a small valley, surrounded by hills on practically all sides. It is a great fruit region. Following outlines are samples of the avocados grown here:



Weight of entire fruit 1 lb. 2 oz.; surface green, somewhat rough; flesh pale greenish-brown, color, flavor slightly bitter, quality poor.

Weight of entire fruit 6 oz.; surface green, rough, skin very thick, hard; flesh whitish, flavor somewhat sour, quality very poor; seed very large.





Weight of entire fruit
6 ggs. surface almost
smooth, maroon purple
flesh cream color, marks
with fiber traces; flavor
flat and, fairly rich,
quality poor.

Weight of entire
fruit 12 ggs. surface
rough, dull purple;
skin very brittle;
flesh cream color;
with fiber traces;
flavor watery,
quality poor.



Weight of entire
fruit 16 ggs; sur-
face smooth, green;
skin rather thin;
flesh cream color;
if skin not very
rich; quality
fair.

Weight of entire fruit
8 ggs. surface almost
smooth, dull maroon
in color; skin very hard
and brittle; flesh
greenish white; flavor
watery and disagreeable;
quality very poor.





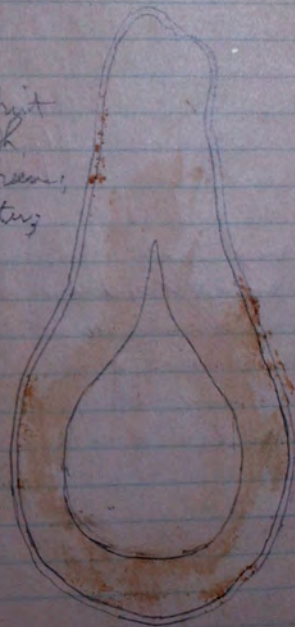
Weight of entire fruit
20 gms; surface
smooth; green;
flesh yellow;
flavor some-
what watery;
quality fair.

Weight of entire fruit
9 gms; surface pitted;
bright green; flesh
pale cream color;
flavor watery;
quality poor.



Weight of entire fruit
5 gms; surface smooth,
green; flesh pale
cream color; flavor
slightly bitter; quality
poor.

Weight of entire fruit
6 gms; surface rough
green; flesh pale green;
flavor watery; bitter;
quality poor.





Weight of entire fruit $5\frac{1}{2}$ oz.
surface rough, green;
flesh whitish, flavor
fairly agreeable, quality
poor.

Weight of entire fruit $3\frac{1}{2}$ oz.
surface rough, lob
flesh greenish, of
rank flavor, quality
very poor.



Weight of entire fruit $5\frac{1}{2}$ oz.
surface smooth, light green
flesh whitish, of rank
flavor, quality poor.

All of the fruits outlined on pp 91 to 96 were purchased in the plaza today and were supposed to be in condition for eating. Practically all of them contained decayed spots, and none was in really good shape. In addition, it seems to me, judging by their flavor, that most of them have been picked too soon. The trees here are now flowering; an avocado is not at its best, I do not believe, until at least one month after the flowers have fallen. It is then rich and oily, but if picked too soon is watery and apt to have a bitter or rank flavor.

In the U.S., it will be well to emphasize the desirability of leaving avocados on the tree until fully ripe, and then ripening them properly before selling them to the consumer. If they should reach the latter in the condition those I have just sampled were in, he is not going to enjoy his avocados very much.

Mango. I saw one mango tree on a hill-side here. It was about 20 feet high, and was decidedly unhealthy in appearance. The Indian who owned the tree said the fruit never amounted to much. This is the highest elevation at which I have found the mango. There were neither fruits nor flowers on the tree at this time.

Walnut The Persien (English) walnut is very abundant in dooryards here. The crop ripens in August. The trees do not grow very tall, and spread out a great deal. No one seems to know who brought the seed here. I was given some nuts of last year's crop, and found them of good quality and rather soft shelled, though somewhat smaller than the walnuts grown in California.

Apple. There are some fine large trees here now full of green fruit. The crop is said to ripen in July and August.

Pear. There are fine large trees here.

Peach. Very abundant. I took a photo showing the bearing habit of the peach tree in Guatemala. It is more proclined than I have ever seen it at home. The trees here are rather small. The fruit will be ripe in July and August.

Pomegranate Seen in a few gardens.

Cherimoya Trees abundant here.

Matasano Ditto

Abyssinian banana Seen in a few gardens. Little banana not grown here.

Wild Cherry Very common. Fruit not yet ripe.

Grevillea robusta commonest ornamental tree in center of town.

Avocado
Season

Avocados. I am told that July is the best month for avocados here, the season being June to August. The fruits now coming into market are said to be the first of the season, and are not yet fully ripe.

I have found no serious pest on the avocados here, but I have not examined many trees closely. The leaf gale is present but is not so serious as in other parts. I have not seen the larva which infests the fruit at Panajachel.

Soil

The soil here, which is quite distinct from that in most other avocado regions of Guatemala, seems to suit the tree very well. I saw and photographed one especially large tree.

On the whole, the avocados here seem to be superior and not worthy of attention. A fairer estimate of them could be made in June or July, however, when they are ripe.

Season

I would say that avocados here
Bloom April and May
Ripe June to August.

Friday Totonicapan, Guatemala May 25 1917

Barometer at 4 pm 21.80 (8600 ft)

On making a search through the town for aguacates. I found one tree which I did not see on my last visit here. It stands on the hillside west of town, facing to the S.E. and is a tree about 25 ft high in good condition with no evidence of severe frost injury. The owner says it bears fine large fruits which ripen in August, but at present are green. At present I am not taking any seedlings. I looked for flowers and saw what appeared to be one raceme but no more, and I may have been mistaken in this one. There are two small aguacates in the immediate vicinity of this one, both about 10 ft high and showing no frost injury.

One of the trees which I noted on my last visit as having been killed by cold I now find may have died from some other cause. Different stories are told by different persons questioned in regard

to it. The bark has been removed from the trunk for a space of nearly 3 feet above the ground, and I suspect the tree died from this cause, though it may have been severely cut back by cold first, as it shows evidence of having been cut back to wood as large as an arm, and then having sprouted again.

The other tree which I photographed as having been almost killed by the cold has made a weak attempt to send out new growth from the trunk. The owners of this tree say that it was killed by a freeze, but that it was already old, and never bore any fruit. From the comparatively small size of the tree I do not see how it could have been very old.

Avocado # 12. In patio Jesus v. de Camay, Calle de Cabanas y 101 Avenida Norte.

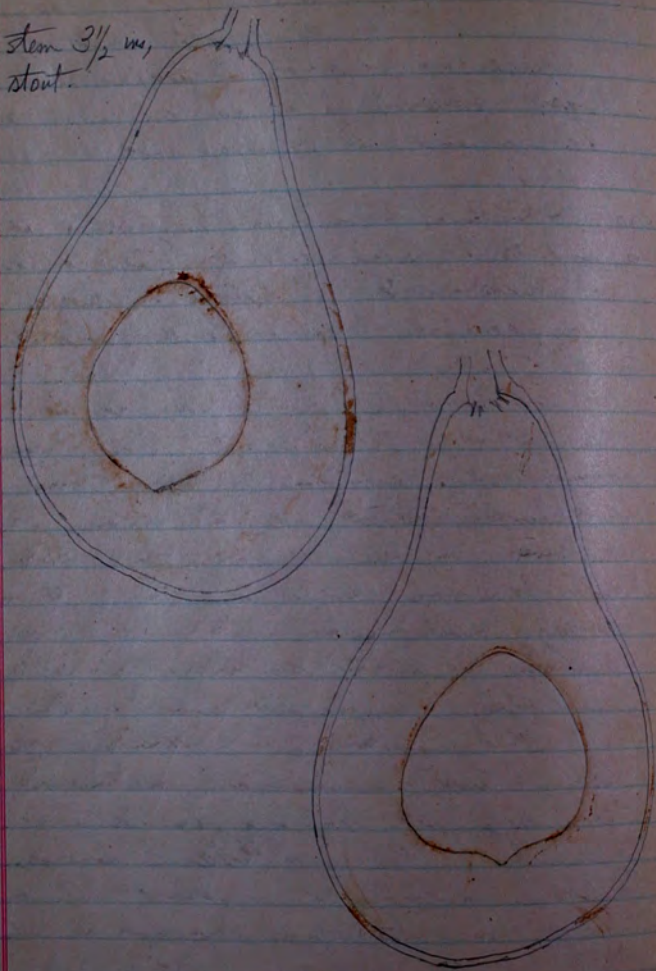
Tree is fully 40 ft high, said to be at least 25 years old. Trunk 25 cm thick at the base dividing to form 2 main branches 8 ft from the ground. First branches bearing leaves at 20 ft from the ground. Crown broadly oval, dense, with the top cut off by the tree from getting too large (the owners were afraid of single branches and fall on the house).

Apparently a productive tree. Fruit said to ripen about September hanging on the tree until the end of the year. Has recently bloomed; flowering season must be May.

The fruits now on the tree are very evidently immature and not fully grown. The two samples shown on the following page indicate the present size of the largest ones on the tree. Most of the fruits are slightly smaller than those shown. The lindwood is still a little too tender, and is of the type which drops the bud scales, and also produces elongated or stalked buds.

AVOCADO
No. 12

Stem $3\frac{1}{2}$ in.,
stout.



Wednesday Guatemala City June 13, 1917

Yesterday I went to Mexico and brought back seedwood of a new avoacae, which I have given the number 30.

AVOCADO
No. 30

The tree stands on the border of a *ladrero* by the name of Castañeda, about 4 blocks north of Alberto Riquelme's house. The altitude here is approximately 5700 feet.

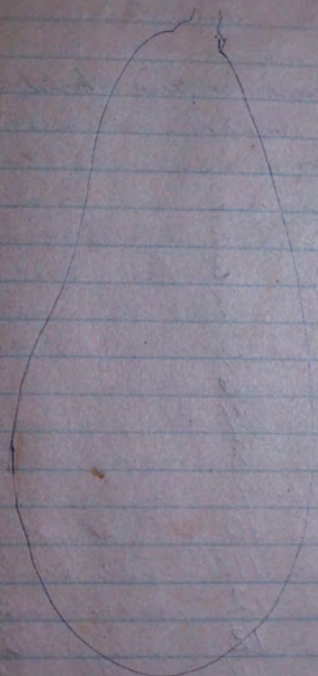
The tree is said to be about 50 years old. It is about 25 feet high, broad and spreading in habit. The trunk is 15 inches thick at the base, branching 7 feet from the ground to form two main limbs. The crown is some 35 feet broad, umbrelliform, with nearly all the foliage on the outside. A peculiarity of the tree is its very brittle wood. I have not seen mature fruits from this tree and am including it in my set mainly on the recommendation of Don Pedro Breña and Don Carlos Luna, both of whom tell me that the wood is of use.

crorally choice.

The form of the fruit, as indicated by the young ones now on the tree is large and slender - it can be called slender pynpyn in general, but in many specimens there is scarcely any swell toward the apex. The surface is nearly smooth, and said to be deep purple at maturity. The skin is comparatively thin for the type. The season of ripening is said to be March. The owner says the tree never fails to bear fruit, but some years it bears fewer than other years. There were very few fruits in the season just past, but the tree is carrying a fine crop for the coming year. The fruits are now 3 to 5 inches long.

The tree yields good hard wood, the eyes being strong, large, and apparently persisting well. The branches, however, are exceedingly brittle, and snap off when bent.

Following is an outline of a young fruit picked today:



The quality of the fruit is said to be good. When ripe the fruit may perhaps weigh 3 lbs. It is of interest as a large fruit of good quality and good bearing habits.

Wednesday Guatemala City June 13 1917

Commenced packing shipment of avocado seeds to be sent to Washington. Boxes as follows:

Box No 1	250 seeds
2	300
3	300
4	325
5	275
6	400
7	225
8	250
9	275
10	250
11	275
12	300
13	275
14	250
15	300
16	550
17	200

5000

Packing completed, as above, on June 15th.

1 case herbarium specimens, making 18 cases in all.

Monday San Cristóbal V. Guatemala July 2 1917

There are two varieties of pineapple in the market here. I have seen them elsewhere in the Verapaz as well. Up to the present they are the only varieties seen in this region. They appear about equally common here but in some places the pointed one appears to be much less common than the other.

Piña de arena. This variety is much the best of the two for eating in the fresh state. Here it is commonly a single fruit, broadly oblong-oval in outline, weighing 2 or 3 lbs. Both base and apex of the fruit are flattened. The surface is light yellow, comparatively smooth, the eyes large, marked by lines rather deeply incised, both not produced into a point or raised above the surface of the fruit. The crown is long and slender, the leaves narrow, with margins smooth. The flesh is tender, white, juicy, sweet, of very good flavor. The keeping qualities of this variety do not seem to be very good.

Variety No 2. This seems to have no distinguishing name, but is called simply pina. It is a fruit of about the same size as the preceding, viz., 2 to 3 lbs in weight. In form it is oblong, more slender than the pina de ascan, and usually tapering slightly toward the upper end. The base is flattened, the apex rounded. The surface is dull orange in color, rough, the eyes small, protruding conspicuously and sharp at the tip. The crown is short slender at the base and broadly spreading toward the top, the leaves short, broad toward the base, sharply serrate. Flesh almost woody in texture, of translucent orange color, juicy, but of rather indifferent flavor, lacking in character or sweetness. Appears to be a very good keeper.

There are still fruits on some of the trees here, but practically all of the good ones have been picked. The season lasts here from January, when the first fruits reach maturity, to July or before August. Those that are on the trees are very red and oily in flavor.

This palm probably belongs to Saccharum or a closely allied genus. It is very abundant in San Cristobal, and also in many other parts of Guatemala, at elevations between 2500 and 6000 feet. It is a slender, graceful palm, most commonly growing in shade or half shade, the ground around the base of the plant being in shade at least. I have seen specimens in full sun, however. It reaches about 25 ft in height and is said to commence flowering at 2 or 3 years of age. The stem is slender, commonly 2 inches thick, with raised rings indicating the position of former leaf bases. The

leaves are 3 to 4 ft long, with 18 to 24 pairs of pinnae, subopposite toward the base of the rachis, often becoming alternate farther up. The rachis is slender, in cross section as follows  with the pinnae inserted close to the edge on the 2 flattened surfaces. The lowermost pinnae are narrow and not over 8 or 10 ins long, farther up they become 18 or 20 ins long and nearly two inches wide.

The leaves are graceful in habit and of bright green color, lending themselves to decoration of various sorts about the houses of the natives.

The flower buds (pacayas) are produced during several months of the year principally between November and March. The seeds ripen from July to October.

The pacaya is called kip in Quiché.

The juice of the small black fruits is highly irritating. Fruits are oval, about 3/4 inch long.

Thursday Purulá, Guatemala July 5 1917

We collected in the forest this morning 300 or 400 young plants of "Cook's dwarf palm", as I call it. These are found in the forest along the road to Unión Barrios, about 1 mile, or a little less, from town, and at an elevation of approximately 5500 ft, Purulá itself being about 5150 ft.

This dwarf palm only grows to a height of about 3 ft in the forest. It makes its character leaves very soon after springing from the seed, and in the young stage - any time after it is 4 ins high - is exceedingly pretty, and decorative in appearance.

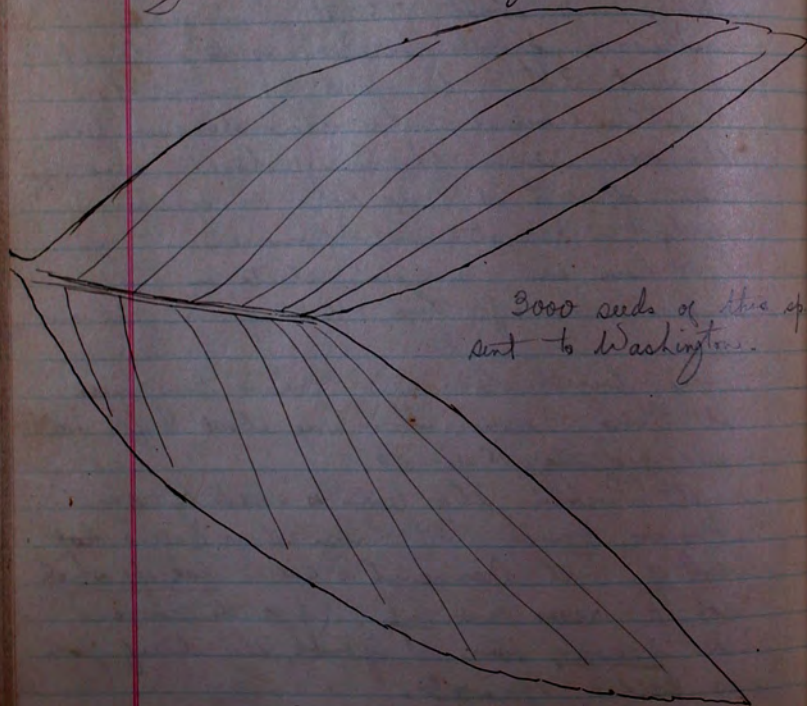
I have seen, in Colan, plants in 8" pots and not over 1 ft high, blooming and producing seeds.

The largest specimens I have seen were at Finca Samac. They were about 4 ft high and probably 15 yrs old.

At Purulá this palm is called by the Indians pinah. In Colan it is called ~~kok~~ kok ip. At Samac it is called kok-ip-shel. Kok-ip means small kip. Kip is the name of the pacaya palm. In Spanish this dwarf palm is called pacayito.

Ko-kiip

Another dwarf palm is found in the forest here. This is the one of which I obtained 3900 seeds while at Chepil. This plant is called Ko-kiip also. It has a slender stem less than $\frac{1}{2}$ inch in diameter and sometimes half-trailing, as it grows to 4 or 5 ft in length when in dense forest.



3000 seeds of this sp.
sent to Washington.

The young leaves are once divided, and resemble a fish tail in outline. Older leaves become pinnate, with about 3 pairs of pinnae, the two basal ones slender, the terminal pair larger and joined together along the rachis for an inch or more like the young leaves.

This is an interesting and decorative small palm, and seems well worth introducing into the U. S.

Seeds sent to Washington under
number 168 a. July 22 1907.

Monday Guatemala City July 9 1917

Material prepared for shipment.

#150. Pacayito or pamak, from Purula

151. *Salvia*? Blue flrs perennial
herb from Purula

152 a *Persea* sp. from Chuacus mts

153 a Leguminosae. Lilac flrs shrub
from Calchil mts.

154 a. *Bignoniaceae*. "Matiliscento"
from Rincon Grande, near Salama

155. *Persea americana*
Avocado # 8. Coban
3 tubes. 6 budsticks each

156. *Persea americana*
Avocado # 10. San Cristobal
7 tubes 5 or 6 budsticks each

157. *Persea americana*
Avocado # 11. San Cristobal
6 tubes 6 to 8 budsticks each

158. *Persea americana*
Avocado # 22. San Cristobal
5 tubes 6 to 8 budsticks each

159. *Persea americana*
Avocado # 23. Purula
5 tubes 7 to 8 budsticks each

160. *Persea americana*
Avocado # 25. San Cristobal
3 tubes 8 to 10 budsticks each

161. *Persea* sp.
Cays. San Cristobal
7 tubes 5 to 8 budsticks each

Wednesday Guatemala City July 11 1911

Outline for description of selected Guatemalan avocados.
 Avocado
 Description

Resumé of important characters of variety which led to its inclusion in the set.

Parent tree

Location - owner - altitude - exposure

Character of soil and environment climate

Probable age - Height

Color, form, character and dimensions

Trunk, diameter at base, and distance

to first branches - Vigor of growth

Flowering - season and habit

Fruiting - Productivity and Regularity

Season of Ripening

Popular description of the Fruit

Formal description of Fruit

Elevations on RR, Guatemala to Mazatenango.

	RR elevation	Barometer
Laguna (Lake of Amatitlan)	3877 ft.	25.72 m
Amatitlan	3872	25.72
Palin	3635	25.93
San Fernando	2300	27.25
Escuintla	1111	28.50
Santa Maria Junction	413	29.24
Obispo	687	28.93
Pantaleon	1101	28.50
Buena Vista	692	29.05
Catualal	720	29.05
Palo Gordo	840	28.85
Mazatenango	1148	28.55

Wednesday Guatemala City August 1 1917

Count of avocado seeds packed for shipment
to Washington

Box no. 1	275 seeds
2	900
3	675
4	725
5	475
6	515
7	390
	4055

Sunday Copan, Honduras August 5 1917

Commenced taking barometric readings upon
arrival at Copan 12 m today

August 5 1 p.m. 27.70 ins
5.30 p.m. 27.70

August 6 6.30 a.m. 27.67
11 a.m. 27.75
1.30 p.m. 27.70
4.30 p.m. 27.66
6.00 p.m. 27.70

August 7 5.30 a.m. 27.80

Average about 27.75 or 3000 ft
1100
Actual elevation 1900 ft

In the Copan market today:

Pineapples

Huiscuiles

Coffee

Flor de ayote - squash flowers

Plantains

Bananas

Chufles - apparently Zingiberaceae - flowers
reddish eaten as greens.

Tobacco in form of cigars

Mas - a corn bread + tortillas

Palmiste - young and tender sap of
trunk of *Copa* palm.

Onions

Useful plants of the Valley of Copan

✓ *Bixa orellana* achiote

A few plants in dooryards in the town

✓ *Mangifera indica* mango

Fairly common along the stream. Tree
not extremely large - about 40 ft. high

✓ *Bersia americana* aguarite

Quite a few trees on moist soil near the stream
and a few in dooryards. I don't know the

✓ *Bromelia pinguin* (?) *Pimela* grows to 6 or 8 ft
in height, with slender, coarsely serrate leaves.
Commonly used for fences. Called *pimela de*
metate here; fruit used for refrescoes.

✓ *Coffea arabica*

Cultivated on a commercial scale,
but apparently no large farms in the valley

- ✓ *Spondias purpurea* jocote
 jocote de San Jacinto large red variety various
 ordinary jocote yellow medium sized
 pitavilla yellow, acid
 This tree very abundant everywhere - wild in ruins
- ✓ *Annona reticulata* anona
 Very common tree, wild or else thoroughly
 naturalised. In bloom
- ✓ *Annona purpurea saccaya*
 Fruit eaten, but said to induce fever.
 Very common tree along streams. Fruits are
 showing maturity.
- ✓ *Saccharum officinarum* caña de azúcar
 Cultivated on commercial scale, and
 panela made here.
- ✓ *Jatropha curcas* piñon or yupur
 piece of plant used to cure sore mouth
 Said not to be used. Plant common
 in hedges.

- ✓ *Mimosa maculata* madre de cacao
 Perhaps not to be listed among useful
 plants, but very commonly planted in cerros
 or fence roads
- ✓ *Zea mays* maize
 Numerous varieties grown. Principal part
 of the people here as in Guatemala. Corn
 is planted on some ground as maíz, each
 crop occupying the field but part of the
 year.
- ✓ *Vitis sp.* uva silvestre
 Common, climbing over small trees or
 the water courses. Yields a crop, red fruit
 which is eaten.
- ✓ *Capsicum frutescens* chiltepe
 Very common, wild or thoroughly naturalised.
 Abundant about the ruins. Much used.

Sapranthus sp.
Don Juan Ramon de la Cruz says this is
not eaten, but it is very abundant hereabouts.
Probably it should not be included in a list
of useful plants.

✓ *Raculus communis* Inguera
Wild along river, rather abundant.

✓ ? *Capulin* (Metastomus?)
fruit eaten out of hand, or cooked with beer.
It is a small red berry the size of a cherry.
Tree grows along river. It is spreading, up to
30 ft high.

✓ *Eugenia corallodendron* Pato
Cooked in conchita and eaten in other ways.
Plant used to form fence rows.

✓ *Cosmibuena edulis* matasano
Several trees here. Fruit said to be good.

✓ *Psidium Guayaia* Guayaia
Abundant, both wild and cultivated.

✓ *Musa sapientum* and *paradisiaca*
There are several varieties of bananas
and plantains grown here. Bananas are
especially abundant, and constitute an important
article of food.

✓ *Mambet utalissima* Yupa
Grown in a number of gardens, and
of some importance as a food product.

✓ *Carica papaya* papaya
Common in gardens. Both green and
purple stemmed varieties.

- ✓ *Yucca* sp. *Doote*
Buds or flowers eaten fried or guisado.
This is a common plant in gardens here.

- ✓ *Acrocomia vinifera* *Coyal*
Kernel of seed eaten. This palm is fairly abundant in valley floor, reaching about 30 ft in height.

- ✓ *Crescentia cujete*
small round - morro
large long - jicara
large oblate - aguacal
All these varieties are common here.

- ✓ *Spondias lutea* *jolo*
This tree is abundant. Fruit now getting ripe and is eaten by the people.

- ✓ *Tamarindus indica* *Tamarindo*
Only a few young trees in the gardens, - none large enough to bear. Don't bear a sweet introduction.

- ✓ *Cactaceae* *Cereus?* *tuna*
Though called tuna this does not appear to be an *Opuntia*. I saw only a few stems. Rare. Fruits not seen.

- ✓ *Citrus aurantium* *naranja*
Common garden tree. Bitter sweet orange.

- ✓ *Citrus lemoeta* *limon*
The lime. Also abundant in gardens.

- ✓ *Citrus* *limia*
Sweet lime. Fairly common.

- ✓ *Citrus medica* *Citra*
Citron. Not seen by me, but said to be grown in a few places.

✓ *Chayote edulis* hirsquil
 This is one of the principal vegetables here. Several varieties are grown. On the market Sunday I saw smooth and prickly ones, all oblong or pear-shaped, and pale to bright green in color. I suppose the one in fruit hangs over a hirsquil, as is done by the *fruticulosa* species, but is allowed to climb over trees.

✓ *Sansevieria zeylanica* curvaria
 One plant seen. Cult. as of medicinal value. Juice believed to cure snake-bites.

✓ *Cocos nucifera* coco
 A good many palms appear to have been planted recently. Some are 25 ft high. No old ones seen. Plant does well here.

✓ *Jacquinia* sp. *sacatinta*
 Seen in a few gardens. Should be quite at home here.

✓ *Chatate*
 A large leaved plant some 8 ft high. Young shoots said to be eaten when mixed with meat. of little importance.

✓ *Cucurbita pepo* ayate
 This squash is common over the big plantations in corn fields.

✓ *Capsicum annum* chila
 Several varieties of chili peppers are cultivated in gardens.

✓ *Ananas sativus* pina
 Two classes: sweet, smooth leaved, and acid, with spiny leaves and yellow flesh. Sweet var. has white flesh.

✓ *Gossypium peruvianum* algodón
 Plant 6 ft high, bushy, seen in one garden. Not cult. here to any extent at present time, but said to do so.

✓ *Pysonima crassifolia* nance
Very common wild tree on dry, rocky
slopes especially abundant.

✓ *Psidium nolle* montesina
Common wild plant, the fruit apparently
little used at the present day.

✓ *Persea* pino
This pine furnishes acate or fat here
used for illuminating and to start fires.
Tree is abundant on hills around the
valley, grows to about 50 ft.

✓ *Mogileas platypus* gunza
The gunza is not common here but
there are a few trees along the stream.

Caribaea palmata
Said to be grown not far from here.

✓ *Lucuma mammosa* zapote
Said to be grown on the river bottom,
but no trees seen by me. Seen near
Chupar, however.

✓ *Annona* ~~blanca~~ anona blanca
One young tree seen on a hill. Leaves
differs from *A. catenata* and being less
aceto, and glaucous below.

✓ *Annona muricata* guanabana
Said to be grown in some of the
finches of the valley. Should be well
here.

✓ *Lagenaria vulgaris* tecomate
The gourd is commonly grown and
used for water bottles.

✓ *Sponsea batatas* camote
Fairly common vegetable.

✓ *Dioscorea* name
 Very scarce; scarcely known, but said
 to be grown here. Not seen by me.

✓ *Achras sapota* nispero
 Very scarce; only a few trees. Should
 do very well here.

✓ *Theobroma cacao* cacao
 Very little, but in cultivation.

✓ *Theobroma bicolor* patachite
 Like cacao, little cult. Some of
 the people says it is not grown here. Not seen
 by me.

✓ *Vanilla planifolia* vainilla
 Very little grown, but said to be found
 in some of the fincas.

✓ *Castilleja elastica* hule
 Very few trees said to exist here.
 Not seen by me.

✓ *Protium copal* (?) copal
 Fairly common on the hills. The
 gum is burned in churches and houses
 and is considered magical.

✓ *Lycopersicon esculentum* tomate
 Abundant in gardens. Common
 vegetable.

✓ *Physalis peruviana* miltomate
 Said to be grown here but not seen by
 me. Apparently not important here.

✓ *Punica granatum* granada
 One good sized plant seen.

Terminalia catappa almendra
 A few young trees, apparently a recent
 introduction.

✓ *Nicotiana tabacum* Tabaco
Principal export crop of Copan. Sown
in October and harvested in January. In
the same soil corn is sown May in
October.

✓ *Persea* sp. Shueti
I have seen no trees here, but there is
one between here and Camotan. Don Juan de
la Cueva says there are plenty of trees here.

✓ *Diga* sp. paterna
Said to occur, but not seen by me.
Should be here.

✓ *Hymenaea courbaril* Guapinal
Common in the valley around Chupar. Prob-
ably also found in the Copan valley.

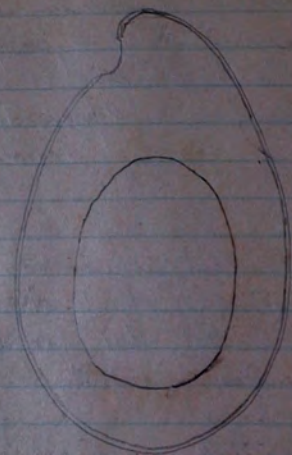
✓ *Bolmae* Bolma real
San palm of which leaves are used for hats.
Not seen at Copan but common a few miles
down the river.

✓ *Phaseolus* spp. Guapinal

Rainy season begins early in May
and lasts until January. Rainfall is
heavy. Hottest part of year is end
of dry season, - April & May. Coldest
part of year is from November to Jan-
uary.

On unclimbed slopes and hills in the upper
end of the valley the forest which is doubtless
a remnant of that which formerly covered
the valley floor is fairly dense. It is not of
the tropical nature of the forest at Guapinal
but has an abundance of tall slender trees
draped with Tillandsia usneoides and below
a dense undergrowth 10 to 20 ft high.
Climbing palms are lacking, also the
abundance of ardisia and bromes found at
lower elevations.

The soil on the valley floor is a heavy
black, sticky clay loam. On the slopes it
is a dull brown clay, often gravelly in
layers, and covered with a surface layer
of black soil when it has not washed.



Avocado grown at Copan.

Skin slightly rough, of greenish
crimson color, thick and fleshy.
Flesh cream color, greenish near skin,
discolored with fiber traces. Flavor rather
insipid. Seed with coats separating, rattle
inside the cavity. An inferior fruit.
West Indian Rice

Morley's list of plants used by the
ancient inhabitants of Copan:

- | | |
|----------------------------|------------------------------|
| x <i>Tea mago</i> | x <i>Byssonema</i> |
| x <i>Phaseolus</i> | <i>Theobroma cacao</i> |
| x <i>Gossypium</i> | <i>bicolor</i> |
| x <i>Crescentia</i> | <i>Vanilla aromatica</i> |
| x <i>Cucurbita</i> | x <i>Amorpha</i> |
| x <i>Ipomoea batatas</i> | <i>artemisia</i> |
| <i>Besicorea</i> | <i>Distichlis</i> |
| x <i>Bacca americana</i> | x <i>Artemisia</i> |
| x <i>Capacum annuum</i> | <i>Desmanthus</i> |
| " <i>putescens</i> | x <i>Lagerflora vulgaris</i> |
| <i>Achradelpha viridis</i> | x <i>Castilleja</i> |
| " <i>nanosa</i> | x <i>Centum copos</i> |
| x <i>Achras sapota</i> | <i>Convolvulus</i> |
| <i>Annona scleroderma</i> | x <i>Pinus</i> |
| " <i>reticulata</i> | |
| x <i>Skordia purpurea</i> | |
| x <i>Alnus</i> | |
| x <i>Psidium</i> | |
| x <i>Carica papaya</i> | |

Those marked x were seen by me at
or near Copan.

Tuesday Camotan, Guatemala Aug. 7 1917
Annona blanda

*Annona
 blanda*

Tree seen at frontier between Guatemala and Honduras. Cult. in dooryards. In general habit resembles *A. reticulata*, but the tree is slightly smaller and the foliage less dense and smaller. Leaves oblong, elliptic, up to 5 in. long by 2 in. broad, sometimes slightly broader toward the broadly ovate apex. The base acute to subcuneate, upper surface light green, lower surface glaucous. Fruit resembling that of *A. reticulata* in shape and size, and also in the delineation of the cartilaginous areas, which are marked by raised lines. The surface, however, is of pale glaucous green, almost whitish in appearance. The skin is nearly $\frac{1}{4}$ inch thick, the flesh snowy white. The seeds are larger and more plump than those of the *Cherimoya*. Specimen examined contained 43 seeds. Season of ripening September. Evidently a species of low elevations. Place where seen is probably 1500 ft. Also grows at Bopulango, an aldea near Camotan, about 1700 ft.

Wednesday Chiquimula Guatemala Aug. 8 1917

Barometer 4 pm

28.22

(5550 ft)

Actual altitude

1100

1450

A chart in the National Museum gives the following monthly maxima and minima for Guatemala City 1906 (approximate: I could not obtain the daily amounts in mm as shown on the chart without slight error)

	Millimeters	Inches
Jan	4	.156
Feb	16	.624
March	3	.114
April	7	.273
May	108	4.212
June	310	12.090
July	285	11.115
August	20.5	.7995
Sept	29.0	1.1310
Oct	2	.078
Nov	5	
Dec.		

Tuesday Chami, Guatemala Sept 11 1917

The elevation of this spot is approximately 1000 feet.

To my surprise, I found a number of trees of the Guatemalan species of *Cucurbit* growing here. It is the least fruit at which I have seen *Cucurbit* growing. The trees here are very small, but not so healthy as *Cucurbit* which are in the highland.

The seasons of ripening *Cucurbit* are July and August and lasts thru September. The fruit is now falling and the season is nearly past. The fruits here are all green in color, small in size and are all *Cucurbit* in form. I have seen some with the tree *Cucurbit*, making them broadly pyriform. The seed is large. The diagram shows a specimen.



Following are names of fruits in use among the Indians here. Quikchi is the language of this region.

Fruit
names in
Quikchi

<i>Persea americana</i>	sh and un
<i>Boridium Guajava</i>	pata'
<i>Megurlea platybus</i>	holoboh
<i>Annona muricata</i>	guanaboa
<i>Lucuma mammosa</i>	saltul
<i>Achras zapota</i>	
<i>Mangifera indica</i>	mango
<i>Persea</i> sp. "coco"	kotupah
<i>Annona sclerocarpa?</i>	pooh
<i>Musa sapientum</i>	mangam, guaso
" <i>paradisica</i>	chol tul
<i>Carica papaya</i>	papaya
<i>Ananas sativus</i>	chop
<i>Hymeraea courban</i>	pak
<i>Theobroma cacao</i>	palal
" <i>bicolor</i>	cacao
<i>Crescentia cujete</i>	balam
<i>Manihot utilissima</i>	hom
<i>Colocasia</i> sp.	tyen
<i>Secchum edule</i>	osh
<i>Eugenia jambos</i>	shechini
	mangam rosso

The following kinds of palms are known here:

Acte

pamak

chem chem

kala'

tuty (Attalia cuneata)

Dr. Carl Dapper (Das Nördliche Mittel
America) gives the following names:

Aguacata

in (Huasteca, Stall); on (Chicomuceltica,
on (Maya von Yucatan, Stall); on (Maya
vom Peten State); um (Chol); um
(Chorti); um (Chontal, Stall); on
(Tzentel); um (Tzotzil, Stall); on
(Tzotzil); on (Motzintleca); of (Maya
on (Jacalteca); of (Aguacata, Stall)
of (Quiché, Stall); of (Cakchiquel, Stall)
of (Tzutuhil); of (Uspanteca); of (Quiché)
of (Pokonchi, Stall); of (Pokoman
von Jalotepeque); of (Pokoman, Stall)

Anona (A. Cherimola)

ajté (Chicomuceltica); ab (Maya
von Yucatan, Stall); k'atratz (Chol);
tzumuy (Chorti); quicaf (Tzentel);
quionuf (Motzintleca); Chuwif (Maya)
Chiv (Jacalteca); Chup (Aguacata, Stall)
kevas (Tzutuhil); k'avaf (Uspanteca);
tzumuy (Kekchi)

Zapate (*Lucuma maxmora*)

itas (Chicomuceltica); ya (Maya von
Yucatan, Stall); covai i jaas (Maya von
San Luis (Moñan); hags (Tzentel);
chul (Motzintleca); chil (Maya); las,
chulul (Jacalteca); tutul (Tzutuhil);
tul (Uspanteca); satul (Kekchi);
telul (Pokoman, Stall).

Chicozapote (*Achras zapota*)

Achan itas (Chicomuceltica);
chacal itas (Maya von Yucatan, Stall);
chité (Chol); Gmri (Kekchi).

Ananas (*Ananas sativus*)

masata (Chicomuceltica); pajch, pach
(Chol); pach (Tzentel); Chubá
(Maya); matzate (Jacalteca); chop
(Tzutuhil); matzat (Uspanteca);
chop (Kekchi); jalon ch'ap (Pokoman
Stall).

Guayava (*Psidium Guajava*)
 Juvec (Chicomucbete); pichi (Maya
 von Yucatan, Stoll); pätya' (Chol);
 pata' (Tzental); pata' (Trotzil, Stoll);
 patay (Molozinteca); Chac (mam);
 pata' (Jacateca); kypk (Tzotzil);
 Chamach (Mefasteca); pata' (Nekchi)

Monday Chejel, Guatemala Oct. 1, 1917

Prepared for shipment to Washington
 the following material:

- #174. 2000 plants of banana,
 probably comprising 2 species
- #175. *Nephrolepis* sp. *Guianensis*
- #176. *Salvia* sp. *Guianensis*
- #177. Avocado #22. *Guianensis*
- #178. Avocado #20. *Guianensis*

EN EL CAMINO

Es este el camino para Cobán?
Ma'in li beh na ~~que~~ Cobán?

~~Si, lo es.~~ - - - No es, este va para Tactic
Aan, ac'qui ~~Ingony~~, Tactic na ~~que~~.

Cuanto hay de aqui a Tactic?
Jonimall na raj' Tactic?

Es muy cerca. Es lejos.
Yall cackin chic. Tocguan. Toc naj.

Hay una legua y media.
~~Toc~~ Guan sehab legua chic.

Es bueno el camino? Es malo?
Ma chabil li beh? Kile li beh?

Es muy bueno. Es regular. Es malo.
Chabil. Cackin us. Inced us.

Para donde vas? De donde vienes?
Berh sti ka kwach. Berh xachal.

Va llooca?
Ma ta xhal li laep?

Si, en la tarde. Si, a mediodia
Toc p'egh. 100 ~~man~~ ~~le~~ gualeb
Es bajada? Es subida?
Makub sine Ma tac sine?
EN LA CASA

Esta listo la comida?
Ma jaloh li comida? Ma jaloh li qua?
Ma jaloh sti be li guah?
Cuanto falta?
Jonimel chic taraj'?

Traigame agua
Cam chae li lub.

No hay mas pan?
Ma ^{toj} ^{guan} ~~je~~ chic li caplan qua?

It is hot. It is cold.
Tiecc. Ke.

Hay que hacerlo.
Te banu.

Quita la mesa.
Quist li mesh.

Póngalo encima de la mesa.
He saq-ben li mesh.

Componga la cama.
Chap gile li chato (o cama)

Barra mi cuarto.
~~En~~ ~~los~~ measure sa lin cuarto.

Traigame agua caliente
Capacha lo ~~hate~~ tiao bal hak

Day Night
Catan ~~Scaytin~~ ~~Oytan~~ kojijin

Limpia mis zapatos
Chatta mes lin paap.

Hágame mi el favor
~~Yo~~ ~~ba~~ ~~ni~~ ~~li~~ ~~us~~ ~~ilal~~ Banu li us ilal

Viste flores en el camino?
Macha kwil li atzab sa li bek?

frijol -- quene
chile --- uk
sal --- atgam
carne --- tle
yerbas --- ichaj
huevos --- mol
tomate -- pix
ajotes -- ~~hate~~ ^{g'ap}
chusquiles -- chimá
ayote --- cuim
camote --- ~~is~~ is
papas --- caplan is
pimienta --- caplan quene
frijol blanco -- saqqi quene
dulce --- cab
tamales --- kobén
platano gordo -- choltul

olla .. uccal
tinaja ene
huecel joon
taga pccc

verbo ir

~~present~~
 tin shik = I go
 ta shik you go
~~tob shik~~
 toj shik we go
 tesh shik they go

~~shin~~
~~shin~~

verbo hacer

tin banu = I go do
 ta banu you go do
 toj banu we go do
 tesh banu they go do

shin banu = I ~~went~~ did
 sha banu you ~~went~~ did
 shoj banu we ~~went~~ did
 shik banu they ~~went~~ did

tob tin banu = I will go do
 tok ta banu you will go do
 tok toj banu we will go do
 tok tesh banu they will go do

hacer = banu

estar =

ir = shik

poner = que'

comprar = loq

trab = hanchag

calentar = tieg ~~goj~~ ~~doj~~

ver = güell

trabajar = canjel

ser = lain, laa, loj, leah

decir = yeh

{saber = nau

{entender = "

tener = gwan ginkin

venir = charkeh

vivir =

lavar = puch

dar 'keh

vender ka kink

José Cabral tells me of a use for
the aguacate of which I have not before heard.
When one gets bruised in any way, a little
fat is rubbed on aguacate leaves, which are then
warmed and bound over the bruise.

mañana guilaj
en la tarde jiquij

haste maname! guilaj ~~chic~~ chic!

patrón = ka quak

uata = ulik

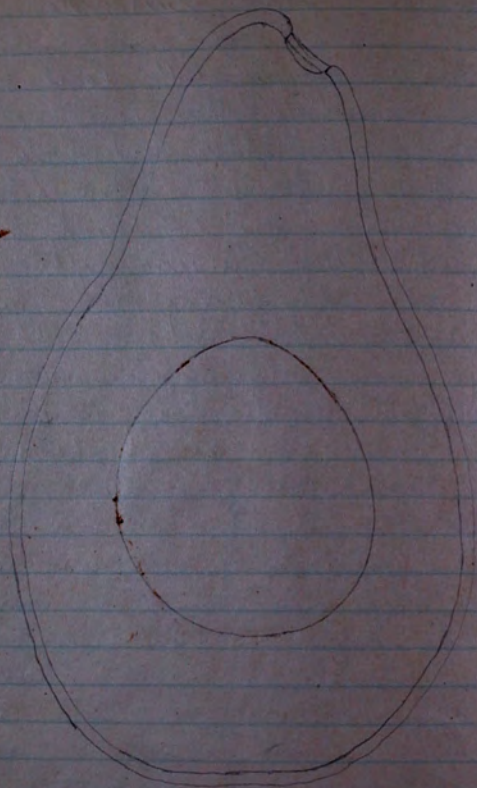
patroná = ka ná

Sunday Tactic, Guatemala Oct 7 1917

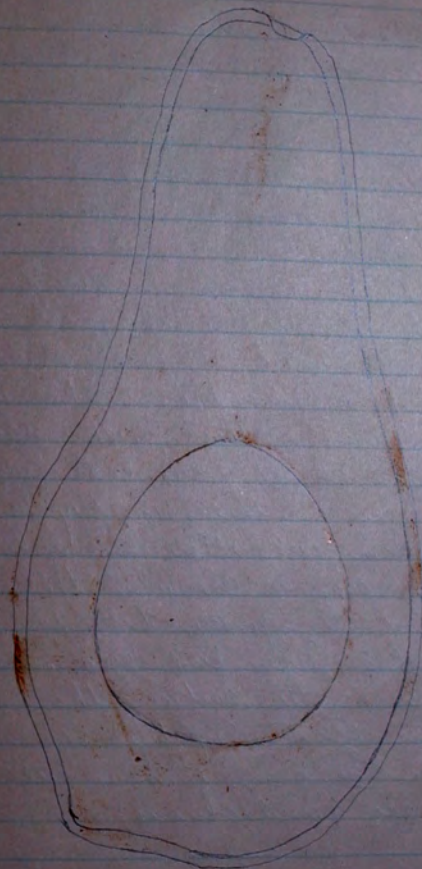
In the grounds of the local curate.
(Padre Rivera) there is a large cagü
tree which produces particularly fine
fruits, - the choicest I have seen. This
probably is about 2 blocks east of the
church called Calvario, after entering
the gate and passing the house one
takes the road to the left which
goes down hill. After walking about
200 feet the tree is on the left
some 40 or 50 ft. from the road.
It is a very large tree at
least 50 ft. high, broad with a fine
crown, apparently in good health.

At this time there are only a few
fruits left on the tree, - not over
one dozen. I do not know how
heavy a crop the tree has borne
this year, but there are quite a
number of decayed fruits on the
ground. The season of ripening
is September, a few fruits hanging
on the tree until October.

Following are outlines of two specimens.



Weight 24 ozs, length $6\frac{1}{4}$ ins, breadth 4 ins,
seed 2 ozs



Weight of fruit, 25 ozs, length $7\frac{1}{8}$ ins, breadth $3\frac{5}{8}$ ins
seed nearly 3 ozs.

This fruit is light green in color, with very numerous, small, yellowish dots. The skin is pale green in color clear to the flesh, and 2 to 4 mm in thickness. The flesh is dull white throughout, not changing color toward the skin as in the aguacate. There is no fiber, but slight fiber tracings are visible, especially toward the outer portion of the flesh. In texture the flesh is firm, rather more coarsely granular than in the aguacate, and yielding a thick milk white juice when pressed. The seed coats vary from 2 to 4 mm in thickness, they are separable from each other and adhere closely to the seed. In character the seed resembles that of the aguacate, but the cotyledons are of a darker pink color, and somewhat rougher on the surface than is common in the Guatemalan type of aguacate.

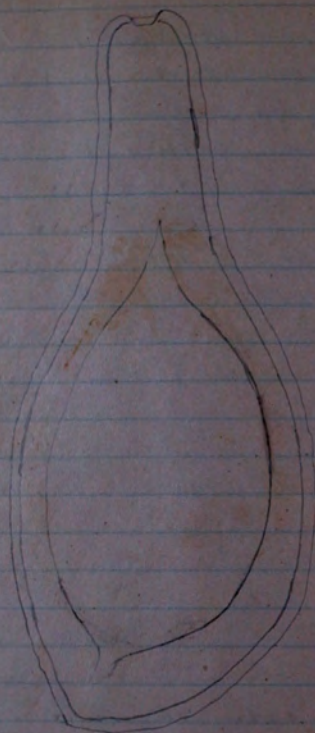
When the green fruit is cut, the flesh is sticky (mucilaginous).

The cayo is here called *kiyo* in place of *cayo*.

The cayo described on the preceding pages is a marked contrast to the cayo seen commonly in the market. The latter are unattractive in appearance and scarcely palatable. In comparison the former is a fine, succulent fruit the equal of the aguacate.

The cayo seen in the market are nearly all small and of uniform size and of uniform color - brownish white. They were all green in color when I saw them or marked with brown. The flesh which in fruits of this nature is quite sticky, due to the large seed, was light brown in color, coarsely granular in texture, often times with small fibers running thru it. The flavor, however is good, rich, strongly suggestive of coconut, and very oily.

These ordinary cayo are not well growing in the United States, but the large one shown on the preceding pages certainly is, and I have obtained seeds of the ordinary ones to grow grafting stock. Following are outlines of two fruits of the ordinary type.



Weight 9 oys, length 6 ms, breadth $2\frac{1}{2}$ ms,
seed $2\frac{1}{2}$ oys.



Weight 8 oys, length $5\frac{1}{8}$ ms, breadth $2\frac{1}{2}$ ms,
seed 3 oys.

Cajiniquil

I bought in the plaza some pods of a species of *Inga* known here by this name. It is quite a distinct thing from the paturo. The pods are 5 to 7 inches long, about $\frac{1}{2}$ inch broad, and very fat. They contain 6 to 10 irregularly elongated dark green seeds, each surrounded by white, jelly like pulp, juicy and of a sweet aromatic flavor suggesting the litchi. I find the flavor very pleasant.

This tree is one used for shade in coffee plantations. I purchased 4 bundles of pods @ 2 reales each, obtaining more than 500 seeds from the lot. It seems worth trying in Florida though I do not anticipate that it will ever become of great importance there. It should be of interest to plant analcans.

Monday San Cristobal V., Guatemala Oct. 8 1917

On the road from Tactic to the place I secured seeds of an herbaceous plant with crimson-scarlet flowers which seeds resulted of introduction into the U.S. This plant is common in the state of Vera Cruz, growing most abundantly in open grassy places. It has a thick stem of being an annual. It has a single stem to the height of 3-5 feet bearing toward the top a terminal bright crimson-scarlet flower, appearing in the form of an inflorescence, but split along the upper surface, and deeply 5-lobed, 3 of the lobes extending downwards and the remaining 2 upwards. The tube of the flower is about 1 inch long, the lobes $\frac{1}{2}$ inch. The flowers are closely set upon the stalks they branch out. As fast as the lower flowers on the stalk wither and turn brown, new ones are produced at the apex, thus the plant remains in bloom for a long period, and always presents a bright appearance.

The stem and leaves are softly pubescent.

or filose. The stem is more or less ~~scabrous~~
 hairy. The leaves are linear-lanceolate
 4 to 6 ins long, $\frac{1}{2}$ to $\frac{3}{8}$ in broad, entire or
 finely and irregularly serrate, adnate to the
 stem, with the margins extending some
 distance down the stem in the form
 of 2 prominent ridges.

Wednesday. San Cristóbal I., Guatemala Oct. 10, 1917

The guayaba, *Persea guayana*, is common
 in gardens here, and it is also seen in
 the naturalised or wild state along road-
 sides and about clearings. The Chamach
 (as it is called in Quiché) *Persea nana*,
 is a common weed plant, rarely very large
 except in dense forest.

The fruit of the guayaba is now
 ripening, and is much sought after
 by the Indians, who generally eat it out
 of hand. They do not seem to use it
 to any extent in other ways, guayaba
 jelly being consumed only by Europeans
 and Ladinos.

The fruit of the Chamach ripens later
 than that of the guayaba. It is still
 green and hard. I found ripe fruits
 near Cobán last year in December.

Both these species produce abundantly,
 the Chamach sometimes being loaded
 with fruit. The great acidity of the
 latter, however, results in its being
 very little used by the Indians, who
 seem in general to have a predilection
 for sweet things.

The fruits of *P. Guajava* and *P. molle* are not easily confused. The flavor of the latter, in addition to being much more acid than that of the former, lacks the mustiness which is characteristic of *P. Guajava*. In general, the fruit of *P. molle* is much the smaller, it rarely measuring more than $1\frac{1}{4}$ inches in diameter; in addition, it is always round and surface yellow when ripe, with whitish pulp while the fruit of *P. Guajava* is often oval or pyriform (though commonly round in this country), as much as 2 inches in diameter, surface yellow externally and either pale yellow or salmon pink internally. Seeds are numerous in both species, in similar in size and general appearance.

In habit of growth the two species are somewhat similar. *P. Guajava* is more often seen as a shrub than is *P. molle*, but the latter occasionally attains to 15 or 18 ft in height. The foliage of the two is not so similar, but the two species are easily distinguished one from the other. In the first place, the young branchlets of *P. Guajava* are

very distinctly 4-angled; those of *P. molle* are slightly compressed, but not 4-angled, or at most very obscurely so. The venation is deeply impressed on the upper surface of the leaf of *P. Guajava*; in *P. molle* it is much less noticeably impressed, and the result that the leaf presents is more or less even. But the most distinctive difference between the two species lies in the texture of the leaves. In the young branchlets and upper surfaces of the leaves of *P. Guajava* it is comparatively dense and prominent, while in *P. molle* it is very fine and silvery. The young leaves of *P. molle* are velvety-foliate and quite soft to the touch (whereas the specific name *molle* = soft); those of *P. Guajava* are thinner and not so soft. It

Cayo' The season for cayos (here called kiyo') is just approaching in end here. Apparently the ripening period here, as also at Toluca and Colima, is September and October. In the lower Molave valley it is June and July. It can be said, therefore, that at elevations of 4000 to 5000 ft.

the season is September - October

At elevations of 1000 to 2000 ft.

the season is June and July.

I have seen a few ripe fruits in Toluca as early as May (see Inventory notes for exact dates). I found a few fruits left on trees in the Chapay in the first half of December of the past year.

The cayo has a much shorter ripening season than the agnate. The latter will in some cases yield ripe fruits during a period of 4 or 5 months, while in the case of the cayo 3 months seems to be about the limit, and most of the crop falls within a period of 6 weeks to 2 months.

If the cayo is ever to become extensively cultivated in the U.S., as I believe it will be if we can succeed in introducing the best varieties found in Guatemala, it is inevitable that it be started off with a name similar to the English language and unpronounceable by the English language.

The names which I have given to the fruit, and the places where they occur, are as follows:

cayo'	-	San Juan, Chimaltepec
kiyo'	-	San Juan, Chimaltepec, Colima
kiyo'	-	San Juan, Chimaltepec
chacto	-	San Juan, Chimaltepec
chacto	-	San Juan, Chimaltepec
chacto	-	San Juan, Chimaltepec
chacto	-	San Juan, Chimaltepec
chacto	-	San Juan, Chimaltepec

It strikes me that cayo' is the most attractive of these names, and it is certainly just as acceptable as any of the rest in the ground of usage, unless kiyo', which is the Colima form, may have more extended usage.

But if cayo' is to be the name used in the United States, something must be done to eliminate the accented o, for

it can not be expected that Americans will retain anything so foreign to the English language. Could the word be spelled Coyoh, and thus be made to retain the accent on the final o? I cannot see any other way to come nearer the proper pronunciation. If it is left simply as Coyoi, and the accent mark is dropped, the stress is certain to be transferred to the first syllable, which would make the name unintelligible to a Guatemalan.

Coyoh Coyoh. I do not believe even with this orthography the accent will be kept where it belongs. Perhaps it will be as well, after all, to leave the word as it stands in Spanish, Coyoi, and let people pronounce it the way they want to. They are pretty sure to do so any way. I believe Coyoi is a good name; it is short, not easy to misspell, and reasonably euphonic. I guess we had better let the accent go and stick to the simplest form possible, which certainly is

COYO.

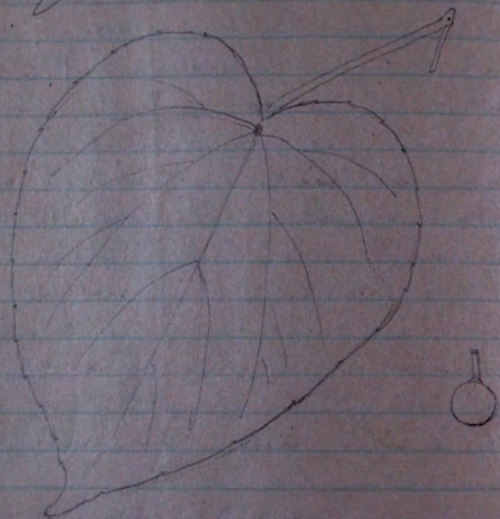
Thursday San Cristóbal V., Guatemala Oct. 11, 1917

On the road between here and Tactic I obtained for seed several bunches of wild grapes. This appears to be a different species from that purchased in the Guatemala market about 1 year ago, and it also appears distinct from Vitis caribaea of L. B.

This strikes me as a very promising species from a plant breeder's standpoint, at least I have yet seen one like it here. In the effort to produce a good grape for tropical constitutions it may be found very useful. It bears heavily, the berries are compact, and the individual berries larger and more fleshy than those of V. caribaea. They are very sour.

The plant makes slender amenthes, with forked tendrils and cordate subserrate leaves 3 to 4½ in. long by 3 to 3½ in. broad. The racemes are 2 to 3 in. long, compact, the berries ⅜ inch in diameter, dull or rather pale purplish maroon in color when ripe, with abundant very acid juice and only 1 to 2 seeds. The fruits seem to be little used here, as they are too sour to eat out of hand and the

Indians are not accustomed to make
jelly or any other products of similar nature



Sage of Avocados of all varieties I have ex-
amined in Guatemala have a proportion-
ately smaller seed at the time the fruit
comes to maturity than they do here
or three months later. If picked before
fully mature, the difference is even
more noticeable. It is not fair, there-
fore, to judge the average size of the seed
in any variety until the seed is
taken from a fruit which is fully mature.
Dr Knight's varieties are indicated by
numbers 13 and 14. I noticed particularly
this difference in the size of the
seed; when these fruits were picked in
November (which Knight says is the beginning
of their season, but at which time they
are actually far from mature) they
have seeds which could be termed small;
when picked in March or April (when
fully ripe and really at their best) their
seeds must be termed large. They are
so large, in fact, as to disqualify
the varieties in my estimation.

Monday Chich, Guatemala Oct 15 1917

Packed the following material, to be dispatched to Washington tomorrow:

#179a *Persea* sp. "Cayo"

Bpf #1 340 seeds in mass, scarcely mixed

Bpf #2 400 " dry

Bpf #3 275 " dry

Total 1015

#180a *Juglans* sp. nogal

#181a *Chayeta edulis* Guisquil perulans

#182a *Pithecocten* sp. uva silvestre

#183a *Guya* sp. Cojüngüil

#184a Blue flowered large shrub, Tamalul

#185a *Pimienta* sp. San Cristóbal

#174a. *Pacayto* seed, Cobán

#186a. *Croton* flowered herb. San Cristóbal

#187. Terrestrial orchid "Sobralia"

#188 *Avocado* #10

#189 *Avocado* #11

#190 *Melastomaceae* Tamalul

#191 *Mussaenda*-like shrub. Tamalul

Tuesday Guatemala City Oct 28 1917

Shipped to Washington the following material.

#192. Red flowered shrub from Chucús mountains.

#193. Avocado #30 from trees of Juanro Castillo, Mexico. 1/5 budsticks + cions.

Tuesday Guatemala City Oct 30 1917

Despatched to Washington via the Diplomatic Pouch

#194. Avocado #31 from cions of Angel Samayoa, Antitlan, 95 budsticks and cions from fully the latter old wood with a good deal of sooty mold.

Friday Guatemala City Nov. 2 1914

Mr Basset has sent me a copy of an agreement to be signed by those who desire to test sets of our Guatemalan avocados.

It seems to me this agreement does not cover all the points necessary. I have drawn up a more lengthy agreement and am sending him a copy of it, suggesting that he read it over and incorporate in his own document any of my points which seem to him desirable. My agreement is as follows:

MEMORANDUM OF AGREEMENT.

The Office of Foreign Seed and Plant Introduction, through its agricultural explorer Wilson Copenoe, has introduced a collection of new varieties of the avocado from Guatemala. These are accompanied by photographs and descriptions of the parent trees and their fruits. It is desired that this collection be tested in the avocado-growing regions of the United States under the widest possible range of soil and climate. It is desired to safeguard the avocado industry,

and at the same time determine the value of these varieties in this country, the undersigned agrees as follows:

1. To grow the avocado trees listed by number below, furnishing the necessary water, fertilizer, protection and cultivation to produce the best results, until they shall have borne at least three crops of fruit.

2. It is understood that properly accredited officials of the Office of Foreign Seed and Plant Introduction shall at all times have access to the trees for the purpose of examining and photographing them, and that they shall have the privilege of taking a limited number of leaves and flowers for study and preservation, as well as specimen fruits from each of the first three crops up to the number of six fruits from each tree each season; except where this number is more than one half the entire crop produced by the tree, in which case one half the total number may be taken for purposes of examination, description and preservation.

3. In regard to the cutting of budwood or cions from the trees, it is agreed that the experimenter in whose care these trees are placed shall not sell any buds, cuttings or cions from any of the trees until after the first crop of fruit has been produced by the tree or trees from which the buds or cions are taken, but such amounts of budwood as can be removed from the trees without injuring them or delaying the production of their first crop of fruit can be taken by the experimenter for his personal use, provided that a reasonable amount of good budwood be left on the tree each year subject to the disposition of the Office of Foreign Seed and Plant Introduction.

4. It is agreed that the Office of Foreign Seed and Plant Introduction has the sole right to name the varieties in this collection and until names are supplied by it the varieties must be given under their Seed and Plant Introduction numbers, with the additional use, if desired by the experimenter for convenience, of the collection number given the variety in Guatemala.

5. It is further agreed that no budded plants of any of these varieties shall be offered for sale until after the tree from which the buds are taken has produced its first crop of fruit.

6. Finally, it is agreed that the experimenter in whose care these trees are placed will keep careful and accurate records of date of planting, amount of growth made annually, date of flowering in different seasons, number of fruits in each crop, period during which the fruit ripens, frost injury to the trees, and all other interesting facts in connection with the testing of each variety, a copy of such records to be furnished the Office of Foreign Seed and Plant Introduction upon request.

Plants
from
Copán

In a letter from G.P. Van Benthin, dated Sept.
21, 1917, he informs me that Standley has
determined my numbers from Copán as follows.

798 (mistake, should be ~~797~~ 794)
Elaphrium gracile (Engelm.) Rose.

795. *Muntingia calabura* L.

797. *Pinus tenuifolia* Benth.

798. *Vitis caribaea* D.C.

800. *Erythrina corallodendron* L.

In letter from Van Benthin dated
March 22 1917 he gives the following
determinations of my numbers.

662. *Eleusine indica*

663. *Chloris viridis*

664. *Eragrostis pectinacea*

665. *Capriola dactyloides*

666. *Sporobolus indicus*

667. *Hiloria verticillata*

668. *Chaetochloa gracilior*

669. *Glycyrrhiza leucocaulis*

670. *Paspalum denticulatum*

693. *Andropogon fastigiatus*

693a. " *Andropogon*

693b. *Aristida sparsa*

694. *Eragrostis secundiflora*

695. " *calycina*

696. *Paspalum notatum*

697. = 693

698. = 666

699. *Andropogon saccharoides*

700. *Aristida scabra*

702. *Opilogenus cristatus*

710. *Aristida jorullensis*

711. *Bouteloua filiformis*
 712. = 694
 730. *Aegopogon cenchroides*
 732. *Dorogastrium nutans*
 733. *Pereilerna crinitum*
 734. *Pennisetum* "
 735. *Lasiacis capensis*
 735a. *Tricholaena rosea*
 736. *Muehlenbergia microspora*
 737. *Lasiacis prostrata*
 738. *Opuncampis stricta*.

From Circular #1 of the California
 Avocado Association I have been able
 to calculate the percentage of the total
 weight of the fruit taken up by the seed,
 in the 8 California varieties which at
 the present time seem to be considered
 the best for commercial use. It is as
 follows.

Variety	Av. Fr. weight (pounds)	Av. Seed weight (pounds)	% of seed
Florida	13.00	1.52	11.5%
Spinks	18.00	3.25	18.0%
Blakemore	16.00	2.50	15.6%
Lyon	16.00	2.75	17.1%
Dickinson	12.00	1.36	11.3%
Taft	15.00	3.13	20.8%
Sharpless	20.00	3.00	15.0%
Puebla	9.00	1.50	16.6%

This gives an average percentage of
 seed in the above 8 varieties of
15.6 %.

While the scales I have here in Guatemala are not fine enough to weigh a fraction of an ounce, I have weighed the seeds of my varieties as closely as possible. The percentage of seed in the best ones is as follows:

No.	Avg. wt. of entire fruit	Avg. wt. of seed	Percentage of seed
3	17 gms	2.5 gms	14.7 %
6	8 "	1.5 "	18.75 "
10	21 "	2 "	9.5 %
11	20 "	2.5 "	12.5 %
15	10 "	1.25 "	12.5 %
17	40 "	4 "	10 %
18	16.5 "	2 "	12.1 %
20	13.5 "	2 "	14.6 %
21	20 "	3 "	15 %
23	14.5 "	1.5 "	10.3 %
27	13 "	1.5 "	11.5 %

The average for these 11 varieties is approximately 12.5%, which is 37% lower than in the California varieties listed on the preceding page.

CALIFORNIA AVOCADO ASSOCIATION

CIRCULAR NO. 1

ISSUED OCTOBER 25, 1917.

AVOCADO VARIETIES RECOMMENDED FOR PLANTING IN CALIFORNIA

(A report of the special committee on Classification and Registration of Varieties, approved by the Board of Directors for publication as a circular.)

The large number of avocado varieties that have been introduced, and the general lack of exact knowledge regarding varieties, render it very difficult for the prospective planter to obtain reliable information as to what sorts are the best and safest to plant. Recognizing this difficulty, the Directors of the California Avocado Association requested the committee on Classification and Registration of Varieties to prepare and publish a list of approved varieties. Such a list prepared by the committee and approved by the Board of Directors, is published herewith.

The list includes only varieties of the so-called thick-skinned or Guatemalan type, which in general it is believed is the best and most reliable type for commercial planting. The committee does not believe that it is possible at the present time with our limited knowledge and experience, to attempt to judge on the relative commercial importance of the different classes of fruits. Only time can determine what the market demands will be. The fact remains, however, that at the present time, a large majority of the experienced growers in California favor the use of the Guatemalan type.

Many varieties that are frequently mentioned in discussions are not included in this list. The list must be taken merely as the best judgment of the committee, at the present time, of the varieties safest to recommend for planting. Several very promising varieties are not mentioned, as the knowledge of the committee concerning them is insufficient to justify passing judgment on their qualities and comparative value. Again, some of the varieties mentioned in the list will probably be discarded later. This list, the committee expects to be of temporary value only. It should be revised by the Association every year and brought up to date to keep pace with advancing knowledge. As soon as justified by experience, varieties of other types should be included.

EXPLANATION OF LIST.

The varieties are listed according to season of maturing and not in the order of their merit. It is well recognized by growers that the season of maturing of a given variety is very variable and may extend more or less throughout the year. The placing of a variety in a definite season merely indicates its usual season of maturing when it may be expected to be at its best. Varieties may extend from one season into another, and when in the judgment of the committee, a variety may be considered as important in two seasons, it is listed under both. It thus happens that several varieties are listed twice.

Outline for a book on Guatemala.

- I. In and About the Capital.
- II. Antigua and Its Environs
- III. The Lakes of Guatemala
- IV. The Pacific Slope
- V. Los Altos
- VI. The Verapaz Country
- VII. Southeastern Guatemala
- VIII. Lowlands of the Atlantic Coast
- IX. The Guatemalan Indians
- X. The Future of Guatemala

Los palos grandes	-	eb li ningi' chek
las ramblas		li ruk
las hojas		eb li shak
la Santa		li ruk
mucha fruta va a dar	-	nabal li ruk tish kek
flores	utzunh	
Liquidambar		ocob
kapote	-	saltul
tomate		piok
guisquiles	-	chinah
Naher	-	chi
jocote	-	rum
Naranja	-	chiina
Lima		liim
Platano		ta tul
Anona		tyumuy
Aguacate		oo

white sag
yellow gan
red gag
black gug
purple moraad
green raf
blue rap tzipin
rose mero gag

de que color? chan ru raf?

Tiene ^(s) dinero ma gwan ^(a) tumin?
Aqui nos quedamos - arrin toh kanag
Yo me voy - lain tin shik
¿Dónde vas - bark tot shik
por supuesto - ga nag mahi.
No se ingha nia nan
Andate pues ayin bi
Es caro mas te toh na ka kin
no entiendo ingha min tau nu.
lo que estas diciendo Si na ka kiek kwad

Yo tengo lain tuwan guikha
tuo tucenas laat gwan at guikha
nosotros tenemos laoh gwan guikha
ellos tienen ebaan gwan keb rikin

Cuantos tenis janul gamat guikha
Le doy diez pesos - Tin keb laheb pes

Yo = lain
tu = laat
Ud. = laat gwa (Ud. señor)
nosotros = laoh
vosotros = laat
ellos = ebaan
el = aan

porque - ban
pronto - jumpat
poco - seachin
bastante - nabal
talvez - tanai
¿porque? ga ut?

QUEKCHI PHRASES

Cómo son? Chaw eb rui?
 Hay muchas piedras - capal pek
 No me gusta - Dingka na gulak chigui
 Es bonito - Capal chinani
 No se puede - Dingka na rui
 Vos sois rico - Laat ueón
 Es poco - Dingka capal
 Traeme un caballo - kamchet acagwayo loan
 A donde voy - Barh tun xic
 Dale gacate - ki richaj
 Limpialo - mey
 Compralo - ylib
 Traeme los zapatos - kamchak li paab
 No tengas miedo - Bat qingnak
 Lo necesito luego - ta quaj na sa qingnak
 Eso quiero yo - Chan ta quaj lain

- | | |
|---------------------|----------------------------|
| 1 hien | 26 quakut shk'kaal |
| 2 kaib | 27 kungut shk'kaal |
| 3 oshib | 28 quashagib shk'kaal |
| 4 kaa kib | 29 beleb shk'kaal |
| 5 oop | 30 lahob shk'kaal |
| 6 quagib | 31 humlahuk shk'kaal |
| 7 wugut | 32 kaplahuk shk'kaal |
| 8 quashagib | 33 osh lahuk shk'kaal |
| 9 beleb | 34 kalahuk shk'kaal |
| 10 lahob | 35 o lahuk shk'kaal |
| 11 hum lahuk | 36 quaklahuk shk'kaal |
| 12 kap lahuk | 37 quklahuk shk'kaal |
| 13 osh lahuk | 38 quakshaklahuk shk'kaal |
| 14 kaa lahuk | 39 belelahuk shk'kaal |
| 15 o lahuk | 40 ka kaal |
| 16 quaklahuk | 41 kakal rin hum |
| 17 quklahuk | 42 kakal rin kaib |
| 18 quakshaklahuk | 50 lahob rush kaal |
| 19 beleb lahuk | 51 lahob rush kaal rin hum |
| 20 hum mai | 60 osh kaal |
| 21 hum shk'kaal | 70 lahob shk'kaal |
| 22 kaib shk'kaal | 80 kaa kaal |
| 23 oshib shk'kaal | 90 lahob osh kaal |
| 24 kaashib shk'kaal | 100 hum ciento (ok aal) |
| 25 oop shk'kaal | |

BENAVENTIANAS.

Gonzalo Canto

Con ser su cultura tanta,
a veces el sabio olvida
que la poesía es santa;
el sabio explica la vida,
más el poeta la canta.

Mira que triste verdad:
queriendo estar siempre solo,
¡me espanta la soledad!

No te des a correr prisa ninguna,
que puede fatigarte la carrera;
disfruta de la alegre primavera,
porque en toda la vida sólo hay una.

Aunque quedo en el arden,
no lirás sola ni un momento.
contigo iré yo también;
que si mucho corre el tren
corre más mi pensamiento.

Hay tus labios aproximados
al que besarlos deseo,
como se besan dos rimas
para expresar una idea.

El sabio remonta el vuelo,
el vate la lira templó;
fuego es uno, el otro es hielo;
el sabio analiza el cielo;
el poeta lo contempla.

Todo ser que nace llora;
todo ser que llora muere;
todo ser que muere vive;
todo ser que vive ama.

¿Cómo no ser soñador,
si todo á soñar convierto?
¡Dejadme soñar la vida
para vivirla mejor!

Juzga por ti á los demás;
del hambre sé que defallece;
y aun por las tardes te vas
á echarles pan á los peces.

No quiero que el favor que ahora te hago
me lo agradezcas. Si te viene en gana
puedes darlo al olvido;
pero te ruego en pago
no te vengas de mí cuando, mañana,
te olvidaras de haberlo recibido.

Account of R. B. H.
Oct 31 1917
Bill rendered
Paid

953

- | | | |
|----|-------|-----------------------------------|
| ✓✓ | No. 3 | Angel Samayoa, Amatitlan |
| ✓✓ | 6. | Victor Garcia, El Cubo |
| ✓✓ | 7. | Masario del Rio, Guatemala |
| ✓x | 8. | Julio del Rio, Coban |
| ✓x | 10. | Diego Muniz, San Cristobal U. |
| ✓x | 11. | Eusebio Cruz, " " |
| ✓x | 12. | Totonicaplan, " " |
| ✓✓ | 15. | Finca Atanacio, Antigua |
| ✓✓ | 17. | Trinidad Hernandez, " " |
| ✓✓ | 18. | Finca La Palmar, " " |
| ✓✓ | 20. | Finca La Palmar, " " |
| ✓✓ | 21. | Finca La Palmar, " " |
| ✓x | 22. | Santrago, Maricao, Pinar del Rio |
| ✓x | 23. | Ensebio Cruz, " " |
| ✓x | 25. | Francisco Muniz, San Cristobal U. |
| ✓✓ | 27. | Atanacio Balaguer, Antigua |
| ✓✓ | 28. | Finca Candelaria, Antigua |
| ✓ | 30. | Leandro Castillo, Milpa |

Tuesday Guatemala City, Nov 6 1914

#195. *Acocoba* No 39, from the property of Enrique Duarte. Las Rastropas near Amatitlan. 100 cones & seeds.

#196. *Malpighia* sp. *azeroles* seedlings from Amatitlan.

The name *azeroles*, which properly belongs to species of *Crataegus*, is applied in Central Guatemala to a large Malpighia, whose fruits are not unlike those of the Barbados cherry, *Malpighia edulis*. I have only seen this plant in a few places; it is most abundant in the town of Amatitlan, where it is found in a large proportion of the gardens.

This species is much larger than *M. edulis*, often becoming a small bushy tree 20 feet in height, but more commonly seen as a large shrub, spreading in habit, with a dense crown. The leaves when young are covered with a thick whitish tomentum; when mature they are membranaceous, elliptic- acuminate in form, shortly acute at the base, bright green and glabrous above, heavily pubescent, with the venations prominent below.

The flowers are produced in small axillary clusters. Individually they are scarcely more than broad, with clawed, crepe-like petals of blue-pink color. The fruits are the size of a large cherry, but flattened, and sometimes almost pointed at the lower end. They are bright red when

fully ripe with a thin tender skin, juicy whitish flesh of peculiar nuttiness flavor, and three roughly winged seeds.

The character of the growth suggests that the plant may be slightly hardy. It has not been seen in the lowlands, but is grown at elevations of 4000-5000 feet, where the climate is cool, but not cold enough for severe frosts.

The season of ripening is from July to September. The plants produce abundantly. While not a fruit likely to become of great importance in the United States, it possesses sufficient interest and value to merit a trial in the United States. The regions in which it seems likely to succeed are Florida, Southern Texas, and California.

Packed shipment of avocado seeds to be dispatched to Washington.

Crate #1.		800 seeds
" #2		800
" #3		800
" #4	75	575
" #5		800
		3775

1 box Soboralia

1 box guisquiles

1 box preserved fruits

1 box Guatemalan textiles, etc.

Wednesday Guatemala City Nov 7 1921
 Varieties of the chayote packed for shipment

#197a. Güisquil de Santa Maria. Probably the best variety in the collection in point of flavor, the green-fruited güisquiles being considered generally to be richer than the white ones. This variety is short and broad, compressed on the sides, and weighing 12 ozs to a pound. The surface is smooth, pale to bright green in color, without prickles except occasional scattering ones near the apex. 9 fruits.

#198a. Large white peruleros. The best of the peruleros, or small smooth güisquiles. A pear shaped waxy white fruit without prickles and with a surface free from wrinkles or corrugations. Weight about 15 ozs. One of the earliest varieties. 4 fruits.

#199a. Güisquil de Santa Maria, a form similar to 197a but somewhat more prickly. It is considered a very good variety.

#200a: Large pale green peruleros. A pear shaped fruit about 8 ozs in weight, with a smooth surface pale green in color. Somewhat larger than the large white peruleros but said to be slightly inferior in flavor.

#201a. Small white peruleros. A popular little güisquil, considered of good quality. It is pear shaped, 2 or 3 ozs in weight, waxy white in color and like the rest of the peruleros smooth and free from prickles.

#202a. Small pale green peruleros. Practically identical with the small white peruleros except in the color, which is

pal. waxy green.

#203a. Small green perulosa. Nearly round in form. about 2 oz. in weight, with a smooth, deep green surface. Considered of especially good flavor. Almost a Ginseng & Santa Maria in miniature.

All of the above varieties were obtained in the market of Guatemala City, and include, I believe most of the best forms grown in this region.

#204. *Libralia* sp., from near Chinantla.

Thursday Guatemala City Nov 8 1914

Prepared for shipment the following material:

#205a. *Annona diversifolia*

#206a. Indet. "uña de gato".

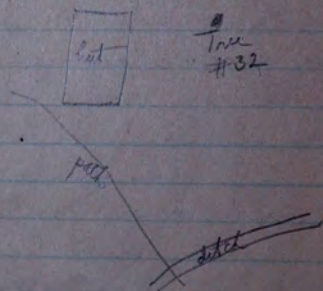
#207a. Indet. Flowering tree from Quirigua.

#208a. Indet. Red flowered Cactid.

#209a. Indet. Leguminous shrub near Quirigua.

AVOCADO
No. 32.

This tree is growing in the property of Eugenio Duarte, at a place called "Las Rastrojas", about $1\frac{1}{2}$ -2 miles from the place of Amatenango, on the road which leaves just the cemetery and goes to San Juan. The exact location of the tree is difficult to chart, but after entering Duarte's property and crossing a narrow ditch, it stands about ten feet to the right of the path but revealed, thus



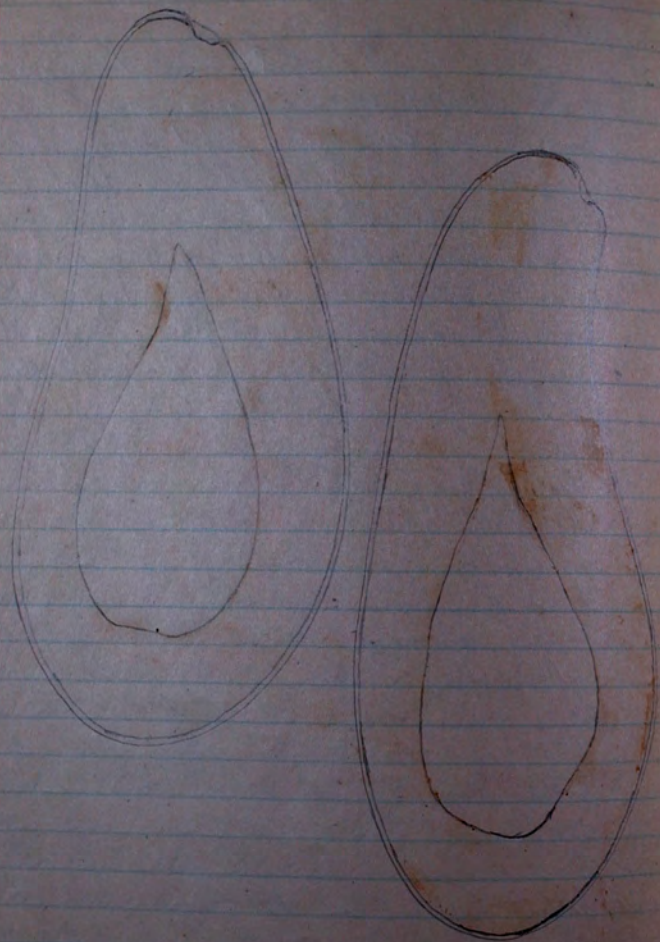
The tree is about 40 ft high, spreading but of good compact form, the crown fairly dense. The trunk is about 90 inches thick at the base, and branches 10 ft from the ground. According to the owner, the tree is 6 years old, but judging by its size it is certainly

not less than 20.

The crop harvested in the season just passed was a good one, Duarte gives it as 600 fruits, but when I saw the tree in August I think there were more on it.

The particular value of this variety lies in its season of ripening. For some unknown reason it matures its fruits from August to October, which is fully 5 months earlier than the principal avocado season in that region. If it retains this characteristic in the United States it should be of great value, for in spite of its slightly awkward form it is a fruit of very good quality, having greenish yellow flesh free from fiber and of rich flavor, and a seed of medium size, - about 9% of the entire fruit in weight. The seed coats do not adhere as closely as in most varieties of this race. This and a variety from the same region which I saw last year appear to differ slightly from the typical Guatemalan in form.

Avocado
No. 32



Avocado
No. 32



AVOCADO
No. 32

The fruits from which the following description of this variety is taken are some which were overlooked when the crop was picked last month.

Fruits elongate to slender pyriform, sometimes curved; size medium, weight 12 ozs, length $5\frac{1}{2}$ to $6\frac{1}{2}$ inches, greatest breadth $2\frac{1}{2}$ to 3 in. base narrow, rounded, the short fruit stem (2 to 3 in. long) inserted obliquely; apex rounded to broadly pointed, the stig. the point slightly depressed. Surface quite smooth, uniformly bright green in color, with very numerous, minute, yellowish dots. Skin very thin for this case, less than $\frac{1}{16}$ inch (about 1 mm) but firm and tough; flesh rich yellow near the seed cavity, changing to light green near the skin, free of free fibers, free from fiber and of very rich, nutty flavor; quality very good. Seed medium sized, weighing about 1.4 ozs (8.7% of entire weight of fruit) conical to slender conical in form, the cotyledons smooth but the seed coats not adhering to them very closely. The seed is not loose in the cavity. Season August to Oct.

AVOCADO
No. 32

The characters possessed by this fruit are not typically those of the fruit making race no. (1) It is very thin skinned, and (2) it's rather loose seed coats. On opening the fruit the seed comes out naked, leaving the seed coats adhering to the wall of the seed cavity.

The quality of the fruit is fair as is quite satisfactory.

The season commences at Amsterdam in late August. Most of the crop is picked in October. If given an opportunity, many fruits would doubtless hang on the tree until November.

As the tree failed to bloom this year its flowering season cannot be given. But from the fact that other trees on the same property, whose fruits ripen at the same time, flowered in August & September it is probable that this variety will flower during those months.

Avocado Specimen from the chacoma of Angel Samayoa in
No. 3 Anahitlan, picked October 29. Not fully mature.



Weight of fruit, entire, 18 ozs

Weight of seed 2 ozs

Percentage of seed 11.1

Elevations on road to the Verapaz, as
determined on my last trip:

La Canoa 1500 ft

Llano Grande 2850

Cumbre de Chuscu 5400

Salama 3150

Cumbre de Cachil 5250

Santo Tomás 4000

Purula 5100

Finca Chijel 3200

Altitudes of El Rancho 1000 ft
Damarate 2665

note copied from small notebook:

In order to demonstrate that the Indians love
of flowers and plant life in general is great, I
make the following list of species growing in
the dooryard of a Quechua at Chitgubai, in
the mountains north of Tacic:

<i>Hydrocotyle elatior</i>	
<i>Richardsonia africana</i>	- Calla lily
<i>Citrus sinensis</i>	- Sweet orange
<i>Eriobotrya japonica</i>	- Loquat
<i>Amigdalus persica</i>	- peach
<i>Rhus copallinum</i>	- barberry
<i>Geranium</i>	
<i>Pelargonium zonale</i>	- Geranium
<i>Canthium indicum</i>	
<i>Papaver sp.</i>	- poppy
<i>Cremum sp.</i>	
<i>Persea americana</i>	- avocado
<i>Ipomoea sp.</i>	- Ipomoea
<i>Gladiolus sp.</i>	

Chirimoyas (here called anonas) are becoming abun-
dant in the market. The principal season here
is November and December. A few can be found
both earlier and later than this.

The cook at Austin's tells me that the
smooth fruited Chirimoyas are much the best.
From my own experience I am inclined to
believe this is more or less true. The bumpy
fruits with very prominent protuberances
are not very good. It is not necessary that the
fruit be quite smooth; the presence of slight
protuberances on a fruit of large size does
not seem to indicate poor quality, but prom-
inent protuberances on a small fruit certainly
seems to do so.

A great many of the fruits in market are
infested with larvae.

Yesterday I bought 11 fruits for seed. The
smallest weighed about 2 lbs., the largest
4 lbs. A 4 lb. chirimoya is a large fruit.
I have seen none larger in the market as yet
this year.

Saturday Antigua Guatemala Nov. 10 1911

AVOCADO
No. 17

Sitio of Truvedad Hernandez, Callejon de Concepcion

On going to see the condition of this tree I found that it had been cut down. I asked the tenant-mos on the property what had happened and he replied that they wanted to plant coffee, and as the tree gave too much shade they destroyed it. The parent tree of this variety is therefore lost, but fortunately buds have been saved at Washington from poisonous shipments.

This variety has always impressed me as a choice one, being of exceptionally large size, good form, and splendid quality. Judging from the character of growth of the parent tree, however, I am rather afraid that budded trees in the U. S. may prove to be weak growers, with brittle wood. I may be mistaken in this, of course. Even if the young trees require some nursing they will be worth growing. The variety is very productive.

The Antigua market is one of the very best in all Guatemala. It is especially rich in vegetables at nearly all seasons of the year. Today it is poor than usual, because many of the Indians who usually come here have gone to the fiesta of San Martin.

Different sections of the market are devoted to different classes of products. Entering from the corner nearest the plaza de Armas the first courtyard is filled with women selling tortillas, meat stands, women with baskets of fruits and cooked vegetables, and around the edge several stalls where hot lunches are dispensed. In the passage way leading to the next section on the right are several women selling bread and prepared chocolate. In the passage leading to the next section ahead, which occupies a ruined church, are women selling lumps of lime, and on the right pelates. In this section are men with small bundles of oxtails and women with chickens.

Passing thru an old cloister on the right, one comes upon a large section occupied

principally by vendors of corn and *pijas*. This is a large and important section. Here also are men selling large ollas, and baskets, and a few vendors of chile. Passing back to the right one comes into the central section, where most of the vegetables and fruits are found. In the corridor around the edge of this section are several stands where fruits and vegetables are sold, also several *refrescos* stands. In the center the Indian women squat on the ground with their baskets of produce. Today there are *miltomates* in abundance, *guisantes* both raw and cooked, oranges, *caja* fruit links, fine radishes, onions, cauliflower, and green peas, fairly good sweet potatoes, both yellow and purple, potatoes raw and cooked, a few *ajonjolios*, plantains and bananas, string beans, turnips, squashes in various stages of growth, *pachyras*, pineapples, guavas, *granadillas*, *mispelos*, green corn, potatoes, *achenta*, *anonas*, carrots, lettuce, beets, green peppers, *marganillas*, tomatoes, cabbages, and *patates*.

In the corridor which divides this section from the next are vendors of dried shrimp, salt, eggs, pottery and chiles. In the section itself are many vendors of chile, both green and dried, *pechules*, small pottery, *guacales*, baskets, peanuts, coffee, and an overflow of vegetable vendors from the last section. In the corridor around this section are leather workers making sandals, belts, etc., vendors of straw hats, and a few vendors of handkerchiefs, aprons, and notions.

Condition of avocados in finca "La Polvora"

AVOCADO No. 20. Tree is maturing a recent flush of growth, leaves having already lost their reddish tinge. Badly attacked by leaf gall, and generally dirty. No fruits what-
ever.

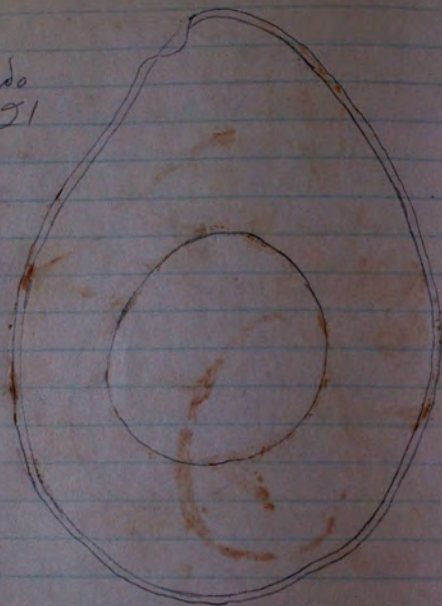
AVOCADO No. 21. This tree had been girdled before I last saw it. The lower branches have now been cut off, and all the bark removed from the ground upwards to a height of about 5 feet. A large crop of fruit is being carried in the top of the tree. It remains to be seen whether the tree will die before it matures the crop or not. This tree has borne heavily 2 years in succession. A few fruits have fallen to the ground. On the following page is an outline of one of them. It is still green in color and probably not quite fully grown.

Avocado
No. 21.



Overleaf is shown another specimen of this variety, which I picked in the approved Guatemalan fashion, - by knocking it off the tree with a stone. This fruit had begun to acquire a purplish tinge around the base, but the flesh looked immature.

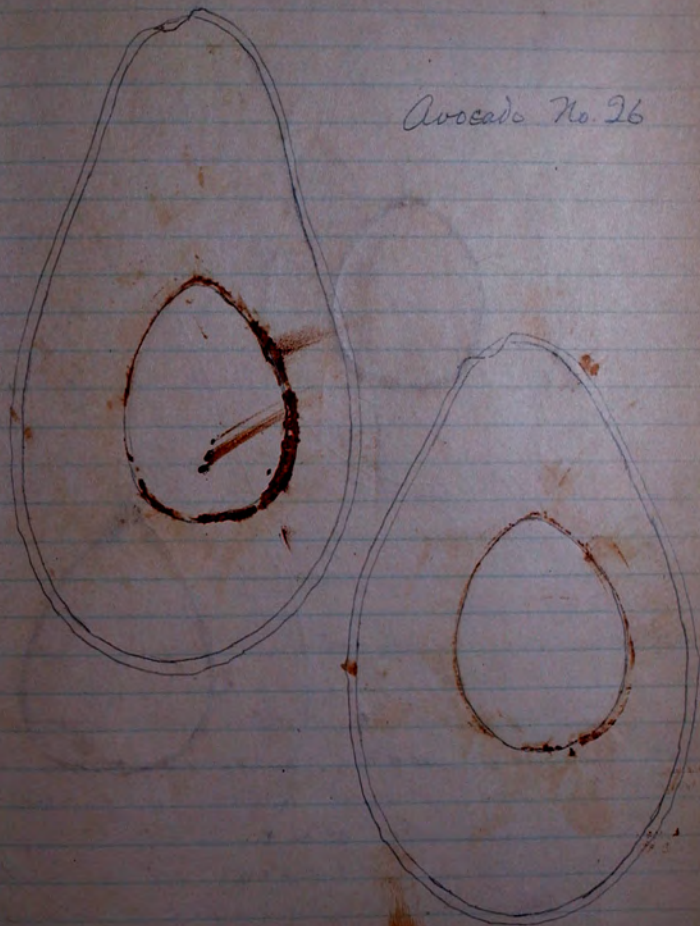
Avocado
No 21

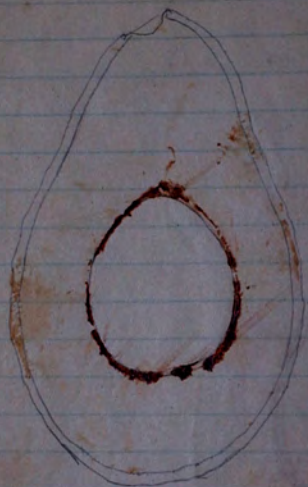


AVOCADO
No 26

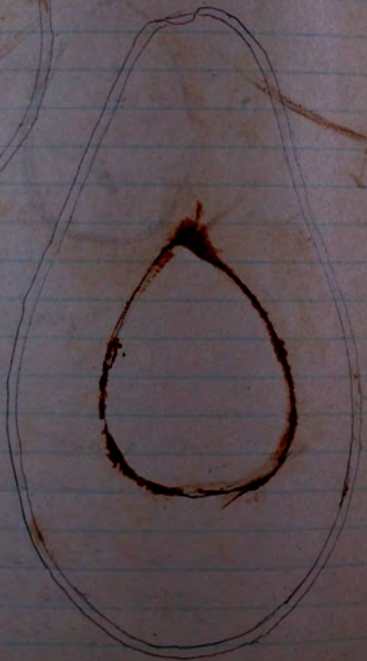
This is a variety of which I have not yet sent budwood to Washington. The tree bore an enormous crop last season, but this season is bearing principally on one side. Following are hundreds of fruits picked today. They are still somewhat immature, so far as I can judge, but seem to be almost if not quite fully grown.

Avocado No. 26





Avocado No 26



Location of Avocado # 26

Road at rear of Finca

old well - then W side of Finca

70 paces

← 14 paces →

• grevillea

Tree No 96.

This tree is erect, 45-50 ft high, with a rather slender but dense crown, straight trunk 2 ft thick at base, growing off the first branch 8 ft from the ground. Tree rather badly attacked by leaf gall in some parts. In general, the tree looks like

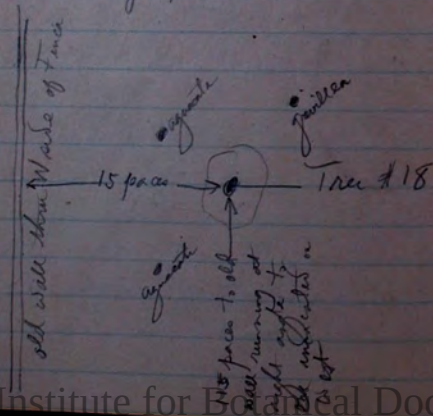
a strong, vigorous variety, the branchlets being well formed, round, and stout. The buttwood looks good, eyes being strong and well placed.

The tree shows a tendency to bear its fruits in clusters, or at least grouped together so as to give this appearance when seen from the ground.

AVOCADO
No 18

This tree is not carrying any fruit at the present time and shows few signs of recent growth. It seems to be in healthy condition, as far as can be judged by appearances.

Location of this tree



AVOCADO
No 19

Tree carrying a very small crop of fruits about 20 in all. Flower buds are appearing, and in not more than 2 weeks the tree will be in bloom. The lower branches of the tree have recently been cut off to give more room to the coffee bushes beneath it.

The tree is now about 20 ft high spreading habit, with a broad, well formed crown. The trunk divides into 2 main branches about 10 inches above the ground, each branch being about 10 inches thick at the base. The branchlets are well formed, the growths rather short. Buttwood fairly good.

Sunday San Antonio P.C. Guatemala Nov 11 19

The guisquil is called here kiish, in the Catechiguel dialect.

The plant is sown about Rosario or Mercedes, and commences to bear in about 8 months. For planting fruits are selected which have commenced to sprout; they are placed in their permanent locations, the upper $\frac{1}{3}$ or $\frac{1}{2}$ of the fruit protruding above the ground. The sprout pointing downwards. In about 15 days the plant appears above the ground.

The vines are only allowed to remain in the ground one season. After the crop has been gathered the root (rhizome) is dug and eaten. Fruits can be gathered from the vine during 3 to 5 months, after which the vine dies down and the rhizome is dug.

Guisquiles are eaten in soup, when picked while young & immature, when mature it is boiled and eaten alone,

boiled with meat (immature fruits only are eaten in this way)

The rhizome is eaten, after removing the outer skin with a knife either boiled in soup, or boiled with meat (cut in slices).

The tips of the shoots (cut in kiish) are boiled with caldo and eaten. It is also scrambled with eggs.

When there is no rain, the vines must be irrigated every three days. About one bucket of water is given every time. Excessive rains do not injure the plant in any way.

The plant does well here in a loose, sandy loam.

There is not considered to be any difference in flavor between the green fruited and white fruited varieties. There are said to be poor and good flavored varieties of both colors.

No preference for any certain color or form is admitted. It makes no difference whether the fruit is smooth or spiny.

The above information was furnished by Gregorio Godínez Pérez, a full-blooded Cakchiquel Indian Cakchikel

Sunday Antigua Guatemala Nov 11 1917

PLADO
No. 6

On my return from San Antonio A. C. I passed by the tree, which is in the ruins of Víctor García, at San Lorenzo del Caba.

The tree has recently made a fine flush of growth and is now in bloom. While the growth (which has already lost most of its reddish color) seems to have been general over the entire tree, I could see no flowers on one side of it. They were abundant on the other side. As the buds are just appearing on some of the branchlets it is possible that the side of the tree not now in bloom may yet flower profusely.

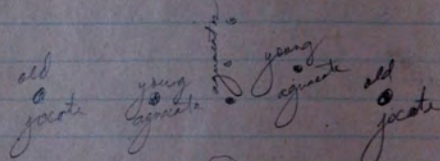
It would be impossible to get good cores or budwood from the tree until the new growth has matured, hence I shall not try to send any further shipments of material to Washington, inasmuch as the variety is already established there.

The tree is carrying no fruits to be opened the coming season.

Jacotes and guayabos are now commencing to ripen in this region. There is a very large crop of both.

Avocado Dr. Inca Candelaria. Location of tree near No 28 near wall of fence, toward the west side.

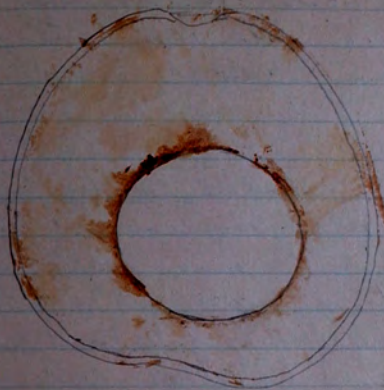
near wall of fence



agave

This tree is carrying a few fruits in the top. There are none on the lower branches. The tree is in good condition, but shows no signs of flowering. It has very good color, and abundant foliage.

Avocado
#28.



This fruit appeared to be quite immature.



It looks as though #28 was going to be a late variety. The fruits are not so far advanced at this time as many others.

This variety, No. 28, looks promising to me. The tree is still quite young, when it gets older I believe it will bear well. The form of the fruit is good, the quality, as I recall it, was also good, and the seed is proportionately smaller than in any other round avocado I have seen. The texture, while somewhat slender in habit, seems to be a good strong grower, and will probably be very easy to propagate, as it makes fine bushes.

AVOCADO In the form Santa Rosa.

No. 39

This tree has just made a flush of growth, but shows no signs of flowering, and is not carrying a single fruit for the coming season. It is badly attacked by leaf-jelly. It does not look to me like a very strong grower. In spite of the fact that the fruit is very attractive in appearance, I think it is safe to discard this number altogether.

The avocado crop in this region is very poor this season. I do not believe it is over half that of last year.

It is fortunate that I was able to select my varieties last season. If I had not come down until this year I would not have had nearly so much material to select from. Doubtless some trees are in bearing this year which produced nothing last season, but in general last year was infinitely more favorable for my work.

Here and there a tree is now coming into bloom. Many will not flower until next February. It seems as though the varieties flowering now must certainly mature their fruits before those that flower next February. My numbers 6 and 19 are among those that are coming into flower now. Both should be watched in the United States for earliness of ripening.

Monday Antigua Guatemala Nov. 12, 19

This morning I went to the finca Janja to see Avocados 13 and 14. Of which, however, I have not sent on budwood, as they appear in the first place to be two which Knight introduced to California, and secondly, they have not come up to my requirements.

AVOCADO No. 13, near the house, is carrying a fair but not a heavy crop. The fruits are not yet full grown and it will be some time before they are mature.

AVOCADO No. 14 is carrying a good crop, - about the same as last year, perhaps a little better. The fruits are not nearly full grown.

Neither of the two trees shows any sign of flowering. I noticed several trees in the same part of town, however, which are now coming into bloom.

AVOCADO No. 33

In the finca La Polvora. While I have not seen ripe fruits of this variety, I am going to include it in the collection for trial in the U.S. It looks to me today as though it is going to be a very good fruit.

The parent tree is about 30 ft high, slender, the crown fairly dense but not broad. The trunk is 8 ins thick at the ground, branching at a height of about 15 feet. It is carrying a good, though not a heavy crop, of fine large fruits.

The growth seems to be vigorous and healthy. The branchlets are round and green, with the buds conveniently placed and strong, indicating that the variety will probably be easy to propagate. The wood is not unusually brittle, and I see no defects of any kind in the habit of the tree.

Prepared for shipment the following:

#212. *Persea americana* Avocado
No 26, from the finca "La
Palmera" budwood.

#211. *Persea americana* Avocado
No 33, from the finca "La
Palmera" budwood.

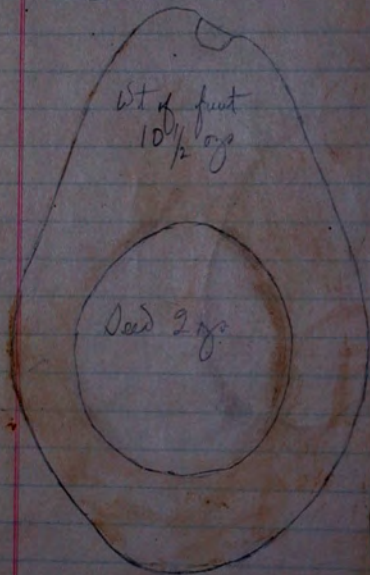


Avocado #33, finca La Palmera
Immature specimen.

Thursday Antigua Guatemala Nov 15 1917

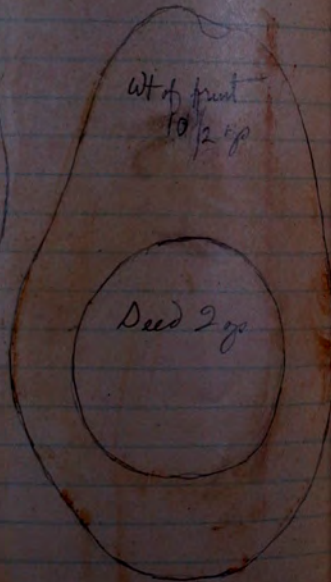
AVOCADO
No 34

Aguacate purchased in the market, said to have been grown by Ignacio Hernandez, whose estate is in part of the church at San Lorenzo del Cuto.



Wt of fruit
10 1/2 ozs

Seed 19% of entire
fruit



Wt of fruit
10 1/2 ozs

Seed 2 ozs

Friday Antigua Guatemala Nov 16 1917

Went to San Lorenzo del Cuto in search of the aguacate tree whose fruit is shown on the preceding page. Before locating it, I came upon a very good tree on a sitio belonging to Ignacia Gonzales. The fruit is not yet quite mature. Below is a specimen.

AVOCADO
No 35



Weight of entire fruit, 17 ozs: Seed 1 1/2 ozs

AVOCADO
No. 35

Another specimen of the avocado from the city of San José, Costa Rica, shown on the preceding page.



Weight of entire fruit $15\frac{1}{2}$ oz; Seed $1\frac{1}{3}$ oz

I have obtained about 25 avocados from the tree in Julio Guen's yard, of which one was sent to Washington under No. .

These fruits are in many cases small, but the good specimens weigh a pound or slightly more. Most of the seed is now soluble. The remainder will mature next month. The season is therefore November and December.

The surface of the fruit, on the larger specimens, is practically smooth. The capillary areas are very slightly depressed at the end nearest the apex of the fruit, making it appear somewhat as though the areas were rubbed off by raised lines, since there is a slight change of level, and an abrupt one when one of the areas ends and another begins. The color of the surface is light green, with very numerous pale or yellowish green spots. The color becomes somewhat darker around the base of the fruit.

I particularly desired to test the

quality of the variety. On cutting a ripe specimen I found the layer of brownish, granular flesh just beneath the skin to be about 1/8 inch thick; within this the flesh is white, aromatic and juicy. The flavor is perfumed, almost sprightly, with plenty of character. The quality improves as it ripens. The seeds are not too numerous.

Below is a formal description of the variety:

Form normally cordate, but subject to more or less irregularities; size medium, good specimens weighing 1 lb. some even more, while many small ones weigh considerably less, length of 1 lb. fruits about 5 in., breadth about 4 in. base usually irregular, the stem inserted in a shallow to deep, usually rather broad, cavity; apex bluntly pointed, surface almost smooth, sometimes becoming slightly rough toward the base, light green in color, with very numerous pale yellowish green dots; skin firm, flesh granular and very pale brown close to the skin, within pure white, juicy, melting, aromatic; flavor aromatic, rich, almost sprightly, very

pleasant, quality excellent; seeds not too numerous, of the usual shape and size, seasons midseason, November and December at Antigua.



Manganiella Yesterday I purchased a quantity of manganiella (*Crataegus* sp.) fruits in the market, to get seeds to send to Washington. Some of the specimens obtained were the largest I have yet seen. Outlines are given below.



10 of these fruits weighed 6 ounces.

The greatest diameter was from $1\frac{3}{8}$ to $1\frac{1}{2}$ inches.

The color is deep yellow, the exposed cheek often blushed flame scarlet. Large russet dots are scattered over the entire fruit. The flesh is yellowish white in color, mealy, and not very juicy. The skin is thin. The seeds number from 3 to 5.

Fruits from the center tree in Julio Guerrero's back yard. There are three trees nearly in a row, spaced some 15 or 20 feet from each other. From the trees on either end I have got in budwood; from the center tree I have not.

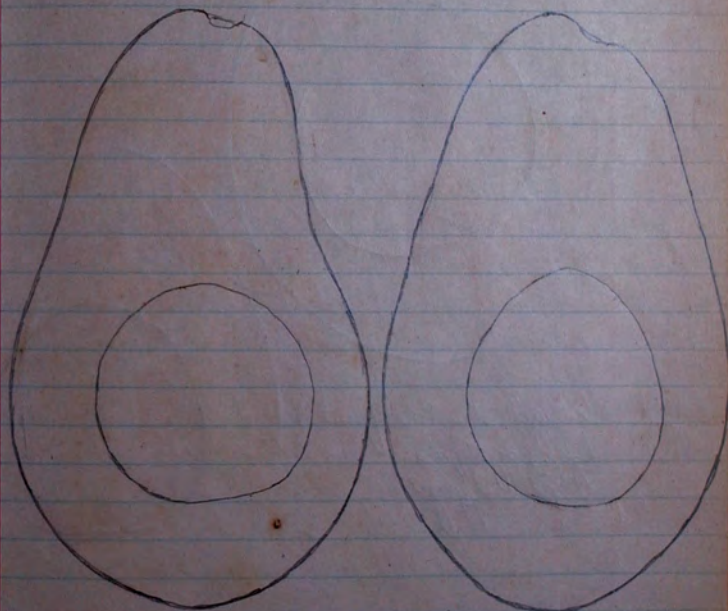
The best specimen weighs 15 ounces. It is cordate in form, but sharply pointed at the apex, and with no appreciable cavity at the base. The surface is rough, and capillary veins giving rise to a prominent boss. The color is light green, and the appearance of the fruit is in general very attractive. The skin is rather thick but the layer of granular flesh beneath it rather thin; the flesh is milky white, very juicy but more "raggy" than is desirable; the flavor is not very aromatic, and has not quite enough acid. The quality is only fair. The seeds are quite abundant.

In quality this fruit is distinctly inferior to the variety described on pp. 47-49. The tree is a heavy bearer, but I do not believe the fruit is sufficiently good in quality to warrant its introduction into the United States. Below is an outline of the fruit.



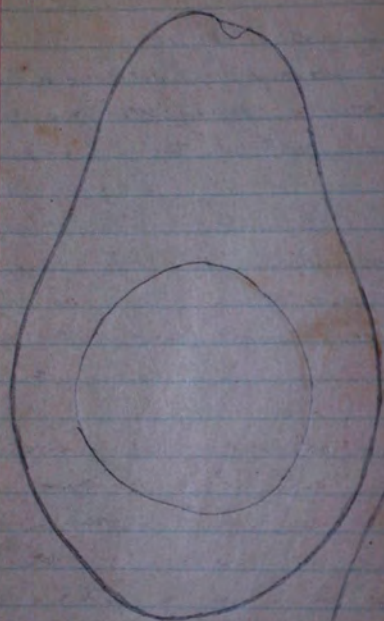
MEADO
No 34

The variety from the terraces of Ignacio Hernandez, San Lorenzo del Cuzco, Chile have this number, as I have decided to exclude it in the set. Below are outlines of 4 specimens I obtained this morning, there being the last fruits remaining on the tree.

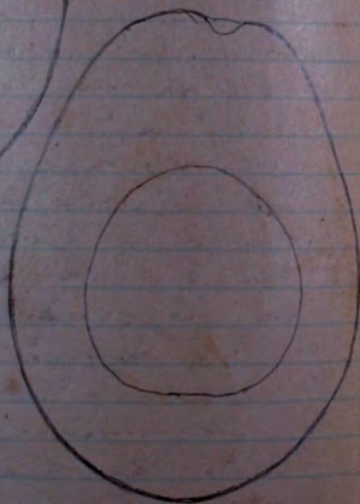


Wt. of entire fruit, $10\frac{1}{2}$ ozs
Seed $1\frac{3}{4}$ ozs

Wt. of entire fruit 12 ozs
Seed $1\frac{1}{2}$



Weight of entire fruit
 $12\frac{1}{2}$ ozs.
 Seed $1\frac{3}{4}$ ozs.



Weight of entire fruit 10 ozs
 Seed $1\frac{1}{2}$ ozs.

Description of No. 34.

Form most commonly pyriform, but sometimes obovate; size below medium to medium, weight 10 to $12\frac{1}{2}$ ozs., length 4 to 5 ins., greatest breadth $2\frac{1}{2}$ to $3\frac{1}{8}$ ins., base narrow, rounded, the stem inserted obliquely almost without depression; apex rounded or obscurely pointed, somewhat flattened around stigmatic point; surface almost smooth, sometimes pitted, deep, dark maroon in color, with numerous small light maroon dots; skin unusually thin for this race, slightly less than 1 mm., soft, tender; peeling fairly easily when the fruit is quite ripe, but leaving some purplish coloring on the flesh; flesh firm grained, buttery, creamy yellow in color, with slight greenish discolorations in some specimens. But no actual fiber; flavor moderately rich and nutty, not as rich as some but pleasant and quite satisfactory; quality good; seed rather large, broadly conical to nearly spherical in form, weighing $1\frac{1}{2}$ to $2\frac{1}{4}$ ozs., tight in the seed cavity.

with both seed coats thin and adhering very closely. Season very early, the last fruits having been picked from the tree in the first part of November.

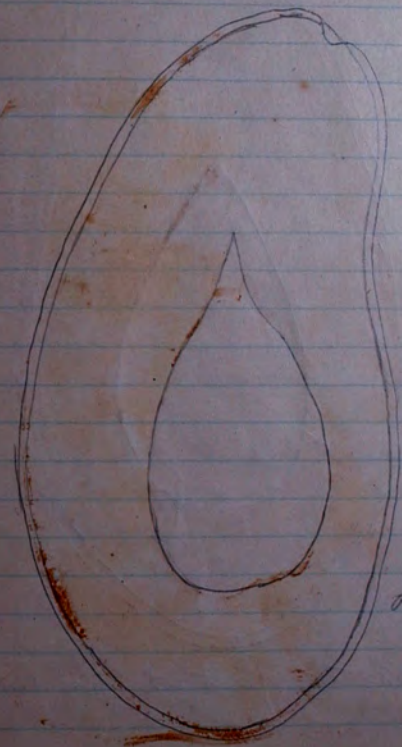
The tree has already bloomed and has young fruits on it larger than those of *polio* that more bloom is now appearing.

This is the earliest variety I have found in the Antigua region, and it looks to me as though it was a heavy bearer as well. The quality is quite satisfactory, the flavor is not so rich as in some of the late varieties. The only defect I can see in the variety at present is its large seed. Compared with the best of the set it is large, but compared with the varieties now being grown in California I do not think it will seem over large. The great value of the variety lies in its earliness.

MEADO
No 33

Magist

Fruits from Finca "La Polvora". These are all quite immature, so the variety cannot be described, but these outlines will serve to give an idea of the shape and so forth.

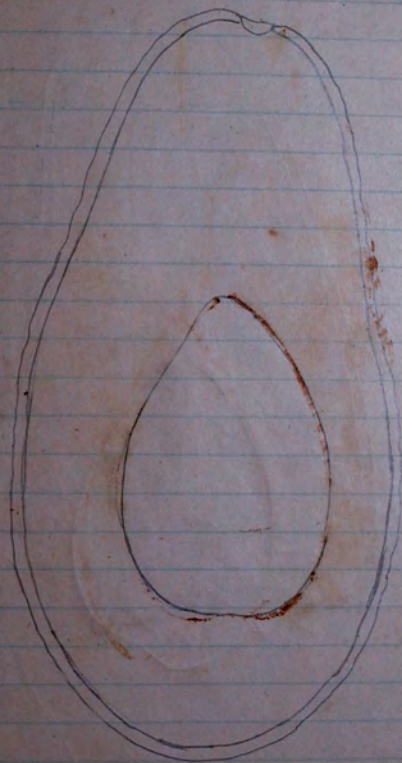


Weight of fruit
at this time
16 gms

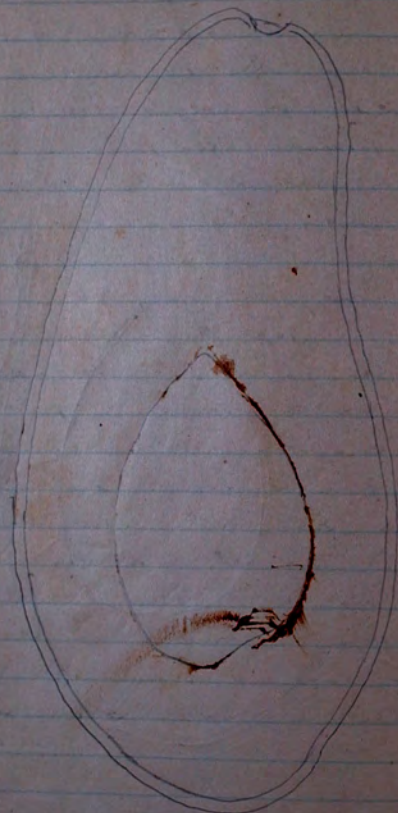
Kasuah



Weight of fruit at this time 16 gms



Weight of fruit at this time 17 gms



Weight of fruit at this time 19 gms

No. 33 looks as though it were going to be a fine cascade of about 24 oz weight. It is rough on the surface, and has a very thick, hard skin (15 to slightly more than 2 mm in thickness), a rather small seed, and clean flesh which I believe will be soft and fine when ripe.

The tree seems to give promise of being a strong grower and a good producer. Besides the strength of its attractive appearance I have sent one lot of budwood to Washington and if it is saved, I think this variety should be tested on a limited scale. I do not believe it should go to all the experimenters I have not had it under observation for a long enough period to want to recommend it very strongly.

Saturday Antigua, Guatemala Nov 17 1911

Anona

Last Sunday I went to Dueñas and obtained several fruits from the anona (*Cherimoya*) tree of which I saw in burwood some time ago under No.

. These fruits are now soft and ready for eating, having required only days to reach this condition. They are badly priced - riddled by insects, so that very little of the pulp is in eatable condition for eating.

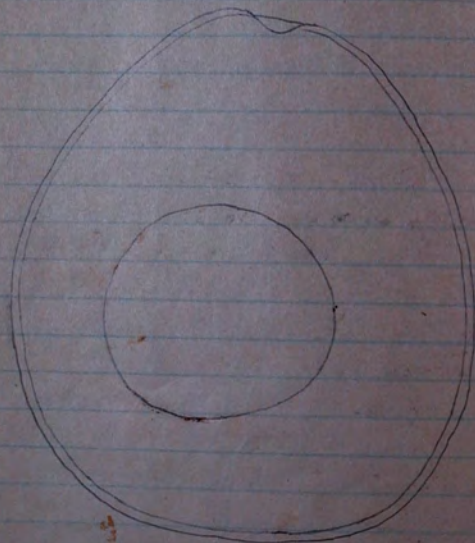
The variety impresses me as a good one. Three specimens weigh $3\frac{1}{4}$ lbs. or a little over 1 lb. each. The form of the fruit is cordate-conical. The base is broad and flattened, the apex rather sharply pointed. The surface is somewhat variable, but in general slightly rough; sometimes the carpellary areas toward the apex of the fruit are smooth, marked off by raised lines; sometimes they are slightly depressed. Toward the base of the fruit there is commonly a small boss nearly the lower end of each carpellary area. The skin is thicker

than in many varieties, and rather firm. The granular flesh immediately beneath it is not long as coarse as in many anonas, nor scarcely differing from the rest of the flesh in color. The flesh is mostly white, juicy, aromatic, not sugary, the flavor rich, slightly and very pleasant. The quality I consider very good. The seeds are rather numerous, of the usual form and size. Sketch of one specimen:

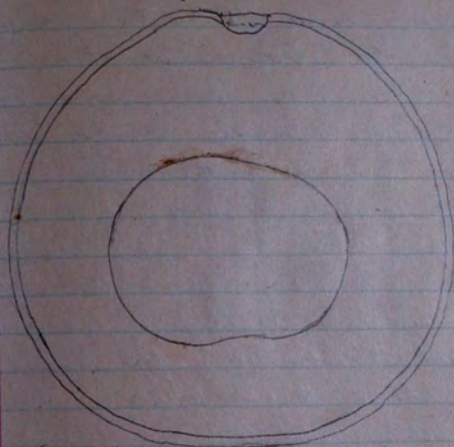


AVOCADO
No. 35.

The variety from the site of Ignacio
Gonzales at San Lorenzo del Cuto will
be included in the collection under
the number 35. Below are outlines of
three fruits picked yesterday:



Weight of entire fruit at this time 90 oz



Weight of entire fruit 16 oz

Combined weight of
seeds of these 3
fruits. $6\frac{1}{2}$ oz

Combined weight of
fruits 52 oz

Seed approximately
12.5% of entire
weight of fruit.



Weight of entire fruit 16 oz

Description of Avocado No. 35, as far as can be determined from these specimens.

Form normally spherical, varying to slightly oblate and more rarely broadly obovoid; size above minimum to very large, weight 16 to 20 ozs, length $3\frac{1}{2}$ to $4\frac{1}{2}$ inches, breadth $3\frac{1}{2}$ to 4 ins; base rounded, the stem inserted very slightly to one side, almost without depression; apex flattened; surface pitted, bright green in color with few large yellow-green dots; skin moderately thick, averaging 2 mm, coarsely granular, woody, brittle; flesh cream color, greenish close to skin, few fine fibers of discoloration; flavor

; seed rather small, weighing about 2 ozs, oblate, tight in the cavity with both seed coats adhering closely. Season apparently rather early, month not yet determined.

MAO
No. 21

Stem 5 ins
rather slender

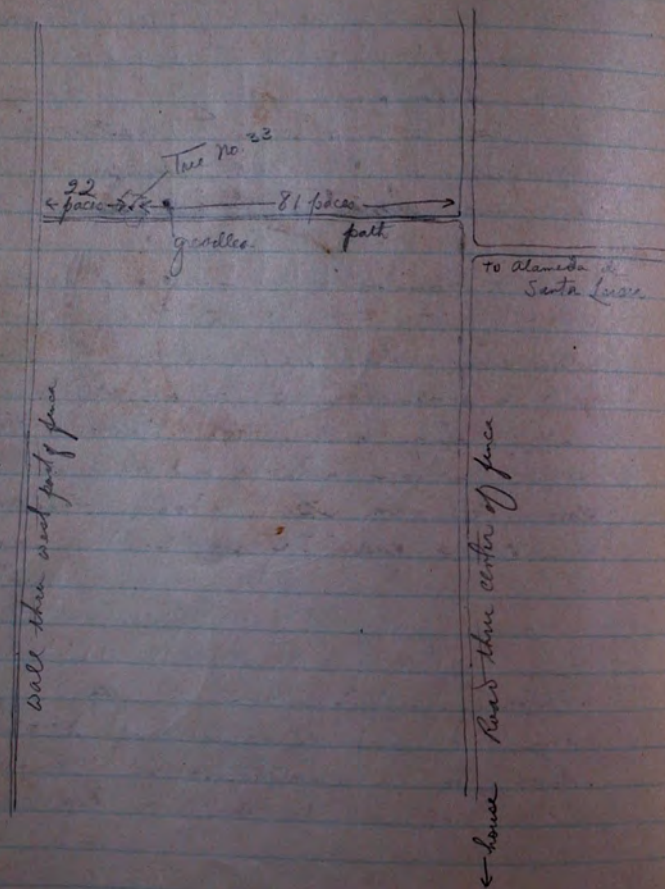


No. 21, from La Palvora. Fruit quite immature. Seed is slightly larger than this in some specimens.

Tree carrying enormous crop, some of the fruits in clusters.

AVOCADO
No. 33

Diagram showing location of tree in finca
"La Palvela".

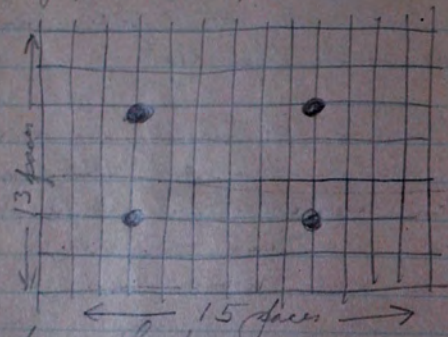


Saturday St. Maria de Jesus Guatemala Nov 17/1917
To sow the guisquil here a hole one
pava deep is dug with the machete, and
then filled in with soft earth. This is
in order that the root may develop to
large size and make good seedling.
The hole is only about 1 foot wide. The
guisquil is sown with the sprout downward,
and sown almost on the surface.

The guisquil is constructed of light poles
the uprights 4 to 6 ft apart, and the horizontals
very thin poles, $\frac{1}{2}$ - $1\frac{1}{2}$ in. about a foot apart,
and approximately 6 feet above the ground;
an enclosure of thin sticks, about 36 ft in
width, is constructed around the plant to keep
animals away. This enclosure extends to a
height of about 3 feet. The guisquil
may be 20 ft wide and long, or even
larger.

Sometimes (often) several hills are planted
under a sole guisquil or trellis. One
such and a very good one, which
examined held 4 hills. The trellis was only
5 feet above the ground and was 13 x 15
paces in extent. The hills were 6 paces

apart, and 3 paces from the outer edge of the trellis, thus



The top of this trellis had a framework of light poles about 6 feet apart, over which were laid cane brava poles about 8 ft long, 3 inches to a foot apart. Poles to support the trellis were set up and fed apart all the trellis.

Another trellis, which had three hills of vines, measured 13 x 16 paces, and was 6 ft high in most parts. Poles set 6 ft apart were used to support it, and cane brava 6 ins apart was used on top.

Another ginseng with 2 hills measured 7 x 10 paces, & was 6 ft high. The two hills, which were near the center of the trellis, were 5 ft apart.

Apparently but one kind of ginseng is grown here — the round ginseng almost smooth. Sometimes the ginseng is quite smooth, sometimes they have a few prickles. This seems to be a very good variety. I saw no other in any of the sites.

Some of the trellises have much fruit. A large part of the crop has already been picked.

Sunday San Antonio AC, Guatemala Nov 18 1917

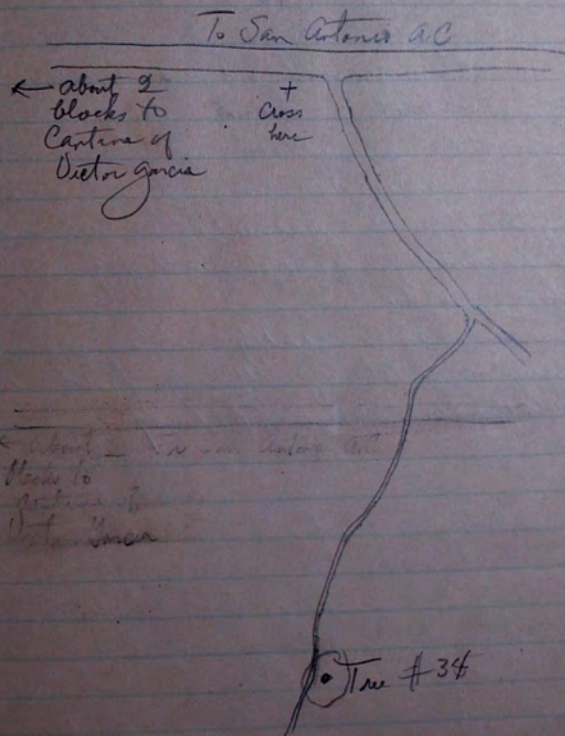
Names of plants and plant products in
Cakchiquel

frijol	kinak
may	ishin
guisquil	kiish
frijol blanco	sag-i-kinak
camote	camote
chile	ik

Monday Antigua Guatemala Nov. 19 1917

In terrenos of Ignacio Hernandez, San Lorenzo del Cabo.

Location of tree

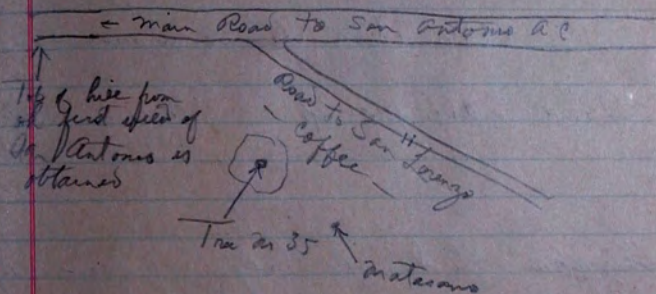


This tree is about 35 ft high, broad and spreading in form, with fairly dense crown 40 or 45 ft broad, slightly inclined to droop. The trunk is divided into two main branches from the ground up, one of these is about 1 ft thick at the base, the other 9 inches. The larger branch divides 8 ft from the ground into 2 main limbs. The smaller branch divides at 2 ft from the ground into 2 main limbs which are suberect.

The growth seems to be reasonably vigorous and is of good form. Barkwood looks good.

Tree has recently bloomed and set quite a lot of young fruit. More bloom is now appearing.

In site of Ignacio Gonzales, near road between San Lorenzo & Caba + San Antonio A.C. Location of tree



This tree is about 30 ft high, with a trunk 30 cm thick at base, dividing at 2 ft above the ground into 2 main limbs 1 ft in diam. These give off their first branches about 12 ft from the ground. The crown is of good form. 95 to 30 ft broad high, with not a great deal of fruiting wood. The buds are good, the growth of good shape & form. The tree is not bearing a heavy crop this year, but is said to do so in some seasons.

Tuesday Guatemala City Nov. 20 1914
Prepared for shipment.

#213. Avocado # 12, Totonicapán

214. Avocado # 34 San Lorenzo del Cabelo

215. Avocado # 35 San Lorenzo del Cabelo

216a Crataegus sp "manzanilla"

Thursday Guatemala City Nov 22 1914
Prepared for shipment

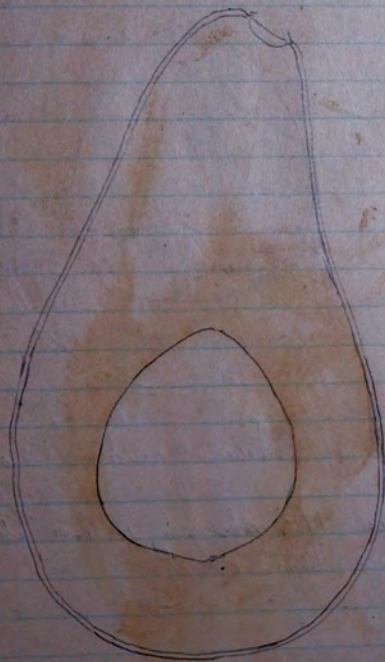
217a. Annona Cherimola
Seeds from large fruits

218a. Copal. Guatemala City

219a Dahlia Variabilis
Sta Maria de Jesus

Friday Guatemala City Nov. 23 1914

Two specimens of Avocado No. 12, patio of
Jesus S. de Camery, Totonicapán, were brought
by José Calmal with the shipment of our
wood forwarded last week.



Weight of entire fruit 13 oz



Weight of entire fruit 13 ozs
 Seed in the specimen is probably unusually large for this variety.

AVOCADO #12
 Description of Avocado #12. Taken from these two specimens:

Form pyriform to slender peariform, with a slender but not long neck; size medium, weight 12 to 13 ozs; base tapering, narrow, the stem inserted slightly to one side, without depression; apex slightly flattened, often oblique; surface almost smooth, bright green in color, with few yellowish green dots, skin rather thin for the type, about 1 mm., somewhat leathery & pliable, feeling readily; flesh rich cream-yellow, greenish near skin, with very little discoloration, firm, dry; flavor rich and oily, pleasant; quality very good. Seed small to medium or rather large, roundish conical in form, tight in the cavity with both hard coats adhering closely; season September to December, or even later, at Totonicapan.

Maximum and minimum temperature during each month, 1902. from "Observaciones Meteorológicas correspondientes al año 1902", Laboratorio Químico Central. Readings taken in Guatemala City, converted into Fahrenheit.

	Means of each month	
	Maximum	Minimum
January	72.1	50.9
February	78.9	55.5
March	82	55.7
April	82.9	57.3
May	81.3	60
June	82	60
July	78.9	59.7
August	79.8	59.1
September	78	60.2
October	76.4	59.7
November	75.7	59.5
December	72.6	54.8

Mean temperature for years 1902 65.3°
 " " 1901 65.1° F

Highest temperature in 1902, Apr 4. 92.3° F
 Lowest " " Jan 1. 42° F

Rainfall in Guatemala City, from same source, converted into inches.

1894	41.13 inc
1895	38.07
1896	45.64
1897	51.36
1898	56.07
1899	41.57
1900	60.59
1901	52.06
1902	52.32

On the following page are figures for rainfall during the last 3 years, obtained from Sr don Pedro Chrenales, director of the Laboratorio Químico Central. Figures have been converted from millimeters to inches.

	1914		1915		1916	
	no of days	Precip.	no of days	Precip.	no of days	Precip.
January	1	.006	8	0.0	1	.03
February	3	1.29	1	0.01	3	.20
March	0	0.0	10	2.36	2	.02
April	3	.56	1	.25	10	2.13
May	7	1.70	9	3.38	19	8.76
June	16	5.47	22	12.83	20	8.14
July	11	1.54	19	10.88	25	10.81
August	7	1.23	22	11.99	25	10.56
September	15	3.77	20	7.76	24	13.24
October	17	3.06	15	4.02	13	5.01
November	7	.17	6	.97	6	.57
December	4	.88	3	.11	6	0.0
TOTAL	91	19.67	128	54.56	148	59.45

The "no of days" = days during each month in which rain fell.

Don Arenales tells me that the lowest recorded temperature in Guatemala City during the last 15 years is 39°F .

From Dr. Karl Sapper's "Die Alta Verapaz" I take the following climatological data concerning that region. Degrees Centigrade have been converted into Fahrenheit, and millimeters into inches.

Mean temperatures, maxima and minima, during each month, at Coban. Average of 9 years (1892-1900)

	Mean Min.	Mean Max.
January	52°F	73°F
February	52	75
March	53	77
April	55	78
May	58	79
June	60	77
July	59	76
August	59	77
September	60	77
October	59	75
November	56	72
December	53	75
Avg. for yr	56.6	75.9

Rainfall at Coban during each month, average of 10 years

	number rainy days	Precipitation
January	13.5	5.18 ins
February	10.1	4.36
March	9.0	4.09
April	9.5	3.39
May	16.2	8.03
June	22.3	11.03
July	24.9	11.31
August	22.3	8.50
September	23.1	9.82
October	23.1	13.09
November	20.5	9.02
December	17.3	6.78
TOTAL	211.8	94.60 ins

Rainfall at Senahui, Alta Verapaz, average of 2 years.

January	5.77 ins
February	2.30
March	2.57
April	4.17
May	19.85
June	30.61
July	28.62
August	19.82
September	17.82
October	16.88
November	7.95
December	5.88
Total (avg)	165.24

Rainfall at San Cristóbal Jacapaz,
during the year 1900:

January	1.01 inc
February	1.48
March	1.87
April	3.68
May	9.04
June	10.35
July	19.34
August	7.48
September	12.71
October	7.52
November	4.05
December	1.79
Total	80.34

Mean temperature during each month of
the year at Guatemala City. Data
furnished by Dr. Arceles. Degree
Centigrade.

	1914	1915	1916
January	18.0°	18.4°	19.6°
February	19.5	18.8	16.9
March	19.6	20.5	19.8
April	20.9	20.9	21.3
May	22.4	23.1	21.3
June	20.8	22.4	20.6
July	20.8	20.5	20.4
August	22.0	20.6	20.0
September	21.5	20.4	20.4
October	20.8	20.4	17.1
November	19.8	17.1	17.7
December	20.0	18.2	18.1

Saturday Guatemala City Nov 24 1914

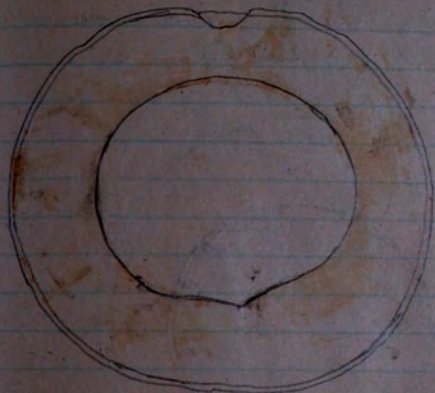
I sent Jose Cabral to El Rodeo near Jalapa to get a barometer reading on the altitude there, and to bring back specimens of E. & Knight's 'Ray' avocado.

He set the barometer $\frac{1}{2}$ hr after reaching the spot where the tree stands. On returning here the reading is 34.30 ins. which gives an elevation of 5450 feet. Knight says 5200 ft in his booklet.

Jose says the Ray tree is only carrying 35 fruits this year. Last year it is said to have produced nothing.

Knight says the fruits begin to ripen in November. Last spring when Jose visited the spot, the owner told him December. The fruits Jose brought yesterday are quite immature, and the owner now says they do not begin to ripen until February.

Judging from the condition of the fruits, I think they will not be mature before the end of February, and not at their best until March or April.



Weight of entire fruit $12\frac{1}{2}$ oz



Weight of entire fruit $11\frac{1}{2}$ oz

Monday Guatemala City Dec 3 1914
Specimens of the Rey avocado, from
El Rodeo, near Jalapa.



Weight of this specimen 11 ozs



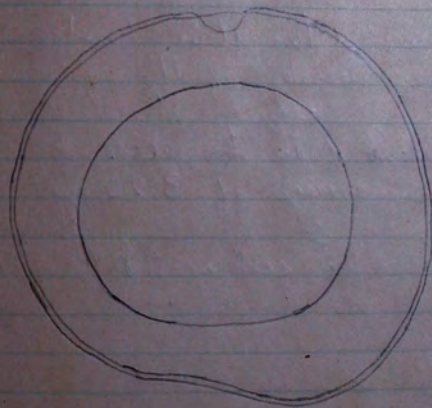
Weight of this specimen $7\frac{1}{2}$ ozs

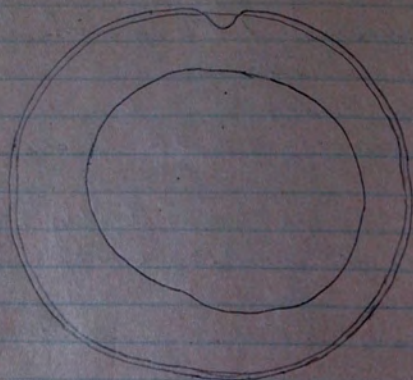
Three fruits weighed $29\frac{1}{2}$ ozs, or an
average of 9.82 ozs each.

Three seeds weighed 6 ozs, or an average
of 2 ozs each.

Therefore, the seed is slightly more than
20% the entire weight of the fruit.

Two more specimens of the Rey:





Weight of two above fruits 1 lb 7 ozs. or
an average of $11\frac{1}{2}$ ozs each

Weight of the two seeds, $6\frac{1}{2}$ ozs, or
an average of 3.25 ozs.

Therefore seed is 28% of entire fruit.

On Nov 27th I shipped the following
to Washington:

Popense # 220 *Persea americana*
Avocado # 32, from property of
Eulogio Duarte, near Amatlán.

Count of avocado seeds shipped Dec 3rd

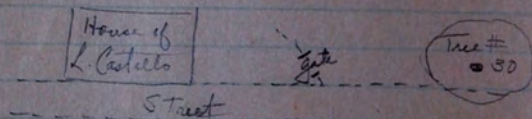
Crate # 1	720 seeds
2	720
3	700
4	700
5	700
6	650
7	750
8	675
9	700
10	800
11	490
Total	7565

Wednesday Guatemala City Dec. 5, 1914.

AVOCADO

#30

Yesterday I went to miqes to cut
cutwood from Avocado #30, in the site
of Leonardo Castillo. The location of this tree
is as follows:

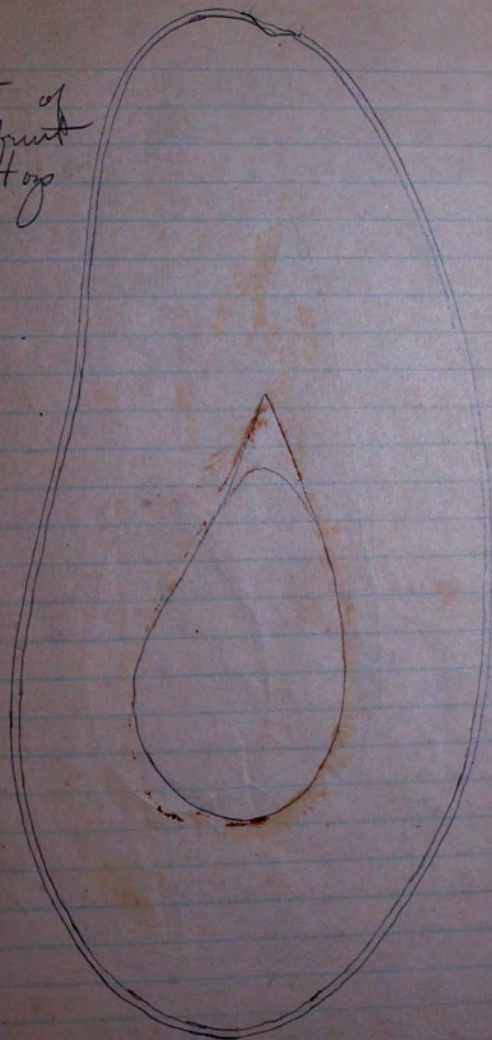


According to a man I met yesterday who
says his grandfather planted the tree, it is at
least 60 years old.

Some of the fruits are ripening prematurely
and falling to the ground. I do not know
what can be the cause of this.

The following outlines are taken from
immature fruits.

Weight of
entire fruit
2 lbs 4 oz





Weight of entire fruit 1 lb 12 oz.



Weight of entire fruit 1 lb 13 oz.

The combined weight of the 3 fruits shown on the preceding page is 93 gms. The combined weight of these seeds alone is 50 gms. The percentage of seed is, therefore, 5.3 of the total.

The following description is taken from green fruits, with the addition of a few characters from prematurely opened ones, and the flavor and quality by reputation.

Avocado + 30; Description Form oblong to slender pyriform; size extremely large, weight 25 to 36 lbs., probably more in fully ripe specimens. Length 7 to 8 1/2 ins, greatest breadth 3 3/4 to 4 1/2 ins. Base broad to narrow, sometimes pointed, the slender stem about 5 ins long inserted slightly obliquely without depression; apex rounded; surface nearly smooth, deep dull purple in color when ripe, with numerous russet dots and patches; skin moderately thick, 1 to 2 mm, coarsely granular and woody; flesh cream yellow in color, free from fiber or discoloration, and of fine texture; flavor rich

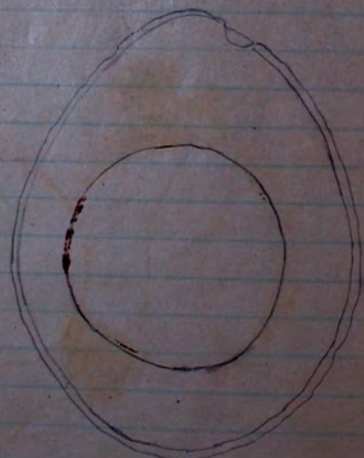
and pleasant; quality very good; seeds very small, slender conical in form, about 1 1/2 gms in weight, tight in the seed cavity with both seed coats adhering closely. Season March to June at Mexico, according to the owner of the tree.

This is one of the most widely renowned avocados in Guatemala. Several people in Guatemala City have spoken to me about it. The owner says the tree has not borne well for the past two years. It set a good crop this year but is not carrying many fruits to maturity.

Avocado
No 7

Yesterday afternoon I obtained some fruits from the No 7, in the patio of the Masonic building, No 4 Calleja Manchón. They are not yet fully mature, and the caretaker says they are much smaller this year than usual, but they will serve to furnish an idea of the principal characteristics of this variety, which has been highly recommended by several people as a fruit of exceptionally good quality.

Following are outlines of this variety:



Weight of entire fruit, 8 ozs. This specimen seems to be almost mature, if not fully so.



Weight of entire fruit $7\frac{1}{2}$ ozs.



Weight of entire fruit 7 ozs



Weight of entire fruit 7 ozs



Weight of entire fruit 7 ozs

The combined weight of the last 4 fruits illustrated is $28\frac{1}{2}$ ozs. The combined weight of their 4 seeds is 7 ozs. Therefore, the seed in this variety (growing from immature specimens, is $28\frac{1}{2}\%$ of the entire fruit.

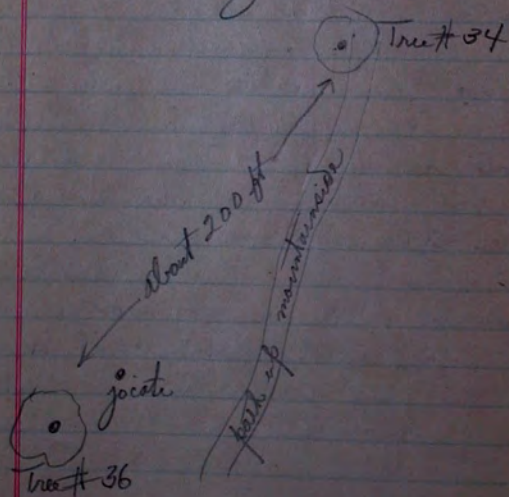
Description of avocado + "1"

Form spherical to obovoid, size small, weight 6 to 8 ozs (probably larger in fully mature fruits), length 3 to $3\frac{1}{2}$ in, breadth $2\frac{3}{4}$ - 3 in, base rounded to pointed, the stem inserted obliquely without depression; apex slightly flattened obliquely; surface rough deep purple when ripe, with very few large yellowish dots; skin moderately thick, 1.5 to 2.5 mm, coarsely granular and woody; flesh deep yellow in color, free from discoloration and of very rich flavor, quality very good; seed very large, nearly spherical in form, light in the cavity with both seed coats as being closely. Season said to be from January to April at Guatemala City.

Thursday At Sea December 13, 1911

On my last trip to Antigua for budwood I added one more avocado tree to the collection, and am taking budwood and some fruits with me to Washington.

AVOCADO This tree is No. 36. It stands close to tree No. 34, in the terreno of Ignacio Hernandez, near San Lorenzo El Cubo, veg.



This tree is 45 feet high, the crown round, of good form, 45 ft. broad high above the ground. The trunk is 2 ft thick at the base, dividing 15 ft above the ground.

The crop this year is a very good one. The first fruits only a few are at this time turning brown, indicating maturity. The character of the growth is good and the budwood excellent. Although No. 36 closely is now in full bloom, this tree shows no flowers as yet.

It was picked out because of its rather early season, combined with attractive appearance and size of fruit, comparatively small seed, and flesh which appears to be of very fine quality, tho I have not yet tasted it.

I am carrying home with me the following avocados, cut on Antigua on Monday the 10th instant.

Papense # 922. Avocado # 34

923. Avocado # 36
(Two parcels of 22)

924. Avocado # 35

925. Avocado # 20

926. Avocado # 33

927. Avocado # 26

928. Avocado # 27

This material was put on ice upon reaching Guatemala City on Tuesday (noon), and brought down to Phil Barrios on ice. After getting on board ship it was taken off ice and kept in the storeroom.

Saturday At Sea December 15 1917

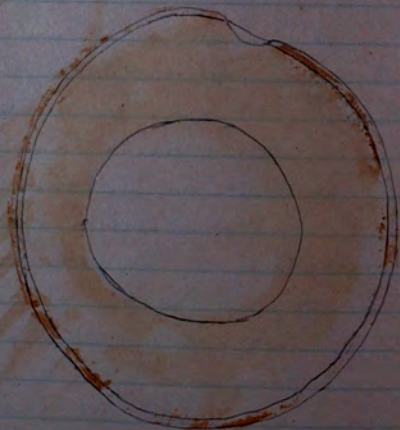
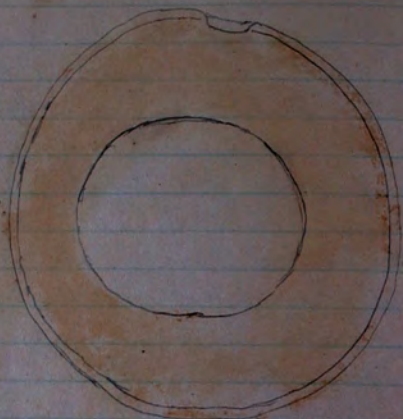
AVOCADO
No. 36

I brought several specimens of Avocado # 36 with me from Antigua and today three of them are kept and ready for eating.

The following description of the variety is taken from these specimens.

Form spherical or nearly so, usually slightly oblique; size below medium, weight averaging 7 ozs, length $3\frac{1}{2}$ ins. greatest breadth $2\frac{1}{2}$ ins. base slightly flattened, the stem inserted somewhat obliquely without depression, apex obliquely flattened but not prominently so; surface practically smooth, deep dull purple when fully ripe, with scattering large yellowish dots; skin thick, 2 to 4 mm, very coarsely granular, hard and woody, somewhat unusually so. flesh rich cream yellow in color, with a few fine and almost unobjectionable fibers running thru it, smooth and fine in texture, and of very rich nutty flavor, quality very good. Seed medium sized, averaging about $1\frac{1}{2}$ oz. in weight, oblate in form, tight in the cavity with both seed coats adhering closely; season December to March (?)

AVOCADO
No 36.



This is a very promising early fruit. Its productiveness and its excellent quality make it seem, in fact, the most promising early avocado found in the Antigua region. It has flesh of red attractive color and very rich flavor, and the seed is rather small for a round fruit. The specimens examined, while picked before they had turned purple on the tree, ripened in 5 days and had a very satisfactory flavor, showing that they are in good condition for marketing during the first part of December.

REGISTER OF AVOCADO VARIETIES.

On the following pages will be found a list of the avocados selected for introduction into the United States, together with references to budwood shipments, photographs illustrating the tree and its fruit, pages in this journal where the variety is described, referred to, or figured, the location of the parent tree and the date on which it was chosen for inclusion in the list.

Some of the varieties are not introduced, but the location of the parent tree and other data is included in this register to make the record of the work complete.

No. 1.

S.P.I. No. Not numbered.

PHOTOGRAPHS:

P898, leaf fruit;

BUDWOOD SHIPMENTS:

No. 40, Shipped Oct. 3, 1916.

JOURNAL:

Vol I, pp 84-85

LOCATION OF TREE:

In the finca of Don Miguel Roto,
on the edge of Lake Amatitlan, about
 $\frac{1}{2}$ mile from the station of Laguna. Tree
is in the rear of the finca with coffee
bushes around it. Altitude of location about
3875 feet.

SELECTED: Oct. 2, 1916

No. 2.

S.P.I. No. Not numbered.

PHOTOGRAPHS:

P. 897, entire fruit; P. 899, half fruit;

BUDWOOD SHIPMENTS:

No. 41. Shipped Oct. 3 1916.

Ordered to Mann 10-13-16

JHB
19089

19010

JOURNAL:

Vol I, pp 86-87

LOCATION OF TREE:

In the finca of Don Miguel Soto,
on the border of Lake Amatitlan, about
1/2 mile from the station of Laguna. Tree
is some distance toward the front of the finca
from No. 1, surrounded by coffee bushes.
Altitude of location 3875 feet.

SELECTED: Oct. 2, 1916.

Itzamna
No. 4

S.P.I. No. 43486

PHOTOGRAPHS:

P-960, entire and half fruit, immature

BUDWOOD SHIPMENTS:

No. 50, Shipped Oct. 23, 1916

Ordered to Miami 9-28-16

Variety Local name	ITZAMNA		
Form	oblong-pyriform to pyriform, necked		
Length	5 1/2 to 6 1/4 ins.	Breadth	3 1/4 to 3 1/2 ins.
Size		Weight	14 to 18 ozs.
Stem	inserted obliquely		
Base	narrow, pointed		
Cavity: Depth	none	Breadth	
Slope		Form	
Apex	rounded, slightly flattened on one side		
Basin: Depth	none	Breadth	
Slope		Form	
Suture: Depth		Length	
Calyx			
Surface	heavily pitted	Bloom or fuzz	
Color	bright green, sometimes yellowed on one side		
Dots: Number	for 1/2 in. square	Size	small
Form	irregular	Color	greenish yellow
Skin: Thickness	very thick 2 to 4 mm.	Texture	woody, brittle
Adhesion	separable, but not coming away clean		
Flesh: Color	creamy yellow	or	almost butter yellow
Thickness	good	Fibre	a few markings
Texture	buttery	Juiciness	
Carpels	3	Seed cavity	
Seeds: Number		Form	conic, obovate-conic
Size	medium	Adhesion	tight in cavity
Flavor	very rich, oily, nutty, iron		
Quality: Deterioration	good	Keeping	
Shipping	excellent	Season	later part of March
Uses			
Insects and diseases			
Remarks			
Form	TREE.	SHRUB	VINE
Growth: Vigor	Height		
Character			
Productiveness	Age of bearing		
Hardiness			
Color of bark	Of young wood		
Foliage			
Leaf: Form	Size		
Color	Surface		
Margin	Petiole		
Flowers	Season		
Insects and diseases			
Remarks			

Scientific name
Classification
Location
POMOLOGICAL NOTES
OFFICE OF FOREIGN SEED AND PLANT
INTRODUCTION, BUREAU OF PLANT INDUSTRY,
DEPARTMENT OF AGRICULTURE,
WASHINGTON, D. C.

S. P. I. No. 43486
Field No.
Described by
Field
Tested
Total

10
word
of
bank
ice.

ture;

JOURNAL:

Vol. I, p. 117

LOCATION OF TREE:

In a small maize patch in the village of Santa Maria de Jesus, 10 kilometers from Antigua. The tree is toward the Volcan de Agua from the plaza of the village, and stands on a high bank beside the street, just within the fence. Altitude about 6900 feet.

SELECTED: Oct. 20, 1916.

No. 5.

S.P.I. No. 43487

PHOTOGRAPHS:

P-974, entire fruit; 975, half fruit;

BUDWOOD SHIPMENTS:

No. 51, Shipped Oct. 23, 1916

JOURNAL:

Vol. I, pp. 123-124

LOCATION OF TREE:

In a garden not far from the center of the village of San Lucas, between Guatemala City and Antigua. Altitude 6850 feet.

SELECTED: Oct. 21, 1916.

KANOLA
No. 6.

S.P.I. No. 43560

PHOTOGRAPHS:

P. 993, tree; 994 entire and half fruit;
995, same; 1150, entire and half fruit;
1151, entire and half fruit; 1196, tree holding
fruiting twig; 1332, half fruit;

BUDWOOD SHIPMENTS:

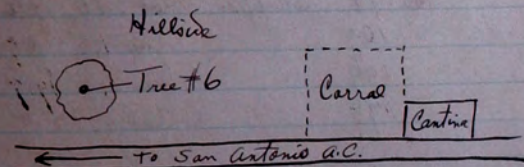
No. 54	Shipped	Oct. 31, 1916
109		May 1, 1917
115		May 7, 1917
137		June 5, 1917

JOURNAL:

Vol. I, pp. 128-129; 148-149;
Vol. II, pp. 80; 84-85; 114-116;
Vol. III, p. 188;
Vol. IV, p. 35;

LOCATION OF TREE:

In yard of Victor Garcia, who keeps a
small cantina in the road from Antigua to
San Antonio A.C., just above the church
at San Lorenzo del Cuzco. Altitude 5200 feet



SELECTED: Oct. 22, 1916

ISHKAL

No. 7.

S.P.I. No. 73602

PHOTOGRAPHS:

P-1575, entire & half fruits;

BUDWOOD SHIPMENTS:

No. 71, Shipped Nov. 13, 1916.

127

May 15 1917

149

June 19 1917

153

July 30 1917

JOURNAL:

Vol. IV, pp. 100-103;

LOCATION OF TREE:

In the patio of the Masonic building,
No. 4, Callejn de Marchen, Guatemala City.
It is the only avocado tree in this
patio. Altitude 4900 feet.

SELECTED: Nov. 5, 1916.

COBÁN
No. 8.

S.P.I. No. 43932

PHOTOGRAPHS:

R 1068, entire and leafy fruit;

BUDWOOD SHIPMENTS:

No. 74 Shipped Dec 22 1916

95 April 17 1917

155 July 10 1917

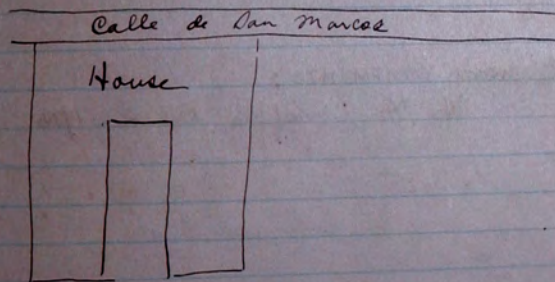
(Two packages of 155)

JOURNAL:

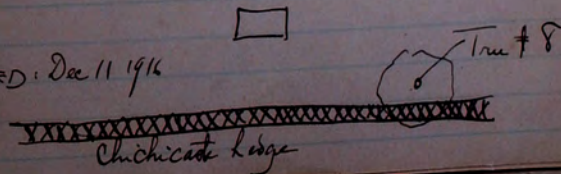
Vol. II, pp. 20-21; 26; 187;

LOCATION OF TREE:

In yard of Filadelfo Pineda, Calle de
San Marcos, Cobán. Altitude 4350 feet.



SELECTED: Dec 11 1916



No. 9

S.P.I. No. 43933

PHOTOGRAPHS:

P. 1083, entire and half fruit;

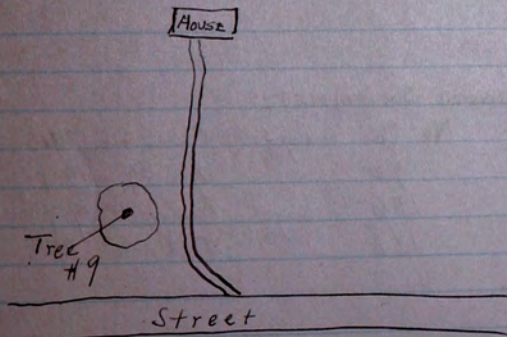
BUDWOOD SHIPMENTS:

No. 75, Shipped Dec. 22, 1916.

JOURNAL:

Vol. II, pp 33-35;

LOCATION OF TREE:

In dooryard of an Indian in southwest
part of the town of San Cristobal Verapaz.
Altitude 4550 feet.

SELECTED: Dec. 14 1916.

KASHLAN
No. 10.

S.P.I. No. 43934

PHOTOGRAPHS:

P1084, entire fruit, 1085, half fruit,

BUDWOOD SHIPMENTS:

No. 76 Shipped Dec 22 1916
 96 Apr 17 1917
 156 (2 pgs) July 10 1917
 188 Oct. 15 1917

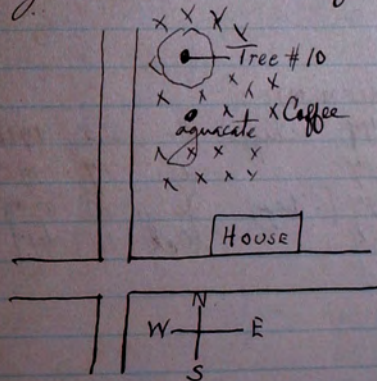
JOURNAL:

Vol II, pp. 37-38; 40; 146;

Vol III, p. 188;

LOCATION OF TREE:

In dooryard of Diego Munoz, in the
 southwest part of town, San Cristobal
 Verapaz. Altitude 4550 feet.



SELECTED: Dec 14 1916

CHISOY
No. 11.

S.P.I. No. 43935

PHOTOGRAPHS:

P-1086, entire fruit; 1087, half fruit;
1282, tree; 1283, trunk of tree; 1293, entire
fruit; 1294, half fruit; 1320. Indian boy
holding 3 fruits;

BUDWOOD SHIPMENTS:

No. 77. Shipped Dec. 22, 1916

97 Apr 17 1917

157 (2 pkgs) July 10 1917

189 Oct. 15 1917

JOURNAL:

Vol. II, pp. 39, 41-42, 148-151, 173, 175-178;

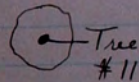
Vol. III, p. 188.

LOCATION OF TREE:

In cafetal of Don Eusebio de la
Cruz, on the street leading to the Temple
del Minero, or San Cristobal Serapaz.
Altitude 4550 feet.

Paved Street to Temple de Minero from Plaza

Cafetal



unpaved road

SELECTED: Dec. 14, 1916.

PANKAY
No. 12.

S.P.I. No. 44785

PHOTOGRAPHS:

P-1125, entire fruit, immature; 1126, half
fruit, immature; 1425, tree;

BUDWOOD SHIPMENTS:

No. 132 Shipped May 24 1917
213 Nov 20 1917

JOURNAL:

Vol. II, pp. 72-73;
Vol. III, pp. 103-104;
Vol. IV, pp. 77-79;

LOCATION OF TREE:

In the patio of the house belonging
to Juana v. de Carney, at the corner of
Calle Avenida norte and Calle Cabaxas, 1 block
from the plaza, Taticopan. Altitude
about 8600 feet.

SELECTED: Jan 11 1917

No. 13.

S.P.I. No. Dead.

PHOTOGRAPHS:

P-946, tree; 1145, tree; 1336, girl holding
2 fruits; 1339, girl holding half fruit;

BUDWOOD SHIPMENTS:

No. 83, Shipped Jan. 30, 1917

JOURNAL:

Vol. I, p. 139;

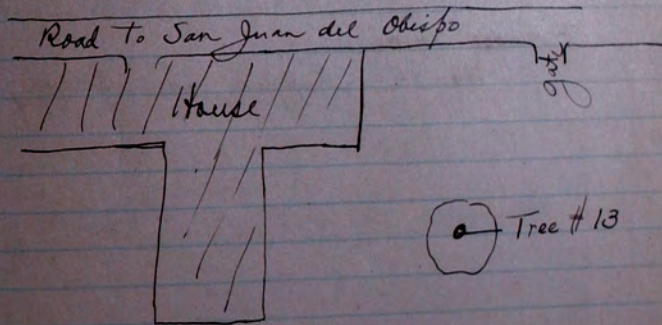
Vol. II, pp 81; 87-88; 108-109;

Vol. III, pp 10, 11;

Vol. IV, p 40; -11

LOCATION OF TREE:

Beside house at the finca "Jauja",
in Antigua. Altitude 5100 feet.



SELECTED: Jan 29 1917

No. 14

S.P.I. No. Dead.

PHOTOGRAPHS:

P-1146, tree, 1160, entire fruit; 1161,
half fruit; 1162, half fruit;

BUDWOOD SHIPMENTS:

No. 84, Shipped Jan 30 1917

JOURNAL:

Vol. I. p. 140;

Vol. II, pp 82-89-90-91;

Vol. IV, p. 40;

LOCATION OF TREE:

In the finca "Lauja", Antigua, some
distance toward the town from the entrance
to the finca, close to the fence, in front
of an estanco which stands across the
road. Altitude 5100 feet.

[Estanco]
Road to San Juan del Obispo →

(a) Tree #14
Cafetal

SELECTED: Jan 29 1917

NABAL
No. 15.

S.P.I. No. 44439

PHOTOGRAPHS:

P-835, tree; 1131, tree; 1134, crop picked
and piled around base of tree; 1165, entire
fruit; 1166, half fruit;

BUDWOOD SHIPMENTS:

Dead. No. 85. Shipped Jan 30 1917
92 Mar 20 1917

Seed shipments:

87a. SPI 44820

JOURNAL:

Vol. II, pp. 83; 92-93;

Vol. III, p. 188.

LOCATION OF TREE:

In the finca 'Santa Lucia', 7a Calle
Poniente near the Alameda de Santa Lucia,
in Antigua. Altitude 5100 feet. The tree
was destroyed in 1917 by laborers clearing
ground to plant coffee.
See Diagram on page 147

SELECTED: Jan 29 1917

No. 16.

S.P.I. No. Dead.

PHOTOGRAPHS:

P. 1132, tree; 1133, crop at base of tree, after picking; 1163, entire fruit, 1164, half fruit;

BUDWOOD SHIPMENTS:

Dead. No. 86. Shipped Jan 30 1917.

Seed shipment;

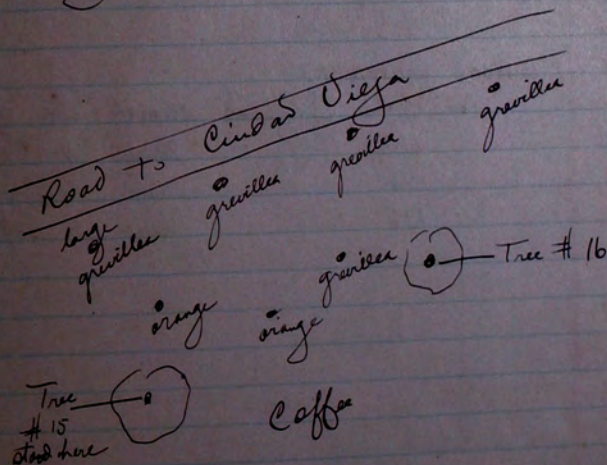
89a - SPI 44445.

JOURNAL:

Vol. II, p. 83; 94-95;

LOCATION OF TREE:

In the finca "Santa Lucia", 7a Calle Poniente near the Alameda de Santa Lucia, in Antigua. Altitude 5700 feet.



SELECTED: Jan 29 1917

NIMLICH
No. 14.

S. P. I. No. 44440

PHOTOGRAPHS:

P. 1169, José beside sack of fruit;
1171, Patrocinia holding fruit; 1209, entire fruit;
1210, half fruit; 1329, tree;

BUDWOOD SHIPMENTS:

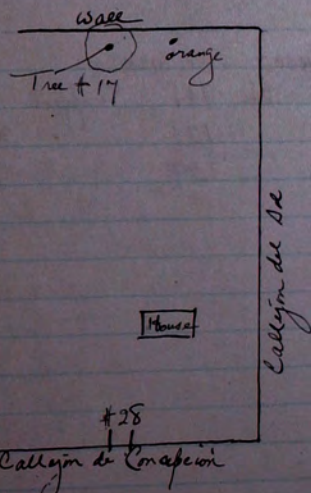
No. 94	Shipped	March 20	1917
110		May 1	1917
116		May 7	1917
138		June 5	1917

JOURNAL:

Vol. II, pp. 102-105; 126;
Vol. III, pp. 70; 188;
Vol. IV, p. 20;

LOCATION OF TREE:

In a sitio belonging to Trinidad Hernández, No. 28, Callejón de Concepción, Antigua.
Altitude 5100 feet. Tree was destroyed in June 1917.



SELECTED: Feb. 20 1917

PANCHOY
No. 18

S.P.I. No. 44625

PHOTOGRAPHS:

P-1203, entire fruit; 1204, half fruit;
1337, girl holding entire and half fruits;
1344, trunk of tree; 1345, tree;

BUDWOOD SHIPMENTS:

No. 111, Shipped May 1, 1917
121 May 7 1917
139 June 5 1917

JOURNAL:

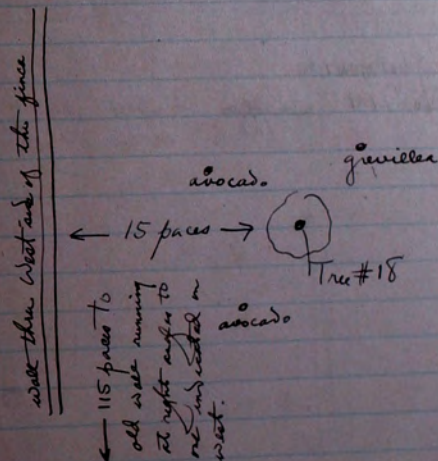
Vol. II, pp. 117; 120-121, etc.

Vol. III, pp. 13; 73; 188;

Vol. IV, p. 30;

LOCATION OF TREE:

In the finca "La Polvora", on the
cemetery road, Antigua. Altitude 5100 feet.



SELECTED: Feb. 24, 1917.

HONAPUH
No. 19.

S.P.I. No. 44628

PHOTOGRAPHS:

T-1205, entire fruit; 1206, half fruit;
1347, tree,

BUDWOOD SHIPMENTS:

No. 114, Shipped May 1, 1917

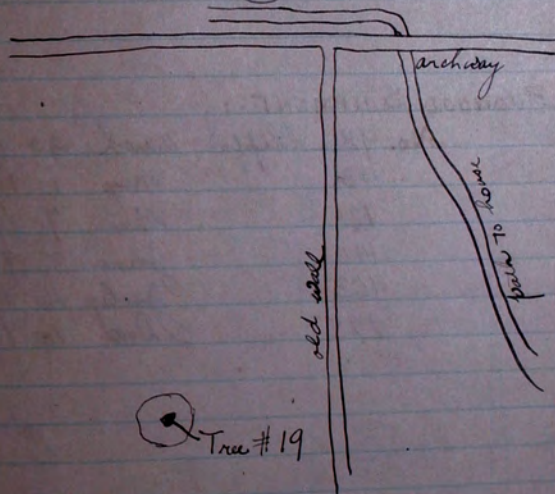
JOURNAL:

Vol. II, pp. 118; 122-123;

Vol. IV, p. 31;

LOCATION OF TREE:

In the finca "La Palocera" on the
cemetary road, in Antigua. Altitude 5100 feet.



SELECTED: Feb 24 1917

TUMIN
No. 20

S.P.I. No. 44627

PHOTOGRAPHS:

P 1201, Graciela holding cluster of fruits;
 1202, Graciela holding twig with 2 fruits;
 1204, entire fruit; 1205, half fruit; 1242,
 entire fruit; 1243, half fruit; 1341, tree;

BUDWOOD SHIPMENTS:

No. 93	Shipped	March 20	1917
113		May 1	1917
120		May 7	1917
140		June 5	1917
163		July 16	1917
225		Dec 10	1917

JOURNAL:

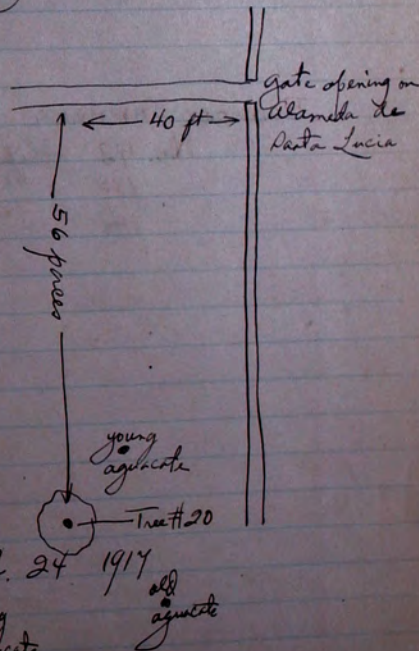
Vol. II, pp 120, 124-125, 129;

Vol. III, pp 73, 188;

Vol. IV, p. 24.

LOCATION OF TREE:

In the finca "La Polvora", on the
 cemetery ~~road~~, Antigua. Altitude 5100 feet.



SELECTED: Feb. 24 1917
 young agave
 old agave

BENIK
No. 21.

S.P.I. No. 44626

PHOTOGRAPHS:

P 1240, entire fruit; 1241, half fruit;
1338, girl holding half fruit;

BUDWOOD SHIPMENTS:

No. 112	Shipped	May 1 1917
119		May 4 1917
141		June 5 1917

JOURNAL:

Vol. II, pp. 130-131;
Vol. III, pp. 12, 73, 188;
Vol. IV, p. 24, 26, 67;

LOCATION OF TREE:

In the finca "La Paloma" on the
cemetery road, Antigua. Altitude 5100 feet.
Tree was girdled in 1917 and was dying
when last seen.

SELECTED: March 19 1917

KEKCHI
No. 22.

S.P.I. No. 44679

PHOTOGRAPHS:

P-1305, entire fruit; 1317, entire and half fruits.

BUDWOOD SHIPMENTS:

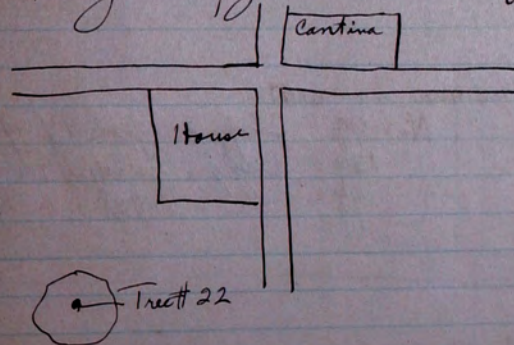
No. 98 Shipped April 17 1917
158 (2 frags) July 10 1917
177 Oct. 1 1917

JOURNAL:

Vol. II, pp. 50-51, 132, 159-160,

LOCATION OF TREE:

In site diagonally across the street from the cantina of Santiago Mendoza, in Purula, Baja Verapaz. Altitude 5600 feet.



SELECTED: December 17 1916

MAYAPAN
No. 23

S.P.I. No. 44680

PHOTOGRAPHS:

P-1246, tree, 1306, entire fruit;
1307, half fruit; 1318, entire and half fruits;
1319, entire and half fruit;

BUDWOOD SHIPMENTS:

No. 99. Shipped April 17 1917
159 (2 pkgs) July 10 1917
178 Oct. 1. 1917

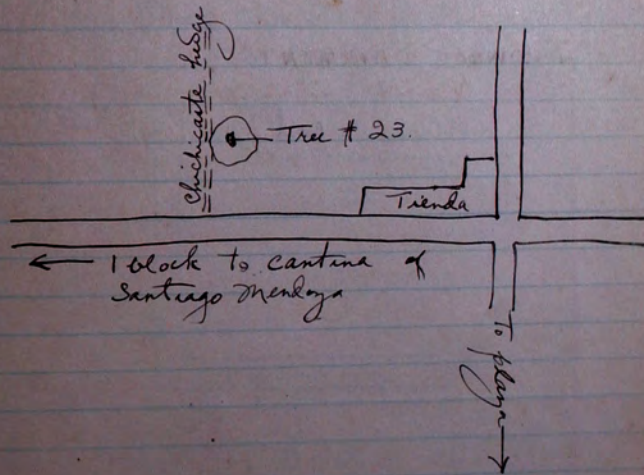
JOURNAL:

Vol. II, pp. 161-164;

Vol. III, p. 188;

LOCATION OF TREE:

In a sitio owned by Don Arcadio
Saguirre, in Purula, Baja Verapaz.
Altitude 5100 feet.



SELECTED: March 24 1917

No. 24.

S.P.I. No.

PHOTOGRAPHS:

P-1291, entire fruit; 1292, half fruit,

BUDWOOD SHIPMENTS:

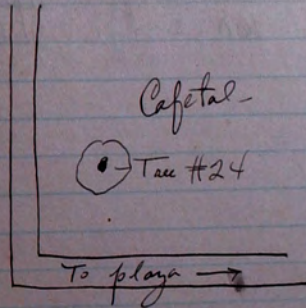
Never sent in

JOURNAL:

Vol. II, pp. 143-146; 152-153; 174;

LOCATION OF TREE:

In a small cafetal or sitio belonging to Vicente Caal, in the Barrio of Santa Ana, approximately two blocks north of the church in the main plaza, San Cristobal Verapaz. Altitude 4550 feet.



SELECTED: April 2, 1917

KAYAB
No. 25.

S.P.I. No. 44681

PHOTOGRAPHS:

P-1299, entire fruit; 1300, half fruit;

BUDWOOD SHIPMENTS:

No. 100, Shipped April 17, 1914
160 (2 pkg) July 10 1917

JOURNAL:

Vol. II, pp. 147, 156-157;

LOCATION OF TREE:

In a cafetal belonging to Francisco Munos, called Chiguitop (Tres Chorros in Spanish), beyond the tannery of Don Alfonso Herring, on the road to Chisoy, in the outskirts of San Cristobal Terapay. The tree stands among coffee bushes about 50 ft from the road. Altitude 4550 feet.

SELECTED: April 3, 1917

MANIK
No. 26.

S.P.I. No. 45560

PHOTOGRAPHS:

P 1343, tree, 1352, entire fruit;
1353, entire and half fruits;

BUDWOOD SHIPMENTS:

No. 212, Shipped Nov. 13, 1917
227 Dec 10 1917.

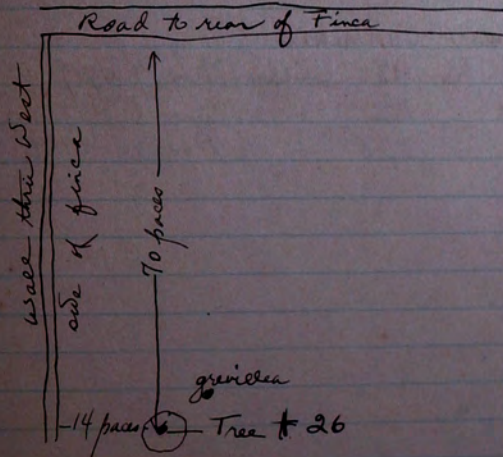
JOURNAL:

Vol. III, pp. 59-61;

Vol. IV, pp. 26-30;

LOCATION OF TREE:

In the finca 'La Polvora', on the cemetery road, Antigua. Tree stands in same row as #18, but farther to the rear. Altitude 5100 feet.



SELECTED: May 4, 1917

CABNAL
No. 27.

S.P.I. No. 44782

PHOTOGRAPHS:

P-1328, tree, 1335, half fruit; 1354,
entire fruit; 1355, entire fruit; 1356, half
fruit; 1357, half fruit;

BUDWOOD SHIPMENTS:

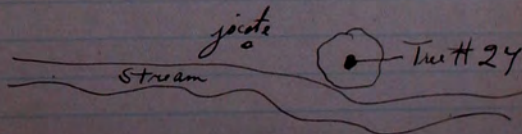
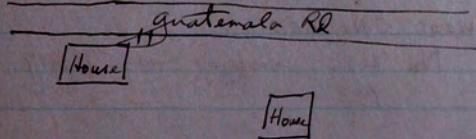
No. 118.	Shipped May 4 1917
142	June 5 1917
228	Dec 10 1917

JOURNAL:

Vol III, pp. 54-57; 67; 70; 188,

LOCATION OF TREE:

In the sitio occupied by Atanasio Salazar, on the Guatemala road, a short distance beyond the sign marking 1 km from Antigua. Altitude 5100 feet.



SELECTED: May 4 1917

CANTEL
No. 28

S.P.I. No. 44713

PHOTOGRAPHS:

P. 1331, tree, 1333, entire fruit,
1334, half fruit;

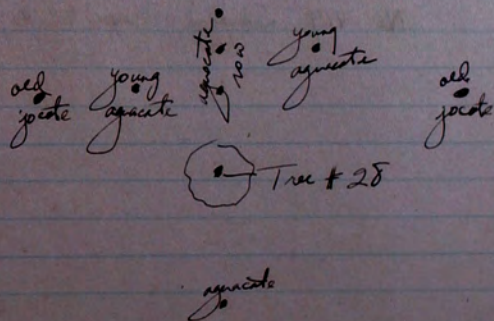
BUDWOOD SHIPMENTS:

No. 122, shipped May 7 1917
143 June 5 1917

JOURNAL:

Vol. III, pp. 62-64, 71;
Vol. IV, pp. 36-38;

LOCATION OF TREE:

In the finca "La Candelaria", near
ruined church of Candelaria, Antigua.
altitude 5100 ft. Tree stands in rear
of finca.rear wall of finca

SELECTED: May 5, 1917

No. 29.

S.P.I. No. 44781

PHOTOGRAPHS:

P. 1330, tree, 1372, entire fruit;
1373, half fruit;

BUDWOOD SHIPMENTS:

No. 117 Shipped May 7 1917

JOURNAL:

Vol. III, pp. 71, 74-76;

Vol. IV, p. 38;

LOCATION OF TREE:

In the finca "Santa Rosa", near
ruined church of the same name close
to the end of the Alameda de Santa
Rosa, Antigua. Altitude 5100 feet.

SELECTED: May 5, 1917.

TERTOH
No. 30.

S.P.I. No. 44856

PHOTOGRAPHS:

R 1435, immature fruit; 1569, fruits;
1570, entire & leaf fruit; 1571, ditto; 1572,
Augusto holding fruit; 1576, tree;

BUDWOOD SHIPMENTS:

No. 146. Shipped June 12 1917
172 July 30 1917
193 Oct. 23, 1917
221 Dec. 4 1917

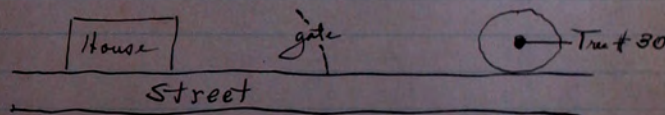
One shipment rec'd without number(?)
FHB 22786

JOURNAL:

Vol. III, pp. 105-107,
Vol. IV, pp. 94-99;

LOCATION OF TREE:

In the area of Leandro Castillo,
about 4 blocks north of Alberto Rivera's
house in Mexico, 8 kms from Quate-
mala City. Altitude about 5700 feet.



SELECTED: June 12 1917

NIMAH
No. 31.

S.P.I. No. 45078

PHOTOGRAPHS:

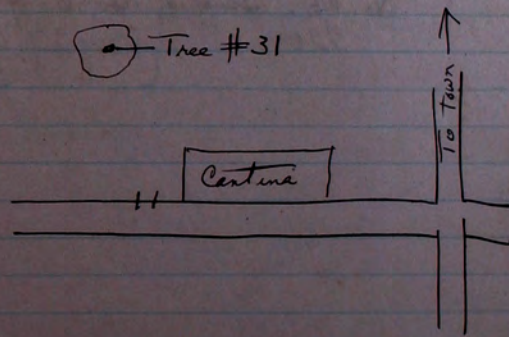
BUDWOOD SHIPMENTS:

No. 171 Shipped July 30 1917

JOURNAL:

LOCATION OF TREE:

In back yard of a cantina in the edge of the town of Mazatenango, on the road to finca El Comprogreso after crossing bridge in edge of town and ascending to top of the hill Altitude 1150 feet.



SELECTED: July 29 1917

AKBAL
No. 32.

S.P.I. No. 45505

PHOTOGRAPHS:

P. 1506, Rafael holding fruit; 1507, ditto;
1517, entire and half fruit; 1518, ditto;

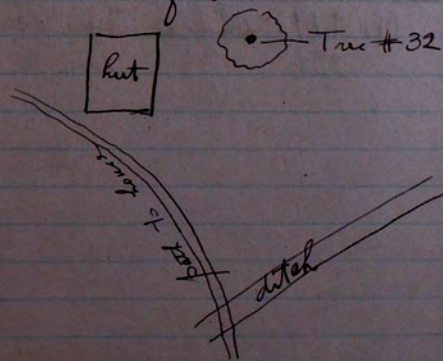
BUDWOOD SHIPMENTS:

No. 195, Shipped Nov. 6, 1917.
220 Nov 27 1917

JOURNAL:

Vol. IV, pp. 10-15;

LOCATION OF TREE:

In property of Eulogio Duarte,
near Amatitlan. The location is known as
'Los Rastrojos' and is about 2 miles from
the plaza, on the road which leads past
the cemetery toward the hills. Altitude
about 4200 feet.

SELECTED: Nov. 5, 1917

KAGUAH
No. 33.

S.P.I. No. 45561

PHOTOGRAPHS:

BUDWOOD SHIPMENTS:

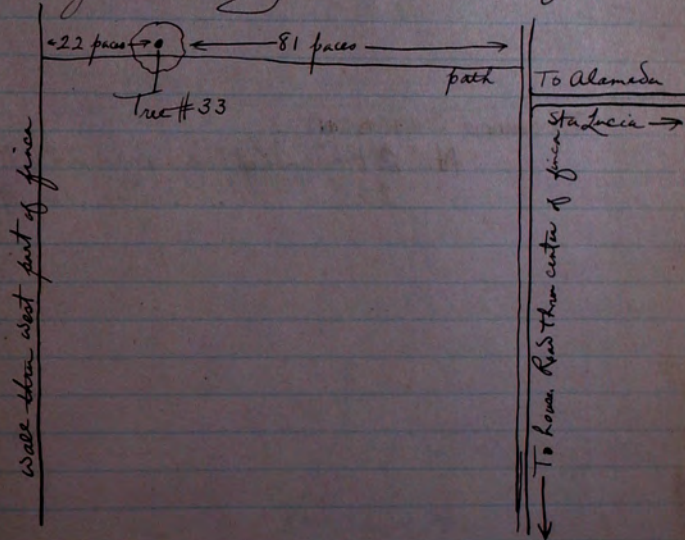
No. 211, Shipped Nov. 13, 1917
 226 Dec 10 1917

JOURNAL:

Vol. IV, pp. 42, 43, 57-61, 68,

LOCATION OF TREE:

In the finca "La Palvora", on the cemetery road, Antigua. Altitude 5100 feet.



SELECTED: Nov. 12, 1917

ISHIM
No. 34.

S.P.I. No. 45562

PHOTOGRAPHS:

P. 1532, disk of fruit. 1533, entire
and half fruit. 1545, tree; 1547, tree;

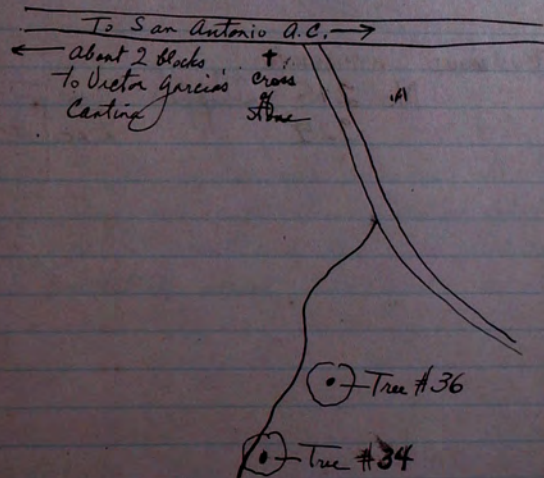
BUDWOOD SHIPMENTS:

No. 244 Shipped Nov. 20 1917
222 Dec 10 1917

JOURNAL:

Vol. IV, pp. 44, 53-56, 73-74;

LOCATION OF TREE:

In a terreno belonging to Ignacio
Hernandez, above the road to San Antonio A.C.,
just past San Lorenzo del Cuzco. Altitude about 5200 ft.

SELECTED: Nov. 16 1917

KANAN
No. 35

S.P.I. No. 45563

PHOTOGRAPHS:

P-1530, entire and half fruits; 1531, half
fruit; 1546, tree;

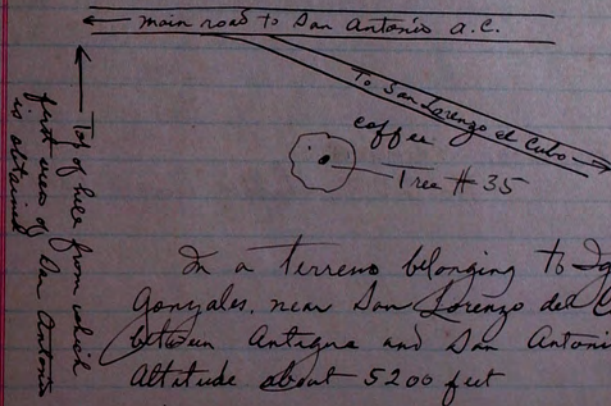
BUDWOOD SHIPMENTS:

No. 215 Shipped Nov 20 1917
224- Dec 10 1917

JOURNAL:

Vol. IV, pp. 45, 46, 64-66, 75;

LOCATION OF TREE:



In a terreno belonging to Ignacio
Gonzales, near San Lorenzo del Cuto,
between Antigua and San Antonio A.C.
Altitude about 5200 feet

SELECTED: Nov. 16 1917

CHABIL
No. 36

S.P.I. No. 45564

PHOTOGRAPHS:

BUDWOOD SHIPMENTS:

No. 223 Shipped Dec 10 1914

JOURNAL:

Vol. IV, pp. 104-105; 107-109;

LOCATION OF TREE:

In the terreno of Ignacio Hernandez,
not far from San Lorenzo del Cuzco, between
Antigua and San Antonio A.C. The tree is only
about 200 feet below Tree #34. See page 183
for diagram of location.

SELECTED: December 10, 1914

Derivation of Avocado Names.

The names which we have selected for the Guatemalan avocados have all been derived from the Maya or one of its dialects. They are as follows:

Lamat (No. 3) One of the Maya day signs. The 5th day.

Kanola (No. 6). Kekchi ^{equivalent} ~~from~~ of the Spanish chula (sweetheart).

Ishkal (No. 7) Kekchi meaning girl.

Cobán (No. 8) Name of a town in Dept. of Alta Verapaz (Kekchi territory).

Kashlan (No. 10) Kekchi meaning foreign. The tree was called "the foreigner's avocado" by the owner because I took budwood and fruit from it.

Chisoy (No. 11) Name of the river which flows close to San Cristóbal Verapaz: an affluent of the Usumacinta.

Pankay (No. 12) A coined name from the Maya prefix pan "place where" and Kekchi keh or kay, "cold," meaning "place where it is cold".

Nabal (No. 15). Kekchi equivalent of the Spanish bastante (plenty).

Nimlich (No. 17) Kekchi meaning "big avocado."

Panchoy (No. 18) Maya-Cakchiquel term meaning "place where there is a lake"; name of the valley in which Antigua lies.

Hunapuh (No. 19). One of the day names; in K'iche'-Cakchikel meaning "the one lord of power".

Tumin (No. 20). Kekchi meaning "money".

Benik (No. 21). One of the Maya glyph signs.

Kekchi (No. 22) Name of the Maya tribe which occupies most of the Dept. of Alta Verapaz.

Mayapan (No. 23) "Place where there are Mayas" Name of an important city in ancient times.

Kayab (No. 25) The Maya tortoise month.

Marik (No. 26) The name of the 4th Maya day.

Cabnal (No. 27) Named for Jose Cabnal, a Kekchi Indian, and my assistant in Guatemala.

Cantel (No. 28). The Kekchi form of the Spanish name Candelaria. The tree was growing in a place named "La Candelaria".

Tertoh (No. 30) Kekchi, meaning "dear" or "expensive".

Nimah (No. 31) More or less coined; Kekchi for "large stream" or "river", but the correct form would be Nim-li-ha.

Akbal (No. 32) The twentieth Maya day name.

Kaguah (No. 33) Kekchi, meaning Chief.

Ishim (No. 34) Kekchi and other dialects, meaning maye (Lea maye L.)

Kanan (No. 35) Maya meaning "yellow when ripe".

Chabil (No. 36) Kekchi meaning pretty or beautiful.

UNITED STATES DEPARTMENT OF AGRICULTURE
BUREAU OF PLANT INDUSTRY
WASHINGTON

AGRICULTURAL TECHNOLOGY

May 6, 1919.

My dear Mr. Popenoe,

Noting that you are to speak this evening at the Botanical Society on your discoveries in Guatemala, I thought you might be interested to see a list of what are perhaps not the least important ones. The following is a list of twenty-three species of nemas which I have found in the soil which you collected. Six of these species are injurious to plants. Five are known to be beneficial to agriculture. The economic relationships of the others remain undetermined.

Acrobates mirabilis n.sp.
Acrobates sp.?
Actinomeridius brasiliensis n.sp.
Actinomeridius heterocephalus n.sp.
Adelius primitivus de Men.
Bastiana gracilis de Men.
Cephalobus sp.?
Cephalobus sp.?
Cylindroiulus obesus Cobb.
Iota decem-lineatus n.sp.
Iota elongatum n.sp.
Xiphonema americana sp.?
Xyrenus longicaudatus de Men.
Xyrenus similis Cobb.
Plectus clivatus Bastian.
Plectus insignis n.sp.
Plectus rhizophagus de Men.
Rhabditis monstrosa Bittschli.
Rhabditis sp.?
Rhabditis sp.?
Tylenchalis pelatus n.sp.
Tylenchus neodus n.sp.
Tylenchus parvotus n.sp.

Yours very truly,

† Damian
* Beneficial

Agricultural Technologist.

List of *Perseas* in the Herbarium of
the New York Botanic Garden:

- Persea albigera* Spreng.
mountains of Jamaica
- P. borbonica* (L.) Sarg.
North Carolina, Florida, Texas.
- P. drimysifolia* Ch. et Sch.?
Zacapan, Vera Cruz, Mexico
Coll. Purpus, Mar. 1914 (Fol. & fl.)
- P. effusa* Hemslay?
Zacapan, Vera Cruz, Mexico
Coll. Purpus, Feb. 1909. (Fol. & fl.)
- P. fusca* Mez
Brazil, probably Guyana
Glezion 1896 (Fol. & fl.)
- P. glaberrima* Mez
Guadeloupe, Oakes Duss 1894
foliage only.

- P. Harrisoni* Mez
mountains of Jamaica fl. Aug.
- P. Hartwegii* Hemslay
San Luis Potosi Mexico
Coll. Purpus, 1911. fl. June
- P. hypoleuca* Mez.
Cuba 1843
- P. humilis* Nash
near Eustis, Florida
- P. kerugii* Mez
Puerto Rico and Jamaica
- P. laevigata* HBK
loc.?
- P. littoralis* Small
Florida East Coast
- P. persica* (L.) Cockerell
Java 1838
Karotonga, Cook Is. "Naturalised in"

abandoned cultivations." 1899.
 And common localities in trop.
 America. None from Guatemala

P. pubescens (*P. Cardinensis*)
 Southern U. S.

P. salicifolia Hemsl.
 San Luis Potosi and Tamaulipas, Mexico.

P. urbaniana Mez.
 "Laurier avocat" Rev. Martineque.
 Fore Duss 1884.

In the Columbia Herbarium, N. Y. Botanic Garden

Persea Donnell-Smithii Mez. n. sp. ined.
 Chicoyunto, Alta Verapaz, alt. 4300 ft.
 Leg. J. D. S. N. Apr. 1899. (fol + flr.)

P. gratissima Benth.
 Panama. Sutton Hayes 1856
 "Cura aguacate" flr. Jan.

P. sp.

Cura de anis:

Med. granada, prov. of Bogota, Colombia.
 1855. alt. 1600 ft. 3 br. Sept.
 Coll. J. Triana 2027.

SIZE

FORM uniform, variable; symmetrical, unsymmetrical; regular irregular; oblique, curved, gourd-form; globose, broad, narrow, obovoid, elongate pyriform; collared; necked; ribbed.

BASE central oblique; truncate rounded; furrowed, wrinkled, smooth.

APEX truncate rounded; Style attachment at apex oblique depressed even mammillate mucronate, furrowed wrinkled smooth.

STEM short medium long; length in cm slender, stout. Position straight or inclined; Color; Perianth conspicuous or wanting. No. vascular bundles.

RIND surface smooth, grained, pebbled, warty, knobbed, glossy, dull; thickness; character callous, coriaceous, membranous, brittle, pliable, inner surface without or with grit; Thickened at point of style attachment. Color of main surface. Ground color. Color of warts. Aroma spicy, anise, wanting. Lenticels on warts or main surface, depressed, even or raised. Color, shape

FLESH firm, soft; color near rind, toward seed cavity; depth of both zones; total thickness of flesh; texture melting, buttery, Oil abundant, moderate, scant. Bundles next rind in a single series of clusters, irregularly placed, tough or easily broken. Bundles next seed cavity many, few, in one or two series, irregularly placed; fine in outer, central or inner series, at stem end of fruit; distal end of seed, throughout, coarse in outer, central or inner series, at stem end of fruit, at distal end of seed, throughout. Flavor nutty, insipid, mild, strong, next rind, toward seed cavity; delicate, rich, watery. Quality inferior, fair, good, best. Seed cavity oblong, globose, oval obconic; seed loose in, filling cavity.

SEED globose, oval, ovoid, conic angular, oblique, truncate rounded, depressed, emarginate at base, rounded or pointed at apex. Length, thickness, seed coats loose or tight. Color, scar color. Form, size of scar. Hilum in center of scar or exarctic.

SEASON

KEEPING QUALITY

SHIPPING QUALITY

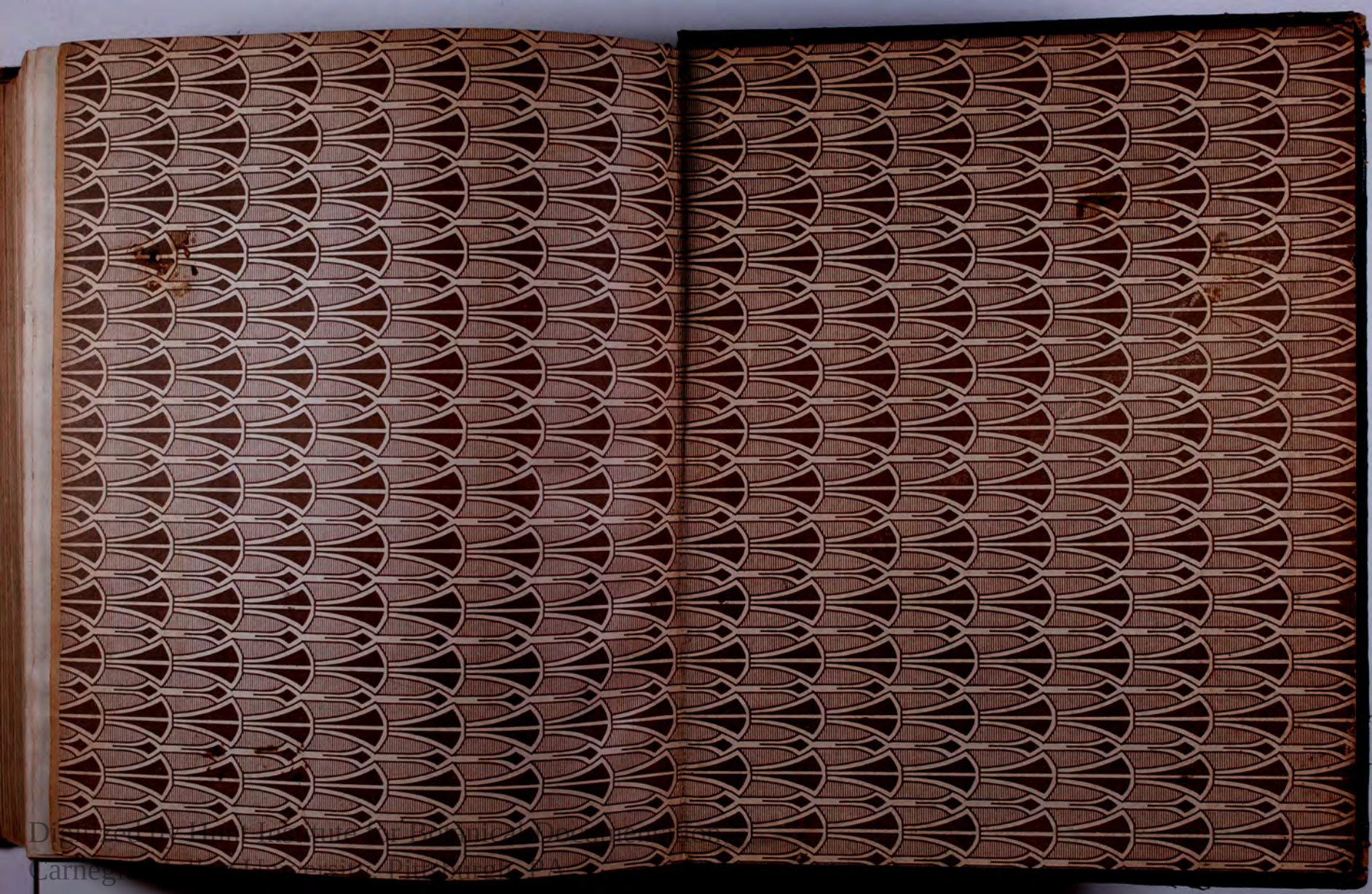
RESISTANCE to diseases and insects

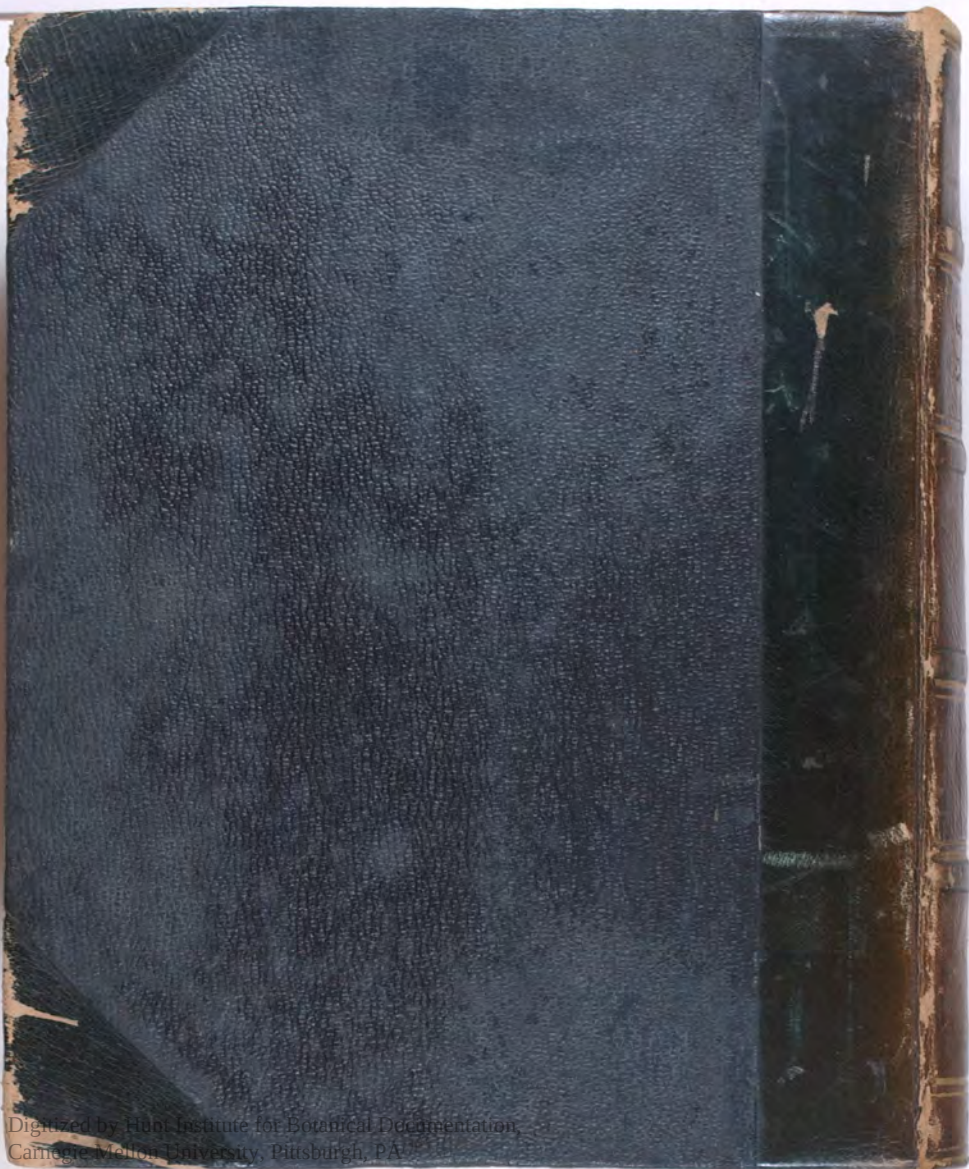
TREE vigorous, weak. Yield medium, heavy, light.

Schedule of Avocado Sigs.

Very small	Below 5 ozs.
Small	5 to 8 ozs.
Below medium	8 $\frac{1}{2}$ to 10 ozs.
Medium	10 $\frac{1}{2}$ to 14 ozs.
Above medium	14 $\frac{1}{2}$ to 16 ozs.
Large	16 $\frac{1}{2}$ to 19 ozs.
Very large	19 $\frac{1}{2}$ to 24 ozs.
Extremely large	Above 24 ozs.

"It is the settled appointment of nature that soft soils should breed soft men, and that the same land should never be famous for the excellence of its fruit and the vigor of its inhabitants." - Herodotus (quoted by Maxm. in "Defenseless America")





Tactic, Guatemala, December 12, 1916.

The common tree Dahlia is extensively used here to form hedges. The stout stems are cut and inserted in the ground, projecting 3 to 4 feet above it. They take root and grow, and after sending up stout stalks to a height of 10 or 12 feet they produce quantities of lilac-pink flowers, 3 to 5 inches across. Just now they are in all their glory here, and the town is literally brilliant with them. This strikes me as being an unusually fine decorative plant, and one which should be more widely employed in the United States. Besides the typical form, single pink, there is a double white form grown here, but it is not common. It may be a distinct species,--I don't know. The people here say it is a wild plant. Like the pink variety, it grows to 10 or 12 feet, and has stout hollow stems up to about 2 inches in diameter. Its flowers are very double, pure white, and 3 inches or slightly more in diameter. They are well formed, and in my opinion fully equal to those of many of the cultivated dahlias of northern gardens.

Don Matias Acevedo says that the water contained in the hollow stem (a small quantity between each two nodes) is medicinal. It is used here against viruela, as a gargle, preventing the throat from becoming stopped up.

The tree dahlia is called shikor in Pokomchi. The

white variety is much used to adorn the images in the churches and houses. The pink variety is not used for this purpose.

After walking over the town thoroly, I find there are three varieties here; the single pink, which is apparently the typical form, and by far the most common; the double white, not common, but seen in quite a few gardens; and the single white, apparently quite common. It is similar to the single pink, but pure white in color.

Purulá, Baja Verapaz, Guatemala. December 17, 1916.

I saw here in the garden of Santiago Mendocsa a double pink tree dahlia. This makes four varieties, the single pink, single white, double pink and double white.

In Quekchi this dahlia is called tzoloh

Notes on Dahlia coccinea (?) from the Guatemalan
Journal of Wilson Popenoe.

-o-o-o-o-o-o-o-o-

Santa Maria de Jesus, Depto. Zacatepequez, Oct. 30, 1916.
Coming up from Antigua we saw many plants of the wild
Dahlia which is found in these regions. It seems to be
uncommon below 5200 feet, and its principal zone appears to
be from 5500 feet upward. I have not yet been to the
upper limit of its zone (elevation at Santa Maria 6700).
By some of the Indians it is called tunaito; by others
papalot. I have been unable to find any name for it in
Cakohiquel. The literate natives call it Dahlia.

Antigua Guatemala, October 23 1916.

On the return trip from Guatemala I collected some specimens
of the wild Dahlia about 2 kms above Santa Lucia, at an
approximate elevation of 6800 feet. The plant seems to be
most abundant at this elevation; I have not seen it as low
as 5000 feet, but have found it up to 7000, which is as
high as I have gone. I do not know how much higher it may
occur. The plant, as observed near Santa Lucia, grows to
about 4 feet in height. The stem is dull greenish purple
to purplish green, usually glabrous but sometimes with
scattering hairs toward the upper portion. Leaves
2-pinnate near the base of the stem, 1-pinnate above, the
leaflets ovate, acuminate, 2-1/2 inches long, 1-1/2 inches
broad, remotely dentate, sparsely furnished with short

bristly hairs, most sparsely on the under surface.; rachis up to 5 inches long (often very short); petiolules 0 to $3/4$ inch long. The flowers are 2 to 3 inches broad, with 8 ray florets. The latter are all infertile, and orange brown to crimson in color. They vary greatly in form, some being short and broad, others long and more slender. The shortest and broadest measured was $1-3/16$ inch long, $5/8$ inch broad, the form being broadly obovate, obtuse at apex; probably the commonest form is oblong-obovate, rounded to broadly acute at the apex, $1-5/16$ inch long by $5/8$ inch broad; the slenderest measured was 1 inch long by slightly less than $1/2$ inch broad, sharply acute at the apex. Another one proportionately slender was $1-7/16$ inch long by $5/8$ inch broad. I have commonly noticed that in many of the larger flowers with proportionately slender ray florets, the edges of the florets recurve, giving the flower the appearance of a cactus dahlia; as opposed to this, in many plants the ray florets are outspread. In the flowers which have very short and broad ray florets the edges are sometimes slightly incurved.