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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.

COIT AGRICULTURAL SERVICE

J. ELIOT COIT, PH. D.

690 OCEANVIEW DRIVE • VISTA, CALIFORNIA

Mr. Wilson Popenoe,
Rancho California,
Almunacar, Granada, Spain.

Dear Wilson:

Thanks a lot for your very informative letter just received. Read it over four or five times. Thanks also for your complements with respect to my article on avocado varieties in the current Yearbook. I am very glad to hear that the avocado buds sent from California took so well. They could grow a lot of avocados in Spain if the people there could get over their dislike for the taste of the fruit.

Here is an item you will be interested in. The Duke variety which I found near Oroville, Butte county, named and distributed many years ago, now assumes great importance because its seedlings have been found to be resistant to root rot. Dr. Zentmeyer has grown thousands of Duke seedlings in heavily artificially infected soil. He finds some susceptible, some resistant and a good number apparently immune. Duke cuttings root easily and from the best of the immune seedlings he has rooted cuttings which so far retain their immunity. A supply of such material may soon be distributed to nurserymen.

Yes. Ticho have cooperated very closely in carob work. I had a letter from him last week in which he recounted some of his findings during his carob survey of Cyprus. We have the Israel No. 3 growing from last year's budding and I have named it "Aaronsohn". If I remember correctly, the miss Aaronsohn of whom you speak was at Berkeley in 1914 or 15 and attended some of my lectures there. I telephoned Chas. Swingle at Papa, Pala California. He told me that Maude Swingle is now visiting in San Francisco but that a letter addressed in care of Dr. Ivey Reed, 315 Westbourne St., La Jolla, Calif. would be forwarded to her.

I am afraid you may be shocked and disappointed when I tell you that on account of the tremendous revolution in retail marketing of fruits and other grocery items throughout the United States, it is becoming impossible to sell any kind of fruit for which there is not already a strong market demand. The chains of supermarkets are rapidly putting small grocers out of business. With avocados it may soon be Fuerte and Hass only, with no chance to test marketability of new kinds and little incentive for the Society variety to continue work. With apples it will soon be only Gravenstein, Pippin, Rome, Delicious and Jonathan. With pears; Bartlett and Winter Nellis; with grapes, Thomson seedless, Muscat and Emperor. Etc.

The meat is mostly cut into slices and packaged with a price mark on each package. Every square foot of shelf space is ticketed for the required rapid turnover, and if it does not turn fast enough, that item is dropped. With self-service everything is packaged, even ready cooked mashed potatoes. More and more Irish potatoes, fruits and some vegetables are packaged. As I see it coming, there will be small chance of improved varieties of such fruits as cherimoyas, loquats, guagas, white sapotes, feijoas etc. ever to achieve commercial status. We hope they may continue to be planted in home gardens at least.

Our carob crop is maturing in good shape. I will spend tomorrow taking notes on some eleven kinds bearing for the first time this year.

Before returning to Antigua I hope you will be able to visit us here.

If so let me know in advance so I may be here to meet you.

With kind regards to both you and Mrs. Popenoe, I remain

Very sincerely yours,

Chemical Analyses of Carob Varieties by U.S. Dept. Agr.
1957 Crop Grown At Demonstration Orchard at Vista.

Flesh of pod without seeds.

Name	Origin	Sugar	Protein	Fiber	Ash
Sfax	Tunis	51.6%	4.44	4.9	1.74
DomiciKrup	Yugoslavia	51.0% 51.4	4.63	6.8	2.22
<i>Herm</i> Conejo	Vista	50.4	3.75	7.2	1.75
Casuda	Spain	49.7	4.44	5.3	1.69
<i>Herm</i> Santa Fe	Whittier	47.5	4.44	6.4	1.77
Tylliria	Cyprus	47.4	4.50	5.5	1.98
Sykea	Greece	45.5	5.19	6.5	1.99
Feminello	Italy (Fe)	44.6	5.00	6.9	2.37
Antonio	Rancho Santa	44.0	4.19	8.3	2.00
White	Riverside	44.0	5.13	5.9	2.13
Mockingbird	"	43.1	4.75	6.9	1.92
Apex	Rancho Santa Fe	43.1	3.81	7.2	1.75
Mekis	Yugoslavia	42.9	4.88	5.5	1.84
Diego	Rancho Santa Fe	42.9	4.63	8.5	1.55
Francisco	Riverside	42.4	3.69	8.0	1.78
<i>Herm</i> Bolser	Rialto	42.3	3.38	7.1	1.92
Melrose	Vista	41.9	3.69	8.2	2.05
Sipanski	Yugoslavia	41.9	4.06	5.4	1.82
Fornay	Spain	41.6	4.25	7.3	1.86
Sobrante	Riverside	41.5	4.50	7.8	2.03
Castaludes	Spain	41.3	6.13	6.1	2.28
Dickerson	Santa Barbara	41.2	4.38	7.9	1.69
Excelsior	Ontario	40.7	3.31	8.0	1.84
Gorduro	Rancho Santa Fe	40.6	5.00	7.3	1.75
Mathews	Riverside	40.6	5.44	7.4	2.22
Fargo	Rancho Santa Fe	39.7	4.44	9.6	2.22
Molino	Rancho Santa Fe	39.4	5.38	9.2	1.83
<i>Herm</i> Domino	Vista	38.3	6.63	7.8	2.38
Laguna	Laguna Beach	37.1	5.25	8.6	1.98
AVERAGE		43.3	5.00	7.2	1.95

Antigua, Guatemala, 2 January 1958

Dr J Eliot Coit,
Vista, California

Dear Doctor Coit:

While I have no doubt you received a copy of "LA HACIENDA" in which they published the paper on Carob which you brought down here, I am including the necessary pages herewith. Because of the extensive circulation of this magazine, by far the best we have in this field, I felt sure your paper would be more valuable if placed there than if we published it in CEIBA; and in the past year, I regret to say, we have had a hard time with CEIBA.

I am also sending a copy of a report which I prepared recently for the government of El Salvador. They invited me over there to make a study of possibilities, which I did with the understanding that I would only tackle the job if they agreed to implement my findings. The report is based on two months' observations, during which time I covered the country pretty fully, and on observations in Honduras and Guatemala; hence I think it brings down to date, within the limits of my own lack of knowledge and experience, the information presently available. The government of Salvador approved three nursery sites which I selected and many seedlings have been planted for later grafting. Our problem is: we do not have good propagators available and they have got to be prepared and fast. A hopeful feature is that Ernest Mortensen of Texas, of whom you must know if you do not know him personally, has recently come to Salvador with the Point Four boys and has supervision of the program.

I am hoping to get off at the end of this month for the US, then Spain and points East; I hope to visit Israel where I believe those lads are doing a wonderful job against odds which would stagger us Californians.

Warmest regards always,

Rancho California, Almuñecar (Granada)
SPAIN. 26 April 1958

Dr J. Eliot Coit
Vista, California.

Dear Doctor Coit:

Here we are, established very snugly in this lovely little valley on the Mediterranean coast - a valley which I am sure contains more grafted cherimoya trees than any area of comparable size in Spain or California or anywhere else in the world. Must be 150 acres or more in production. I don't know whether or not you have been in this particular valley, on your Carob work; maybe you have. And speaking of Carobs, I have just heard from Robert Ticho over in Israel, who says he is going to Cyprus for the month of August on Carob work. Helen and I plan to go to Israel in July, and later to the Canaries when the avocados there will be in season.

The future of the avocado here in Southern Spain looks very bright. Climatic conditions seem more favorable than in either California or Florida. What we need are varieties. There are perhaps 100 Mexican seedlings on this coast, and only one grafted tree so far as known, and when we went to see it a few weeks ago it turned out to be my Benik, sent over here from Washington perhaps 15 or 20 years ago. Maybe Knowles had something to do with it!

As we become more familiar with things here I shall be writing you. There is a lot to see - for example this valley is quite a producer of loquats - second in importance to cherimoyas - and of course mostly seedlings, but Tanaka and Early Red are here, just getting established. What I want to ask now is this: Will you give us your assistance in connection with the avocado project? Art Schroeder has promised to help, and I know he will, but I don't want to miss any bets. We have here some 200 Mexican seedlings in orchard form, 2 to 6 feet high, which we propose to graft by the veneer system, which has already given excellent results at this particular place. It seems that all three races of avocados can be grown here - because they are already here and growing well, but on a very small scale. We are hoping to get Simmonds and Waldin and Choquette and Lula and one or two others from Florida. Hass and Fuerte are already here, a few trees of each, and I am not sure that the Fuerte is a good strain - it came here from the Canaries. I am thinking of a good Fuerte for coastal areas from California, and of Bacon and Rincon and Zutano. What do you say? And would - or could - you send us half a dozen scions of these and any others you might think worth while, terminals to be used for veneer grafting, rather mature material, by first class air mail (just like an air mail letter) addressed to Sr don Luis Sarasola, Rancho California, Almuñecar (Granada) Spain? We shall of course be glad to defray all expenses. We would like material as soon as possible, as we should do our grafting in May. No documentation needed, any more than for an ordinary air mail letter. I know you will help us out if you can do it without too much inconvenience.

Warmest regards always, and you will be hearing from me once in a while.

Ever yours,

Wilson Coe

COIT AGRICULTURAL SERVICE

J. ELIOT COIT, PH. D.

690 OCEANVIEW DRIVE • VISTA, CALIFORNIA

May 4, 1958.

Dr. Wilson Popenoe,
Almuncar, Spain.

Dear Wilson:

Your letter of April 26th was here last evening on my return. Very glad to hear from you. Was about to write Paul to try to get your address. Happy to hear that you are so well situated and doing things you enjoy. I hope you can send Schroeder some fine varieties of cherimoyas. One of my clients here at Vista just finished harvesting his crop of Booth cherimoyas yesterday. 350 boxes for which he will receive about \$5. per box.

While I studied carobs in Italy, Greece, Cyprus and most of Southern Spain, I did not get down to Malaga as planned. One of my old clients who has a large citrus, almond and olive farm (225 acres of Wash Navels) near Jativa, made us his guests the entire two weeks in Spain and furnished a car and driver. He kept me at his farm so long, we ran short of time; took the train from Jativa to Granada for a visit to the Alhambra and then the train to Madrid and air to France. Mrs. Coit's older son by her deceased husband is a major general, U.S. Army, stationed at Orleans in charge of transportation and communications of U.S. Forces in Europe. We had not seen him in years and He entertained us royally in France. You can imagine how Louise tugged at me to finish the carob work and get on to France, London, Edinburg and home.

This morning I took a trip to visit several ranches and see what avocado varieties I could get for you. As soon as the P.O. is open tomorrow I am sending you by first class air mail as directed scions of Zutano, Bacon, Lodge, Nimlich, Leucadia, Edranol, MacArthur and Rincon. I put in the Nimlich because I believe one of my clients here has the only Nimlich free from virus left in the state.

I doubt if I can mail the package because they hold me up at the P.O. here to make out a declaration of contents, value etc. etc. If I admit the package contains scions (alive) they will demand a certificate, and the inspector will likely say that all living plant material of any kind is prohibited entry to Spain. I have been trying to send a few cuttings of the Wonderful variety of pomegranate to my friend at Jativa, no luck so far. However, there is no harm in trying. I should think that Schroeder, or the people at the Citrus Experiment Station at Riverside are in a far better position to get stuff through than I. They have a large representative collection of avocado varieties at both U.C.L.A. and Riverside.

Frank Magdahl, son of Roger of Chili has visiedus here and is now establishing his own tropical fruit nursery in central Mexico.

When you go to Israel, please do this for me. Find out how carobs do in the dry Jordan Valley with adequate irrigation. I have hesitated to recommend carob for our Coachella and Imperial Valleys because shade-tree seedlings on the streets there have pods with only shuck and seeds. I fear that the high heat may force maturity before the sugar develops. But I don't know.

After 7 years of terrible drouth we had fine rains the past winter. Our carob trees have never had a drop of irrigating water. They have done well, but would doubtless have done better with more nearly normal rainfall. We have 60 varieties; 19 from Europe. Last fall we had enough fruit on 29 varieties to have analyses made by the U.S.D.A. Research Lab. Three kinds ran better than 50% sugar, or better than the same when grown in Europe. We have such a large crop of Fuerte avocodos this year the price is very low.

Louise and I send best regards to you and Mrs. Popenoe, and we hope to hear from you often. Cordially yours,

Rancho California, Almuñecar (Granada) Spain.
15 May 1958

Dear Doctor Coit:

Your letter of 4 May arrived some days ago, and yesterday the package of avocado scions, in fine condition. Accept our best thanks, and I enclose my check in the amount of \$5 to cover the postage. If we owe you anything more, please advise. It is very good of you to help us out. With the material received from you and from Art Schroeder and from Florida and from Magdahl in Chile we now have about 15 varieties grafted here. If they all stick we will have a splendid variety collection which may - and I believe will - be the foundation of a nice little avocado industry on this coast. I may have told you that the few people around Malaga who have Mexican seedlings are getting the equivalent of a dollar a kilogram for their fruit, right at the grove. It goes to Madrid where it sells for double that price. There is not much, of course. I suppose the Latin American diplomats and the Latin American students in Madrid gobble up all the avocados they can get, at any price asked.

I have written Art Schroeder about sending Cherimoya budwood from here. Art says interest in this fruit is on the wane in Calif, but it certainly would be worth while to have a few of the best varieties from this valley - where I now find there are almost 250 acres of grafted trees, no named varieties but a lot of selections which are probably good.

We are leaving about 10 June for Italy, Greece, and then Tel Aviv. I will see what I can do about looking into Carob culture in the Jordan valley; we won't be able to go into Jordania because of the row between the Jews and the Arabs, of course.

The budwood Art Schroeder (scions, I mean) sent came through in five days, yours in ten. In polyethylene it doesn't seem to matter very much. Art sent his in manila envelopes, four in all, just as ordinary air mail letters. We are getting wonderful cooperation from the people in the postoffice here. They even call on the phone to say there is a package waiting which is probably avocado material, and we send right over to town and get it.

Try sending your friend at Jativa some pomegranate cuttings in an air mail letter. If they won't receive it at Vista because it contains plant material, mail it somewhere else - maybe through Art. I wouldn't take chances bringing in any Citrus material but I can't see we are taking any chances of hurting Spain with avocados or pomegranates.

Helen joins in best regards to the señora and yourself, and with renewed thanks,

Sincerely,

Rancho California, Almuñecar, (Granada)
8 Sept 1958

Dear Doctor Coit:

Just back from an interesting 10 days in the Canary Islands, more properly, on the island of Tenerife, the largest of the group. Never have I seen such intensive banana culture - they export 300,000 tons of Cavendish every year. Also a huge quantity of winter tomatoes, mostly to England, and some potatoes. Of course I went to see their tropical fruits; not as much as I expected. There are perhaps 2000 to 2500 West Indian seedlings on Tenerife, and a few Cuban mango seedlings. In the last few years two or three people have begun to plant grafted avocados, mainly Fuerte; probably not more than 250 trees now set in orchard forms. They have three other varieties: Jema which is believed to be a seedling of Fuerte; Java which is not from Java at all but is either a grafted variety from California or a seedling from California, and almost certainly a Guatemalan; and Tesen which is a local West Indian selection. They have experimentally quite a few other varieties from California but are not really doing very much with them. Their mangos are few and poor; Cuban seedlings with plenty of hair in them. The climate is extraordinary; I saw one fine coconut palm in Santa Cruz, 35 feet high with a good crop of nuts. A few white sapote trees - we discovered this by seeing a few fruits in the market. They ~~not~~ think much of this fruit. Quite a few papayas, and here is another anomaly: those confounded papayas live and keep on producing fruit for 20 years or more.

The Jardín de Aclimatación de Orotava is a joy; founded in 1788 and has kept going ever since. Small, but just full of grand old specimens from all over the world. I had known of it all my life of course, and 40 years ago had corresponded with Juan Bolinaga who was the head gardener. Now retired. I went to see him; he is very feeble and said "At times I can not even remember my own name." The present head of the work is Andrés García Cabezon, a rather young Spaniard from Madrid who studied in California, mostly at Riverside I believe. A first-class man.

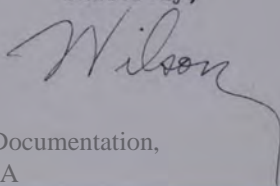
We brought back 299 seeds of West Indians for rootstocks, had a hard time getting that many. You have to buy fruits in the market at about 10 cents each to get any seeds at all.

Many thanks for your letter which I found here on our arrival last week. George Zentmyer has written me about Duke; wanted to know if I had any information regarding the history of the parent tree, and I told him I do not.

We had been planning to go back to Central America before the end of the year, but the best publishing house in Spain, Salvat Editores of Barcelona, is hounding me to prepare a "Manual Práctico de Fruticultura Tropical" and I may decide to sit down here on the sunny Mediterranean coast for the winter and whip it into shape. I believe it might be worth while as we have no general treatment of tropical fruits in Spanish. I would like to watch these avocados for a while longer, anyway. Dr Oppenheimer of Israel is due here the 23rd to spend a week on this coast,

With best regards always,

Sincerely,



COIT AGRICULTURAL SERVICE

J. ELIOT COIT, PH. D.

690 OCEANVIEW DRIVE • VISTA, CALIFORNIA

September 12, 1958.

Dear Wilson:

Thanks for your letter of Sept. 8th in which you tell me about your investigations in the Canary Islands. A client of mine recently visited that place and told me about the wonderful bananas raised there.

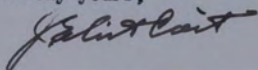
Glad also to hear that you plan to write a book in Spanish on tropical and subtropical fruits suitable for Spain.

Inasmuch as Spain is the largest producer of carob in the Mediterranean countries, about 600,000 U.S. tons per year, Perhaps you should include some carob material. Under separate cover I send you by surface mail a collection of recent printed matter on carob and its products. If you have questions, I will be glad to try to answer them.

We will be harvesting our carob varieties in about two weeks. Here the market demands worm free pods. In Spain they pay no attention to worms because carob is used mostly as cattle feed and manufacture. We have 60 varieties under test. Of these about ten are immune to worm infestation and this includes some of the best. Some kinds are only slightly subject to worm infestation, such as Tylliria and Amele. We have some kinds which are so wormy that last year I had to haul them to the dump or give away to a neighbor to feed his pony.

I introduced the Duke avocado, had it registered in 1925. I have the complete history of it and will be glad to write Dr. Zentmeyer about it. It originated in Butte county about 150 miles north of Sacramento.

Very sincerely yours,



Rancho California, Almuñecar (Granada)
12 October 1958

Dear Doctor Coit:

Many thanks for your letter of 12 September and the Carob literature which arrived a week ago. I had no idea there was already so much commercial interest in the Carob in your part of the world. I assume you are responsible for most of it! I am going to Barcelona in a week or so to discuss the forthcoming book with the publishers and shall recommend that we include a brief treatment of the Carob, to which I do not believe there can be any objection. I shall not attempt to start work on the MS until I get back to Guatemala, probably in December, and when I work up the rough draft on Caron I will send it to you for criticism. I have just read what has been published recently on this crop in Spain (1955) and there is not much; you have developed much more information regarding culture than I find available here and with your permission I will lean heavily on what you have published, with due credit of course.

We had Chanan Oppenheimer of Israel with us for a week, and took him for a tour of the coast from Malaga to Valencia. Turned up two Puebla avocados in the experiment station at Valencia, one of them with quite a fair crop, the fruits now ripe and pretty good. But we are not going to push this variety here as I am sure we have better ones in the collection. We are having some trouble with the young grafted trees. Our soil is a fine silt loam, probably with a sodium complex instead of lime, and it does not drain well. I see no signs of Phytophthora root disease but the trees go chlorotic on us. West Indian rootstocks seem to be more resistant than Mexicans. In the irrigation ditches water stands for 24 to 36 hours without going into the soil. I don't like the situation too well but once the trees get up to 6 ft in height, or so, they seem to go ahead.

We received 15 Brewster lychees from Florida. Ten of them are breaking into growth. This tree may have a future in southern Spain. We have discovered two or three more avocado seedlings in the Malaga and Motril regions which look promising; seem to be WI x Mexican hybrids, and well worth propagating. Incidentally, it is quite a job getting young plants over here by air express. The simple thing is budwood by air mail.

Faithfully yours,

Antigua, Guatemala, 17 Jan 1959

Dear Doctor Coit:

We reached home a few days before Christmas - had lunch in Madrid and supper the following evening in Antigua. Pretty nice, only that supper cost us \$800 - that is to say, the airplane fare from Madrid to Guatemala City. We had expected to come home free, but the bananas at Tiquisate here in Guatemala blew down and there were no banana boats coming this way.

Before settling down here for the rest of my natural life I want to re-visit California, so we have booked as far as Mexico, where I will spend a few days with the Rockefeller crowd and then we go on to San Francisco. Between the 5th and 15th of Feb I hope to be in southern California and most certainly want to spend an hour or two with you to talk about carobs (in which I have, as a matter of fact, become quite interested) and some of the other things I saw in Spain and Israel and the Canaries. What a trip! In some ways, the most interesting year of my life.

So this is just a warning.

Ever yours,

Wilson Pogence

COIT AGRICULTURAL SERVICE

J. ELIOT COIT, PH. D.

690 OCEANVIEW DRIVE • VISTA, CALIFORNIA

January 22, 1959.

Dear Wilson:

Yours of the 17th is received and I am glad to hear that you are safely back home again. I am also happy to learn of your planned visit to California in February. I am still quite busy managing and or supervising some ten fruit ranches, seven in San Diego county and three in Santa Barbara county which, as you will remember is 200 miles north of here. Therefore I am away from home or out of the office a good proportion of the time. If you will let me know a day or so before your visit to this county, I will be glad to arrange my schedule so as to be sure to be here. I wish you to see the carob demonstration orchard, which is now in bearing.

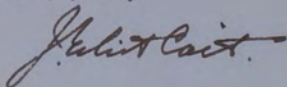
When you are in Mexico City and in touch with personnel of the Rockefeller operation there, please find out if they may be interested to any extent in tree crops. At my last visit I gathered that they are working mostly on annual crops; beans, tomatoes, peppers, corn etc.

The Mexicans are showing more interest in carob than Californians so far. Our largest commercial planting is in Baja California, near Ensenada.

This year the weather here is distressingly "unusual". After a series of dry winters, this one breaks all records. At this date we have had no rain except a few "mizzles" which hardly dripped from the eaves and were quickly blown away by desert winds. Our hills are still brown with not a blade of grass showing. Cattle men have their herds in pens and are feeding them.

Let us know when to expect you and BRING ALONG SOME RAIN!

Cordially yours,



Antigua, Guatemala, 4 March 1959

Dr J Eliot Coit,
Vista, California.

Dear Doctor Coit:

On getting back here a week ago I found your letter of 22 January, in which you requested that I let you know before trying to see you at Vista. I guess Art Schroeder must have done so, or maybe we just had luck. Anyway we saw you, and it was a mighty pleasant visit, so far as I am concerned. I still look back on that packing house scene; it has made quite an impression on me. Never thought there were so many Fuertes in the world, all at one time, and all in one place. I keep telling my friends down here about my experience in Pasadena, when ~~she~~ *my aunt* came in with the morning paper and said "Look at this; three Fuertes for a quarter" and I said "I dont want to see it, I dont like the idea at all". And when she asked Why, I said no grower can make much money growing Fuertes when they sell three for a quarter".

Perhaps I didnt tell you, when we had that pleasant visit, that I stopped in Mexico City on the way to California and a long talk with Ralph Richardson of the Rockefeller Foundation about their interest in fruit crops. As you say, their work has been limited to cereals and vegetable crops, but when we were in Mexico almost two years ago for the ASHS meeting, Ralph told me they might go in for fruits. Later I learned that they were not able to start anything; and this time Ralph said they approached the Minister of Agriculture about a program for tropical fruits. The Minister is much interested in the subject, but Ralph said they dont know as yet whether he will ask them to take charge of the program or whether the govt will do it. If the Foundation enters the picture, Ralph says it will be on tropical fruits only - which I think is a good idea; they are doing pretty well in Mexico, already, with apples and peaches and other deciduous fruits; and he asked me if I would come up for a time to help plan to the program. I told him if I am still alive when they get it going, I will be glad to do so. He think it wont be earlier than the beginning of 1960. If this program develops, I believe you could get carobs into it without any trouble, and it would be worth doing.

With best regards to the señora and yourself,

Faithfully yours,

Wilson Popenoe

COPY OF FADED LETTER

Antigua, Guatemala, 12 July 1959

Dr. J Eliot Coit,
Vista, California.

Dear Doctor Coit:

Just back from Mexico, where I took part in the III International Course in Horticulture under the auspices of the Organization of American States. Two weeks before, I took part in the annual meeting of the Caribbean Region, ASHA, at San José de Costa Rica. Pretty good meeting, some 40 members present. This Caribbean group is a going concern and we must work to keep it going. They voted to meet next year in Puerto Rico which is going to be difficult for us Central American members, but will bring in more of the boys over in the Islands, and I think it is fair to give them their turn.

Something is going wrong with our avocados. I was in Venezuela for three weeks in June; some 60% of their avocados are dead or dying. And now in Mexico last week, I saw more dead avocados than I have ever seen before. What is it? Is Phytophthora gaining ground on us or is it we just haven't had our eyes open? In Venezuela I only saw half a dozen trees more than 25 years or ago. It seems something hits the trees about the time they are 10 to 15 years old and they pass out. The situation at Querétare in Mexico shocked me.

Main reason for this brief letter is to ask if you know anything about the paper I sent Marvin Rounds for the Yearbook, covering my work of last year in Spain and around the Mediterranean. I sent it to Marvin at what I have as his home address, Glenodra I believe, and have not heard that he has received it. Would you check up on this? Perhaps he thought the paper too long and not just in the right vein. I tried to make it interesting, easy reading and at the same time a document of historical value. Maybe he feels publication will be too expensive. Or maybe he never got it. I sent it to him before I left for Venezuela about the first of June.

I am writing George Zentmyer about those dead avocado trees which I have been seeing so often, from Venezuela to Mexico. This business really has me worried. I met Dr. Boyce of Riverside at Mexico City last week and told him I have about come to the conclusion that we must limit planting, down here, to calcareous soils or very porous sandy soils.

Best regards always,

Sincerely,

COIT AGRICULTURAL SERVICE

J. ELIOT COIT, PH. D.

690 OCEANVIEW DRIVE • VISTA, CALIFORNIA

July 30, 1959.

Dear Wilson:

Your letter re article for Yearbook was received some time ago, but I have postponed reply until I could make contact with Marvin Rounds. He now writes me that he has the article and the next time he is in Vista will call here and let me read it over.

We had a fine meeting of the Western Section ASHS in San Diego which I enjoyed attending. I got the Horticulturists of the University of Arizona to agree to establishment of a carob variety collection at Tempe State College.

With respect to avocado root-rot, I have been up to my neck in it for thirty years. I have seen its depredations in Mexico. The only place there where I did not find any is in the north part of the state of Nuevo Leon along the Rio Salado around Sabinas Hidalgo. Here there are hundreds of old Mexican type seedlings 75 feet high with trunks three feet in diameter scattered around the town. Also a half dozen commercial plantings in which I saw no root-rot. This is desert country of limestone formation.

I am not at all surprised at your finding so much root-rot in Central and south American countries. While occasionally the trouble may be due to *Dematophora necatrix* root-rot, I believe most of it is due to our old enemy *Phytophthora cinnamomi*, the common soil fungus.

It is impossible for avocados to suffer seriously with this disease unless excess soil moisture and this fungus occur TOGETHER. In the countries you mention there are many other host plants: papaya, Pomegranate, Jacaranda, camelia etc. etc. It is likely that the avocados are very seldom on virgin land which is being irrigated for the first time in the countries you mention. Therefore much of it may have the fungus when the avocados are planted.

I supervise a very profitable 75 acre avocado orchard in Santa Barbara county planted on heavy black adobe soil. Previously it has always been dry-farmed to beans. By planting the seeds in orchard spacing and budding in place later, and by rigorously prohibiting the introduction and planting of any balled trees, the fungus was excluded from this orchard. Where a valve leak occurred the nearest tree turned yellow. When the leak was fixed the tree recovered which it could not have done if any of the fungus had been present.

Thousands of acres of our new avocado plantations are planted in virgin soils being watered for the first time. There is no reason for these to ever ~~be~~ have root-rot so long as the fungus is excluded.

Growers in tropical countries do not understand the life history of cinnamon fungus as we do here. The 40 acre Fuerte and Hass orchard of our friend Henri Gilly near Atlizco was, the last time I saw it, three years ago, fast going out with root-rot as the result of flooding. Where the ground was not properly leveled the water often stands in pools a week or more. Frank was there recently and tells me that Gilly was still shipping avocados at very fancy prices to both Mexico city and Monterrey from the remnants of his formerly good orchard.

The system of flood irrigation, so common in tropical countries will eventually kill avocado trees unless they are on virgin soil free of the fungus. If our friends toward the south were able to have plastic pipe with a sprinkler by each tree, they could control soil moisture much better and retard the spread of the fungus.

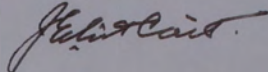
Around Arcadia, California the soil is light sandy gravel forty or more feet deep with no clay layers. I know some fine forty year old avocado trees which I believe have acquired the fungus from other host plants. But the trees still look fine. Under these conditions the fiber roots grow much faster than

While many Vista orchards have gone out because they were planted before we knew enough about this fungus. Still there are a number of old orchards here which are still healthy. They should remain so provided no replant trees are brought in with the fungus within the balls. My ideas here expressed are derived from thirty years of experience working with avocados throughout southern California. I get such ideas from field work rather than from the laboratory. In my opinion it would be better to emphasize the benefits from excluding the fungus rather than spend so much effort trying to develop a resistant root-stock which would permit avocados to be planted on already infected land.

It would indeed be a sizable job to educate all prospective avocado growers in tropical countries in root-rot technology.

If you survive this too lengthy epistle, please let me know your reaction.

With best regards,
Sincerely yours,



COIT AGRICULTURAL SERVICE

J. ELIOT COIT, PH. D.
690 OCEANVIEW DRIVE • VISTA, CALIFORNIA

July 30, 1959.

Mr. Wilson Popenoe,
Antigua, Guatemala.

Dear Wilson:

Soon after my last letter to you was mailed, Marvin Rounds called and let me read your article. He said he sent you a letter of acknowledgement and thanks which you may not have received.

The article is long but considered well worthy of the space. It is not only all in press but was preceded by an introductory editorial paragraph. I consider it very interesting, especially as it adds greatly to our present knowledge of avocados in the Mediterranean region.

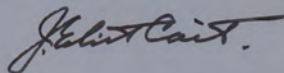
The forthcoming Yearbook will contain another article of exceptional value by Doctor Horace F. Pierce of Santa Barbara. He reviews the recently developed findings with respect to the two classes of fats in the diet; hard fats (beef, hog, sheep etc) and vegetable unsaturated fats (Avocado, olive, corn, peanut etc.etc.)

It has been shown that an excess of the hard saturated fats or hydrogenated and hardened vegetable fats such as Crisco, Cotaline, etc., is the primary cause of accumulations on artery walls resulting in high blood pressure and finally Atherocoronary-sclerosis with fatal or near fatal heart attacks.

Dr. Pierce states that among the several soft vegetable fats so far tested, avocado oil is tops in counteracting the deleterious effects of any excess hard fats in the diet, and in keeping arteries and heart in good condition.

I hear that Calavo will have thousands of reprints printed for general distribution.

Cordially yours,



Antigua, Guatemala, 17 Sept 1959

Dr J Eliot Coit,
Vista, California.

Dear Doctor Coit:

Your letter of 30 July is mighty interesting. I wholly agree with your statement that it is impossible for avocados to suffer seriously from *Phytophthora* root rot unless excessive soil moisture and this fungus exist TOGETHER. This statement seems to me the Alpha and Omega, whatever they are, of the whole situation.

Now what I want to ask - and I am sending a copy of this to George Zentmyer because he probably knows more about the geographical distribution of *Ph. cinnamomi* than anyone else, does this fungus exist everywhere in the tropics, and subtropics? I shall not be surprised if he says Yes.

I assume it is present in Guatemala, probably plenty of it; but sometime or other when I talked with George he said he had not up to that time isolated this fungus from any avocado roots in this country. Maybe he has by this time. I would like to know if he has. Certainly we dont see many avocados dead or dying here, on these porous, friable volcanic sandy loams. I havent had a chance to see what has happened in recent years, down on the Atlantic side, in the old banana farms, which are on heavy, undrainable clays. I'll bet we can find some dead avocado trees down there.

My question is this: will avocados tolerate wet feet - heavy, sticky, undrainable clays, if *Phytophthora* is not present. I dont know, but you certainly could not sell me a piece of wet clay soil for an avocado orchard even if you gave me a written money-back guarantee that there was no *Phytophthora* in the soil. But of course George will say, alright, but you are going to bring in your young trees from somewhere and there will be fungus on the roots. I give up.

So far I stick to my present thesis, as expressed to Al Boyce when I saw him very briefly in Mexico a month ago: I will only recommend planting avocados in tropical America on (a) limestone soils or (b) very light friable sandy soils not necessarily of limestone origin. Maybe even that program isnt sound, but on the basis of what I have seen in this past year, I sure am scared of heavy wet clay soils.

Ever yours,

Wilson Popenoe

Dr George Zentmyer - cc.

COIT AGRICULTURAL SERVICE

J. ELIOT COIT, PH. D.
690 OCEANVIEW DRIVE • VISTA, CALIFORNIA

September 23, 1959.

Dear Wilson:

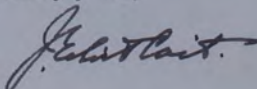
In reply to yours of Sept. 17th and in answer to your question "Will avocados tolerate wet feet-heavy, sticky, undrainable clays, if Phytophthora is NOT present"? They might tolerate such a soil for a time but should not be expected to thrive or be profitable, especially where irrigation is practised. In fact such a soil is not considered suitable for any kind of fruit trees with which I am familiar. Therefore your proposed recommendation appears sound.

However, I would caution you about Your assumption that avocados on limestone soils may be more tolerant of Phytophthora. I have not found it so. In 1926 I supervised the planting of an eight acre orchard at Goleta, near Santa Barbara. It was a steep hillside with white limestone at variable depths and outcropping at a few places. Balled trees from Los Angeles county were planted and irrigated by sprinklers from the first. Surface drainage was good and the trees grew well. However, during World War II the owner, in response to the appeal for more bacon to feed the troops, fenced the orchard for a hog pasture. When a pipe-line leak developed near the lower side the hogs found the wet place, rooted out a basin which filled with water in which they had a fine wallow. Soon adjoining trees began to die with root-rot. After the war the hogs were eliminated, but the root-rot slowly spread ever since in all directions, even up the hill. Now, about a hundred trees are dead or are in serious decline.

In tropical countries irrigated orchard land is seldom leveled as accurately as it is here. Thus the water may collect and stand in pools in some places. Just the thing for Phytophthora. I don't know to what extent avocados are irrigated in Guatemala. It may be interesting to find out if there is any root-rot in irrigated plantings. Did you irrigate the avocados at the school in Honduras? The Avocado Yearbook for 1959 is just out and you will be receiving it shortly. You will be much interested in an article by Zentmeyer describing recent work on the factors governing spore development.

When I was at Kew in London I learned about the commercial plantings of *Crataegus mexicana* in South Africa on dry lands for cattle feed. I got seeds from both Mexico and Guatemala and have tried it here. This project is now abandoned because the plant is native where rains come in summer and winters are dry. My 40 test plants here have all died this summer for lack of irrigation. Our irrigation water is far too expensive to use on Tejocote for cattle feed. But I have a fine specimen plant in my garden which is watered.

Cordially yours,



c.c.-Dr. Zentmeyer.

UNIVERSITY OF CALIFORNIA
AGRICULTURAL EXPERIMENT STATION

CITRUS EXPERIMENT STATION
DEPARTMENT OF PLANT PATHOLOGY
RIVERSIDE, CALIFORNIA

September 28, 1959

Air Mail

Dr. Wilson Popenoe
Calle de la Nobleza No. 2
Antigua, Guatemala

Dear Wilson:

I was very glad to have your letter in July and the copy of your recent letter to Dr. Coit, and am very interested in your comments. I have just recently returned from a trip to the AIBS meeting in Pennsylvania, and to Beltsville, Puerto Rico and Florida, and am finally getting around to some correspondence.

I was not too surprised with your report of the sad state of avocados in many parts of Venezuela, as I had heard something about this from Dr. Malaguti and others. On my brief visits to Venezuela I haven't been out in the areas where the root rot occurs, however. I met Malaguti at the AIBS meeting and heard some of the sad story from him too.

I did not realize that there is so much of a problem in the Queretaro area. When I was there in 1956, I saw some root rot, but there was also a lot of frost damage from the past winter's low temperatures.

You ask me to sit down and prescribe a cure for the avocados in tropical areas. I think the best hope is the things we are trying to emphasize here--a resistant rootstock. Some of the other approaches that I am trying, such as soil fungicides, systemic fungicides, organic amendments, etc., if successful, would have use under our intensified and irrigated system of avocado culture, but I doubt if such methods would be practical in the tropics. Resistance would be practical there as well as here.

Regarding your question on the distribution of P. cinnamomi, the fungus does not exist everywhere in the tropics and subtropics. The principal places where I have found it in tropical America are where the avocado has been brought under cultivation, as in your plantings in Honduras (both Zamorano and Lancetilla), at Orotina in Costa Rica, at Villa Guerrero in Mexico (not orchard plantings, but many seedling trees and considerable movement of seedlings when young), at Queretaro (in many cases again not definite groves, but almost pure "stands" of avocado trees over large areas), at Ciudad Victoria (in a regular grove), at LaCruz in Chile in commercial plantings, near Campinas and Piricaba in Brazil in commercial plantings, in Cuba in commercial plantings, etc.

It is my impression, though I am certainly not as familiar with Guatemala as you are, that there is very little P. cinnamomi there, or at least if present it causes little damage. I have cultured roots from quite a few avocados in Guatemala and have isolated the fungus only from one tree of Persea schiedeana growing near the little town of San Pedro Carcha in Alta Verapaz. The fungus has been reported on cinchona in Guatemala also. Maybe also there is more of it on the wet Atlantic and Pacific coasts; I have not visited those areas.

I feel that Phytophthora cinnamomi is definitely not a native inhabitant of Southern California soils, based on many samples taken from virgin soils. Here it has probably been brought in from somewhere in the tropics in years past and gradually spread around by means of various types of nursery stock. To some extent, I think this has taken place in the tropics too. Possibly, originally, it came from the East Indies; the original description by Rands back in the jungles of Sumatra in 1922 sounds as though it must have been a native inhabitant there.

My thought on heavy wet clay soils is that avocados will tolerate them if Phytophthora is not present. I am thinking here of soils where there is at least some drainage, not low heavy soils which stay waterlogged for weeks or months--on this latter type, no self-respecting avocado will grow; in fact, many other self-respecting plants won't either. I have seen some good avocado trees in very sticky clay soils in areas of terrific rainfall, as at Esquinas in Costa Rica, where Paul Allen's "native" avocado trees grow in 200-250 inches of rainfall per year. I found some of these huge old trees last summer, incidentally, and collected seed. Unfortunately, the seedlings don't show much resistance.

As you say, I would much rather have a deep, light, well-drained soil for avocados. I certainly go along with the statement of Dr. Coit, which I have expressed also a number of times, that you have to have both excess moisture and P. cinnamomi in order to have trouble. I have been following several cases here in California where P. cinnamomi has been present for many years in well-drained soil and causes no visible damage.

If I were planting questionable soils in the tropics (or elsewhere, for that matter) I would plant my own avocado seed right on the property and try to exclude other plant importations from the area where the avocados were planted. I would be careful about the seed too, and would either pick the fruit from the trees or heat-treat the seed before planting to avoid bringing in any P. cinnamomi. *The avocado nursery certification program here in California would of course accomplish the same thing in commercial nursery stock, if they use it.* Incidentally, I found some interesting trees from the standpoint of possible resistance in Puerto Rico. There is a lot of root rot on the island; it has been there many years. I went there with the idea of picking out some individual resistance among the large population of seedlings scattered around the island. I cultured roots from about 20 promising looking healthy, old trees, and found four that had P. cinnamomi, yet were growing well in areas where other avocados were dying out. We will test seed of these, and hope they show up well.

Dr. Wilson Popenoe

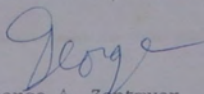
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Septemer 28, 1959

Also on this last trip, I found several cases of root rot in the Homestead, Florida area, and cultured P. cinnamomi from the roots. This was in those rocky soils but probably with fairly high water table. There isn't a lot of root rot there but it can be found without much trouble.

With best regards,

Very sincerely yours,



George A. Zentmyer
Plant Pathologist

GAZ:rr

cc: Dr. J. Eliot Coit

Antigua, Guatemala, 6 May 1960

Dr J Eliot Coit,
Vista, California.

Dear Doctor Coit:

For a long time I have been intending to thank you for your letter of last September, in which you cautioned against my idea that avocados on limestone soils may be more tolerant of Phytophthora than those on other soils. I realize it is not calcium that is the factor; I think it is because limestone soils down this way usually have better drainage than the heavy clays. Does this make sense? What I have gone on, as I have mentioned many - perhaps too many - times is that the only avocado areas in Cuba are the limestone areas in the western part of the Island; the only avocado areas in Jamaica are the limestone areas, not the coastal flatlands where they grow sugar cane (and which are heavy clays) and the only avocado areas in Puerto Rico are the limestone areas.

I have just come back from my first visit to Escuela Agrícola Panamericana since I left there almost three years ago. A year before I left we planted a new variety collection, about 45 varieties of the three races; on heavy clay soil just like the previous orchard where George Zentmyer and I noticed that the Guatemalans seemed to be holding up better than the West Indians - though almost certainly on the same rootstocks. Just after we had planted this new orchard, Dr Malan from South Africa visited us (you know who he is) and he said "Try holding off the irrigation water and see if your trees wont live longer". Well, we werent quite sure the trees could stand our six dry months but we tried it, and they survived, and they are still alive with two exceptions. George knows how bad Phytophthora was in our older groves (the present one is the fifth we have had to build in 16 years - the rest went out). The trees in this new orchard, non-irrigated, have made about half the growth our previous plantings made, but they are alive.

You ask about irrigated avocados in Guatemala. I dont know of a single planting. There were a few trees in our little experiment station at Pintado here in the valley, which we irrigated some 25 years ago; they have died out, with a couple of exceptions and these trees are sick. Maybe George would like some material for examination. The water table gets very high in this area during the wet season - not less than three feet from the surface. But the trees have not been irrigated in at least ten years, probably fifteen. The soil is the usual sandy loam of volcanic origin; no clay.

Man just came in and asked me for advice about planting fifty acres of avocados near here. I asked him "How are you going to make any money raising avocados and selling them at two cents each?" And answered "I dont intend to sell avocados, I want to grow them to feed hogs." Maybe if the California prices stay where they are this you, this will be the solution of your problem!

With warmest regards always,
Sincerely,

cc Dr George Zentmyer

COIT AGRICULTURAL SERVICE

J. ELIOT COIT, PH. D.

690 OCEANVIEW DRIVE • VISTA, CALIFORNIA

January 29, 1961.

Mr. Wilson Popenoe,
Antigua, Guatemala.

Dear Wilson:

It is my understanding that you plan to or are now writing a book on tropical and subtropical fruits of the world to be published in Spanish. That is fine and we will all be practising up on our Spanish in anticipation.

Herewith I send you a reprint of my recent report on progress on carob culture here.

I also enclose a paper on culture and utilization of TEJOCOTE, *Crataegus mexicana* which you may not have seen. When I was in London I visited Kew Gardens to look up carob publications. There, Mr. Howe suggested that we should try the Mexican hawthorne for both human and domestic animal feed. I later referred to your book and was intrigued by your illustration of tejocote fruits.

I got seeds from both Guatemala and a suburb of Mexico City. I was warned that stratified seeds required several years to germinate. Trials with hot water, acids and alkalis failed to promote germination. Finally we found that when the hard seeds were slightly cracked in a small vise germination was both prompt and uniform. Forty seedlings were planted in a row near our carob demonstration orchard and well watered to give them a good start.

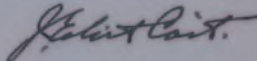
My idea was to grow them all to fruiting and then graft them over to one or two of the best fruited ones. These plants grew well the first year or as long as they were irrigated. They have now been all disked under ~~for~~ the following reasons.

This plant being native to areas where rains come in summer rather than winter will not survive our dry summers without irrigation. The cost of water here is very high and domestic and industrial demands are increasing the cost every year. We cannot afford the water cost to grow tejocote here either for human or animal consumption. Inasmuch as we now have a burdensome surplus of feed grains, we could not afford to grow this crop for animal feed, even if it would grow and produce under dry farming conditions.

When the well watered tejocote plant in my garden came to fruit the fruits were scarcely one half inch in diameter, and so hard and full of large bony seeds that Mrs. Coit removed it to make room for a fig tree.

Any comments from you will be welcome.

Very sincerely yours,



Antigua, Guatemala, 27 Feb 1961

Dear Doctor Coit:

Your letter of 29 Jan most interesting. This tejocote business. Quite naturally, I think, the paper on this fruit (returned herewith) had not come to my hands. My first reaction is to say there are better things of the same kind. For some years I have been working with George Darrow on the "Spanish Cider Grabs" which we can grow here at 4000 feet or even a little lower and which to my mind are much more interesting than the tejocotes. As you know, the latter are much used here as an understock for pears; I was talking about this with Jorge Benitez (the best fruit man we have in Guatemala) a few days ago, and he agreed with me that we should not use tejocote. It is too slow growing for a pear - the scion outgrows it very promptly.

We use tejocotes here for jelly, and for making sweet preserves with lots of sugar. The main use however is to make long strings of tejocotes for decorating at Christmas time. By selection we can get strains of tejocote which will produce fruit here an inch in diameter; but I simply will not bother with them when we have so many better things. The various forms of *Spondias purpurea* or *mombin* or what have you, are so much more useful. By selection we could make these into small mangos.

I used to think the tejocote might develop into a fine understock for some of the temperate zone fruits, but I have given it up. I suppose I am wrong again. I have ~~been wrong often~~!

You speak about your surplus of feed grains. What a curious world this is! We have to plow under the little pigs (or did) and we have potatoes rotting in the bins and butter stacked up in the cold storage rooms because we cannot give it to the East Indians without hurting the New Zealand boys. Are my data all wrong? I have just been in a row here about cotton. The boys in Nicaragua were growing it and making a lot of money until the bugs caught up with them, and now the cotton growers south of Managua owe the National Bank eight million cordobas and have asked and obtained a moratorium. I think we must get back onto the solid ground of growing things where nature says they should be grown, and selling them at prices which are not artificially supported. ~~But~~ I suppose I am all wrong again.

Just had a fine four days visit from Knowles Ryerson. I am flying up to Florida in two weeks to take part in the annual meetings of the Caribbean Region, ASHS, and the annual meeting of the Fairchild Tropical Garden. I hear Mrs Fairchild had a fall and has been in bed for some time. I want to see her.

Ever yours,

COIT AGRICULTURAL SERVICE

J. ELIOT COIT, PH. D.

690 OCEANVIEW DRIVE • VISTA, CALIFORNIA

March 13, 1963.

Dear Wilson:

Your interesting letter of the 8th is received and thanks for the information about your progress on the book "Tropical American Fruit Culture". I am also glad to hear about Professor Hume. I had a long talk with him at Gainesville in June, 1949, while he was dean of the college.

Dr. Rittenhouse, who has financed our carob work as a public service, died some two weeks ago. He was 86 years old. His will provides that the trust officer of his estate is to continue to pay the cash costs of the carob project until January 1, 1970, after which the land will be sold for subdivision. I, of course, continue to contribute my time and interest as a public service.

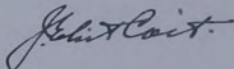
However the planting of commercial carob acreage around here has slowed down to a trickle. The reason is that people are pouring into southern California and Arizona at such a rate that there is a population explosion. Speculation in land is terrific. Pothill lands suitable for carob culture have increased in value from several hundred dollars an acre to several thousand. Most land owners hesitate to plant carobs because, if they do nothing, they may be able to sell out at a much greater profit than they can hope to gain from carob culture.

There has been considerable increase in interest in carob culture in foreign lands, and Dr. Rittenhouse suggested that if farmers here are no longer interested, we may as well carry the crusade to foreign lands. We have so far furnished literature and bud-wood for variety test orchards which have now been established in Tunis, Algeria, South Africa, Chile, three locations in Brasil, Mexico, West Australia and Hawaii. We are now planning such a test orchard in India. I enclose a very popular article, the manuscript for which I checked over for facts before publication.

I plan to go to Raleigh, N. C. April 27th to attend the 60th reunion of my college class of 1903. After that I plan to visit my ninety-one year sister who lives in the Blue Ridge mountains near Asheville.

I would like to attend the meeting of the Carribean Society for Horticultural Science in Mexico City the week of June 23ed, but doubt if I can make it. If I do I have hopes to meet you there.

Cordially yours,



*A popular style article, the manuscript
of which was checked for facts by Coit*

THE CAROB CRUSADE

By M. D. LOGAN



Dr. Rittenhouse provided funds for carob orchard to operate for thirty years.



The talented carob pod serves many industries, including food processors and pharmaceutical houses. Varieties from left, Sante Fe, Bolser, and Sfax.

IN that western wonderland called Southern California, two dynamic senior citizens are successfully proving the incredible abilities of the treasure-laden carob tree. The long-overlooked talents of this California resident read like an excerpt from Ripley's Believe-It-Or-Not: it offers diversified products for American markets, a strong helping hand to the nation's struggling soil-conservation program, and a valuable yet easily-grown crop to supplement the Golden State's agricultural economy.

Do all these qualities sound improbable? Dr. Walter Rittenhouse, M.D., and Dr. J. Eliot Coit, Ph.D., agree that the carob does sound too good to be true, but after years of probing this strange tree's potentials, they realize that it is truly one of Mother Nature's masterpieces.

Eleven years ago, these future-minded doctors launched their carob crusade with an eye toward fighting erosion and introducing a promising crop to non-irrigated California acreage. Deep in the sunburned hills of San Diego County they began keeping close tabs on America's first carob demonstration orchard—with the University of California,

the Soil Conservation Service, and the Department of Agriculture watching attentively from the side lines. Today, the "carob doctors" have earned the co-operation of all these spectators, and their ambitious project boasts 225 leathery-leaved trees, bearing increasing crops of edible brown pods.

Dr. Coit, recognized as an American carob authority, says emphatically, "There is no doubt the need is here for select, orchard-grown carobs, and California farmers have land that stands to benefit from their culture." At present, the United States is forced to rely on Mediterranean countries for some 17,000,000 pounds of carob pods and their by-products used annually in a multitude of American commodities, including a delectable mock-chocolate candy and a highly effective pharmaceutical.

The timeless carob has long been cultivated in areas bordering the Mediterranean Sea and the Near East, and it is believed to have supplied a principal food in the Garden of Eden. An evergreen member of the legume family, the carob produces a chewy, lima-bean-shaped

pod or fruit, endowed with a distinctive, honey-date-chocolate flavor. Through the ages, both Europeans and their livestock have relished these energy-packed pods, now known to contain six per cent protein and over 40 per cent natural sugar. While engrossed in carob research, Dr. Rittenhouse found that as late as World War II the rural population of southern Greece lived largely on carob pods after the German army appropriated other food and livestock.

Historians find that the carob (*Ceratonia siliqua*) has been known by more aliases than a well-seasoned criminal. The popular name, "St. John's Bread," stems from the belief that John the Baptist subsisted on this fruit during his extended stay in the wilderness, while the pods were called "husks" in the Biblical parable of the prodigal son. The Israelites first used the name "Boecksur," or "God's Bread"; Mohammed's conquering armies fed on the pods and knew them as "Kharub"; the Romans used the word "Carobi," and in the Spanish Peninsula "Algeroba" was a broad reference covering carobs and their near

relatives, such as mesquite.

For America's "sweet tooth" today, the seeded pods are processed into a beige powder which capably substitutes for chocolate or cocoa in baking or making candy. Carob powder is not only highly nutritious and easily digested, but is agreeable to most people allergic to chocolate. Since 1951, one of the chief sources of this powder in the United States has been an Alhambra, California, milling company. Over 100 tons of choice, imported pods are milled here yearly. This "stand-in" for chocolate is sold to the wholesale and retail trade, and is also used as an ingredient in their own crispy, oatmeal-like carob cookies and a melt-in-your-mouth candy bar reminiscent of milk chocolate. During the past year, the popularity of all these goods has resulted in their being stocked not only by health food stores, but by many Los Angeles supermarkets.

Since available Mediterranean carobs fluctuate in both quality and quantity from shipment to shipment, West Coast food processors would welcome an assured supply of better and perhaps cheaper domestic pods. "When select, California carobs begin bearing commercial crops, their sugar-rich pods will find a limitless future in American kitchens," vows Dr. Rittenhouse, a retired physician and nutrition specialist.

Wonders seem never to cease where the carob is concerned. The seemingly insignificant seeds, which make up 10 per cent of each pod's total weight, are a marvel in themselves. Legends say that the carob seed was the original carat weight of ancient goldsmiths. Next, the seeds were used in the making of cherished brown rosaries. Modern Europeans continue to find unusual jobs for these willing seeds. The tiny, protein-rich seed embryo is added to poultry food, while the largest part of each tough, lentil-sized seed is used to concoct a vital, sticky gum called "tragasol."

The United States is a ready customer for this multi-purpose gum, importing about 15,000,000 pounds a year. Tragasol serves our food industry as a stabilizer in many palate pleasers including ice creams, salad dressings, sausages, hot dogs, cheese spreads, pie fillings, and mustard.

Dr. Coit, a top authority on American carob culture, supervises the 225 trees.



Textile mills depend on carob gum in the process of sizing cotton cloth. Producers of cosmetics, paper, photographic film, matches, paints, inks, polishes, ceramics, adhesives, boiler compounds, and oil field drilling mud are among the other manufacturers that find this gum invaluable. Dr. Rittenhouse and Dr. Coit point out that the growing need for tragacanth, now obtainable exclusively in Europe, is another of the reasons California growers are beginning to take a second look at the carob tree.

The carob is unique if for no other reason than its prodigious offerings of pods and seeds, but being a natural show-off of the plant world, it puts its tenacious roots to good use also. With thousands of tons of irreplaceable soil needlessly lost each year through lack of conservation practices, our government now offers financial and supervisory help to land owners practicing an approved conservation program such as carob culture affords. Dr. Coit explains, "The remarkably vigorous root system of the carob serves as a natural soil binder, and when planted fifty trees to the acre in proper locations, with correct contouring and a minimum of care, they give unsurpassed dry-land erosion control."

Dr. Rittenhouse, a slender, white-haired philanthropist, first became carob-conscious 14 years ago while traveling in the Mediterranean countries. He immediately spotted the similarity between the Mediterranean climate and topography and much of southern California's slowly but steadily-eroding foothill sections. Here, he thought, would be perfect locations for orchards of soil-saving, crop-bearing carob trees.

Through the University of California at Berkeley, Dr. Rittenhouse tracked down Dr. Coit, now a consulting horticulturist, whose interest in carobs dated back to his subtropical pomology teaching days in 1919. Their subsequent carob discussions ultimately inspired Dr. Rittenhouse to provide funds for the eleven-acre demonstration plot, to operate over a 30-year period as a public service.

The two painstaking doctors purposely hunted for unirrigated land suffering the first pangs of erosion, representative of dry-farmed areas in southern California. At the inception of the orchard in March, 1949, four of the 11 acres were planted with small carob seedlings. These youngsters provided rootstock to re-

ceive the budwood that eventually controls tree and pod characteristics. The remaining ground was put in reserve for future experimenting.

All the demonstration trees are now budded to the best carob varieties obtainable. Dr. Coit says, "Seedling carobs, such as have been thriving about 100 years as ornaments from Santa Barbara to the Mexican border, generally bear fruit of inferior quality."

The doctors wholeheartedly agree with their extensive collection of European carob publications that show this carefree tree is undemanding, to say the least: it will tolerate several degrees more cold than oranges, basks in intense heat, laughs at insects and disease, demands no fertilizer, performs well on many types of soil, requires very little pruning, and can, if necessary, survive several seasons of drought. Profitable crops, however, are the result of at least 14 inches of rain per season. In dry, desert areas, trees will bear with one or two irrigations a summer—totaling about half the water required by other tree crops.

Knowing there were hundreds of select European carobs he might never otherwise have access to, Dr. Coit spent eight enlightening weeks in the Mediterranean countries in 1954. "It was a regular 'carob grower's holiday,'" he laughs. "I tramped over countless rocky hillside ferretting out promising species, named trees for new budwood, almost wore my glasses out reading carob information, talked with every carob connoisseur I could corner . . . and loved every minute of it!"

With the acquisition of foreign stock, the Rittenhouse orchard now represents a small-scale, growing United Nations. Carobs from Algeria, Crete, Cyprus, Greece, Israel, Italy, Portugal, Spain, Tunis, Yugoslavia, and the United States flourish agreeably side by side.

The 225 trees are budded either to one of 19 European types or to one of 51 stellar California discoveries. Tedious searching and testing among the scattered landscape plantings in California revealed these 51 rare carob seedlings which were outstanding enough to introduce into the orchard. After eight to ten years, any trees showing traits that would hinder their use commercially in Dr. Coit's opinion are destined to undergo surgery and to receive yet another variety.

Three superlative trees are now producing in the demonstration

acreage. The Sfax from Tunis, and the Bolser and Santa Fe, both exceptional Californians. These carobs pride themselves on their above-average sugar content, excellent flavor, and acceptable bearing habits.

Dr. Coit, a stocky, white-haired, deeply-tanned perfectionist, knows each carob tree and its personal life like an intimate friend, thanks to his exacting records. A tree that insists on ripening its pods in late fall quickly loses favor in his comprehensive testing program. It is imperative that the crops mature in early fall before the start of California's rainy season. An extended wet spell before harvest, when pods are ripening and reaching a high sugar content, will cause fermentation. This nearly-rainless autumn required by the carob is the main reason commercial carob culture would be impractical for the southern states.

Most trees start bearing five years from budding. There is no laborious hand-picking of the crop; at maturity, the flat, pliable, green fruit becomes a rigid tobacco-brown and begins dropping to the ground. As nature efficiently gives these signals, heavy cloths are spread under each pod-bearing female tree and the fruit is shaken down. After several days of sun-drying to minimize the moisture content, crops can be sacked and stored indefinitely.

A mature, 25-year-old carob is capable of producing 250 pounds of pods a season. After this first quarter-century, the tree still looks forward to a lengthy life, as seen abroad, where vigorous carob centenarians are very common.

The overall crop in the Rittenhouse planting has quite naturally been below normal, since many trees have been rebudded to a second strain. Part of the pods that are harvested, however, serve as guinea pigs in endless testings. The United States Department of Agriculture's Western Utilization Research and Development Division at Albany, California, says the carob is one of the most interesting crops they have studied. Here, with the future in mind, fruit crops not widely grown in America are under constant surveillance. Thirty carob varieties from the San Diego County orchard were recently analyzed at this government laboratory, showing the pods contained up to 51 per cent sucrose and invert sugars, an exceptionally high amount compared to other tree-ripened fruits.

The University of California at

Davis has also experimented with these versatile pods. As fattening foods for cattle, carob pods proved to be an equal to barley and an ideal supplement to roughage, such as hay. According to Dr. Coit, this robust tree can produce not only more, but cheaper livestock feed per acre than either barley or hay. And if the two progressive doctors have their way, American cattle will be greedily munching nutrition-packed California carob pods in the not-too-distant future.

Hungry spectators at agricultural exhibits and fairs gobble up surprising amounts of the carob crop not needed in the research field. Several grain-sacks-full of these candy-like pods were handed out as samples at the 1959 San Diego County Fair. Dr. Coit chuckles, "It's like old home week when fair-goers of Mediterranean extraction meet at our booths and have lively arm-waving conversations about their beloved carobs."

The majority of European carob-growing countries have long strengthened their economies with these serviceable brown pods, selling the largest amounts as livestock food to England, Holland and Denmark. However, in years of other crop failures the dependable carobs are prudently reserved for their own cattle.

One of the largest carob-growing areas is Italy. Here, the government restricts the exportation of pods. With no wheat, oats, or corn to speak of, the carob is a prime factor in the production of industrial alcohol so vital to their increasing factories, particularly in the growing Po Valley area.

A shipment of carob seeds is believed to have first entered the United States in 1854. Time-yellowed records generally agree that about this time an American Consular officer in Spain persuaded the Patent Office (which in those days was responsible for agricultural matters)

to introduce the trees into our warmer states.

Now, after a century of lazy California sunbathing, the carob is going to work. Eleven years of planting, persuading, and proving are finally enabling Dr. Rittenhouse and Dr. Coit to break down the resistance of grain and livestock farmers who said: "When I see my neighbor making money growing carobs, I'll plant some." The demonstration orchard is now the proud "godfather" of a 400-acre carob venture in Baja, California, 13 acres of young trees in Santa Barbara, and four plantings in San Diego County, ranging from six to 85 acres.

Knowing their pioneer planting was the stimulus behind all these youthful carob orchards, these two senior citizens with an aversion to rocking chairs feel that their work and determination are paying dividends. Both "carob doctors" are quick to agree with whoever quipped: "Failure is the line of least persistence."

LABORATORY REPORT ON CAROB POWDER

Moisture	6.30%
10% MOISTURE BASIS	
Crude protein (1.24% nitrogen x 6.25)	7.75%
Crude fat (ether extract)	1.90%
Crude fiber	5.05%
Nitrogen free extract (carbohydrates)	72.85%
Ash (mineral matter)	2.45%
pH Value of ash	10.6
Total sugars (as invert)	46.25%
Reducing sugars (as dextrose)	9.15%
Sucrose	37.90%
Starch	6.30%
Calcium	0.22%
Magnesium	0.08%
Potassium	0.95%
Phosphates	0.28%
Sodium	0.1%
Silicon	0.1%
Iron	0.05%
Aluminum	0.05%
Strontium	0.05%
Manganese	0.01%
Barium	0.01%
Boron	0.005%
Chromium	0.005%
Copper	0.001%
Nickel	0.001%
Carotene (milligrams per 100 grams of sample)	0.03
Equivalent to Vitamin A (Int. Units per lb.)	227
Thiamin, milligrams per pound	0.16
Riboflavin, milligrams per pound	0.25
Niacin, milligrams per pound	12.0
Calories per pound	1595

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COIT AGRICULTURAL SERVICE

J. ELIOT COIT, PH. D.

690 OCEANVIEW DRIVE • VISTA, CALIFORNIA

May 11, 1965.

Mr. Wilson Popenoe,
Calle de la Nobleza, No. 2,
Antigua, Guatemala.

Dear Wilson:

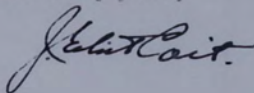
A Mexican vegetable grower near here has ten bearing Capulin (*Prunus salicifolia*, HBK) trees grown from seeds brought to him from Mexico by a friend. The trees thrive here and while they bear fairly interesting fruits, none are worthy of being propagated by sophisticated fruit growers.

A friend of mine, Paul Thomson, has a small place in Vista. He likes to experiment with every kind of tropical and subtropical fruit he can get the seed of. He wishes to do some selection work with the capulin. He noted that you suggested this in your book forty-five years ago. He asked me to write you and enquire if you know of any selection work with the capulin in Florida, Honduras or anywhere else. If so, he wishes to get some seeds of the best form to start with rather than use seeds from the wild trees available here.

I am still busy with a reduced schedule of ranch supervision and experting work and plan to continue as long as it is fun and I am well. I hope things are going well with you.

With kindest regards,

Cordially yours,



c.c.-Paul Thomson

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COIT AGRICULTURAL SERVICE

J. ELIOT COIT, PH. D.

690 OCEANVIEW DRIVE • VISTA, CALIFORNIA

June 20, 1965.

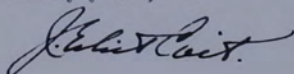
Mr. Wilson Popenoe,
Antigua, Guatemala.

Dear Wilson:

Thanks for yours of June 12th, just received. The information re Capulin cherry is being turned over to my close friend and associate Paul H. Thomson (Star Route, Bonsall, Calif) who is interested and well qualified in doing selection work on *Prunus salicifolia*. He has a three acre place in the Vista foothills, almost frost-free, where he is doing outstanding work on mangoes, cherimoyas, sapotes, hardy bananas and several other tropical and subtropicals. He is a recently retired marine, a good systematic botanist with wide experience in Pacific tropical countries and islands. He has recently achieved a root-stock for the jojoba which does not throw up root suckers all over the vicinity. He often comes here to refer to my copy of your 1920 book on tropicals and subtropicals. You may hear from him and if you can help him get propagating materials of the best Capulin, it will be appreciated.

In the last paragraph of your letter you handed me a very nice bunch of flowers re my sketch of the history of the California Avocado Society. Coming from you it is especially appreciated. As a matter of fact that could easily have been expended to book length. Space in the Yearbook was so limited I had to leave out a wealth of material and call it a "Sketch".

Cordially yours,



COIT AGRICULTURAL SERVICE

J. ELIOT COIT, PH. D.

690 OCEANVIEW DRIVE • VISTA, CALIFORNIA

January 30, 1967.

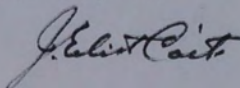
Dear Wilson:

Thanks for your very informative letter of January 11th.

I was particularly interested in the second paragraph in which you lament the lack of interest in systematic pomology by today's students of horticulture. I have long felt the same way. When I was at Cornell, in close association with L.H.Bailey and also Hedrick, I was well drilled in laboratory work in all kinds of fruit varieties. But now such subjects are not taught. The big, thick reports of the American Society for Horticultural Science are so filled with graphs and mathematical formulae that I questioned whether my technical article on carob varieties would be accepted. By the way, I am a charter member, having joined in 1905.

Our trouble ~~is~~, we are simply out of fashion. Times change. Commercialism has taken over. After the exceptionally high quality Murietta Green avocado was discarded because it would not grow on Mexican root, it was forthwith forgotten. No one today would think of top-grafting some unwanted Guatemalan tree to Murietta Green (if he could find a scion) just for the joy of growing and eating such an exceptionally fine fruit. There are none left like old J.M.Elliott. Tempus just keeps right on "fugiting", and perhaps it is just as well.

Faithfully yours,



Vista, Apr. 20-70

Dear Wilson-

Perhaps you may be interested
in the Enclosed-

Having recovered from the attacks of
rheumatism and later heart attack, I
sold my old home and am living very
comfortably in a mobile home in down
town Vista Trailer Park.

I am pretty well, live alone and do
all my own cooking and housework
and a little garden work.

Kindest regards to every one -

J. Eliot Coit
751 East Vista Way, No. 107
Vista, Calif. 92083

J. Eliot Coit

Antigua, Guatemala 23 April 1970

Dear Doctor Coit:

My hat is off to you (but when hasn't it been?). When I returned from Florida a day before yesterday I found your note of the 20th and "Birthday Bains of a Co-op". This little note adds another chapter to the history of the avocado in California. The paper you published in the Yearbook some time ago was a major contribution. Those boys who come to write about avocados 50 years from now are going to have pretty good historical material. I believe they will use it.

I have just had an interesting experience in this connection. When in Miami two weeks ago, my nephew John Popenoe, who is now head of the Fairchild Tropical Garden (as I am sure you know) called me into the library and said "Look what I have just found in the attic!" It was the papers, account books, and records of George B. Cellon. Going back to 1838 when Cellon, one of 11 children of a Capt Cellon of Metz, France, who came down to Florida to fight the Seminoles, had left his nursery in Gainesville to move to Miami, where he developed the first commercial nursery of avocados and mangos, as you know.

Well, David Fairchild had come into possession of Cellon's papers and records at the time of Cellon's death! He had worked them over; classified them a bit (no one could classify George B. Cellon's records; they simply weren't classifiable!) and left them at the Fairchild Tropical Garden where they went up into the attic and would still be there if my nephew John hadn't happened to go up into that attic one day looking for something else.

As you know, the Lula avocado has for many years been the leading commercial Florida variety. I have published the story of its origin - How George B. told me that he had eaten a fruit of Taft, and had thrown the seed in that capacious spittoon which always stood beside his desk, his wife Lula fished it out, planted it, and when the tree came into bearing the fruit was so good (as he thought; most of us nowadays simply call it acceptable) that he propagated it and put it on the market.

Now, we have never been too certain about that Taft avocado from which the Lula came. Was it from a tree in his orchard, which he had received from the West India Gardens, or what? Well, in his records I find that the parent of Lula was a Taft fruit which had been sent from California to "Mrs Cillon", as he says (of course to George B.) But who sent it? Was it from the original Taft tree at Orange?

And that aint half, as Cillon would have said (I remember so well his language; he used to look at me and say, every once in a while about something we were discussing, Pompeno, hit dont mattah), in his first catalogs or price lists he called the Lula a Mexican-Guatemalan hybrid. Later he changed and called it a Guatemalan. My nephew John is insisting that Lula is a pure Guatemalan. Others are calling it a Guatemalan x West Indian. It cant be the latter, as Cillon would have said, if it came from a Taft seed sent from California.

I cant see anything but Guatemalan blood in it. No anise odor at all, but here is the question. Where did the original Taft tree come from? Wasnt it one of those fruits from Atlixco which Juan Murrieta brought in, and which were the origin of so many of those early varieties in southern California? If it came from Atlixco,

only the good Lord knows what blood it had in its veins, but I think you and I feel that Taft is a Guatemalan avocado.

The boys ask me, Why do I waste my time on points like this. They ask me, Why did your 35-year-old Fuerte here in your patio, which bore 700 fruits in 1967, 50 fruits in 1968, 7 fruits in 1969, and which produced a tremendous crop of flowers in February and March of this year, only have a dozen fruits hanging on it now, and these from an earlier small batch of flowers? All I know is that we had a pretty cold winter, but no actual frost here in Antigua. Fifteen miles from here, in a cold pocket at 5900 feet the government's nursery of 40,000 Guatemalan seedlings for rootstock and some 3000 grafted trees, about 6 to 12 inches high, were completely wiped out.

I am happy to know that you are "pretty well"; you must be a little more than that, to be doing your own housekeeping and some garden work. Stay with it. Two days ago I brought down from Miami, 50 grafted sapodilla trees, variety Prolific, which bears young and heavily - most sapodillas do not - and I am going to find someone who will start the first commercial orchard with this fruit. Of course it will be a very small orchard, but I sometimes think it is better to start small and row big, than to plant - as one man here is contemplating - a hundred acres of Macadamias. Of course I believe in Macadamias but we dont know much about them here; we introduced a few trees in 1930 which have grown and fruited but the squirrels get all the nuts. The man involved, who worked with me on Cinchona 25 years ago and has made a lot of money out of cardamoms (plus seven million bucks he interited) is just the right guy to tackle this job.

My affectionate regards to you, my dear old friend and

B. Elliot Coff
751 East Vista Way, No. 107
Vista, Calif. 92083

May 23, 1970.

Dr. Wilson Popenoe,
Antigua, Guatemala.

Dear Wilson:

Your much appreciated letter of April 28th would have been answered before had I not been overburdened with carob correspondence. Our latest foreign carob development at Cariso Springs at the center of Australia is backed by the government and has great promise.

I can't know and do not believe that Lula is a Taft seedling. Taft seed came from Atlizco and is I believe a Guatemalan. In my opinion Lula is a chance W. I. X Guat. hybrid. It got its high resistance to saline water from its W.I. parent. Some years ago I collected 1250 balled avocado nursery trees, including all the varieties I could get. With Armstrong's help in getting them packed, I shipped two car-loads to the Rio Grande valley, where I finally got them planted on the Hoblitzelle ranch near Mercedes. I had been assigned the project of finding out if avocados had any likelihood of being commercially successful in that area. We brought most of them into bearing. Fuerte bloomed and set very well but had to be sprayed too many times for anthracnose. Also in that climate it never got over 8--10 percent oil, and was discarded. Of all the kinds we fruited, none were equal to Lula, chiefly because they were from a local nursery budded on West Indian stock which is resistant to saline water. All the trees from California were on Mexican stock and suffered severely with tip-burn at times when the Rio Grande river water was high in salts.

NOW WILSON !. I am in need of help and hope you may be able to furnish some of that mentally, if not physically. What I need most is criticism from you as an old friend in the event you may think I am wrong or perhaps crazy. But in order to get some background will you please refer to and read my article on page 35 in the 1968 yearbook of the Calif. Avocado Society; entitled "The Importance Of The Fuerte Variety". What do you really think about that article? Blaze away smooth or rough!

I wrote it in an effort to alert the California industry to the fact that the Fuerte will soon be out of cultivation in California unless something is done about its rapid demise. No matter how much Hass is grown in summer to compete with a long list of fruits and vegetables, the California industry (which was largely built on Fuertes) can ill afford to lose the most valuable avocado marketing season, Dec-May. After my article was printed and since then you could have heard a pin drop on a carpet, as far as any attention resulted. I have never heard or heard it mentioned and sometimes wonder if any of the "board of Directors have ever read it.

2-Popenoe.

Prospects for successful research on "How to make the fuerte Bear enough to pay" have been greatly improved. Recent developments in the reproduction of clons by single cell tissue cultures have become common with greatly improved methods.

If a number of the best bearing fuerte trees can have their roots cultured and multiplied by tissue culture, there surely should be one or perhaps several which can be cutting rooted. In case such cuttings do not root easily enough, then research should result in better methods of rooting cuttings. With this accomplished we could then grow Fuerte orchards on identical root-stock which would retard the bloom until night temperatures are conducive to fruit set. I have long noted the wide variation in time of bloom (here extending from January to June) of Fuerte trees on our very variable common Mexican root-stock. Such an orchard would not only be very very profitable but save the industry. What do you think? *How to get Board Director of Agr. Soc. W. Kal. exp?*

Perhaps the variation in fruit set from year to year on your old home fuerte tree may be partly due to seasonal variations in night temperatures during bloom. My experience is that fuerte bloom will not set on chilly nights, such as we have here in March--May. My business for more than forty years has been to walk through fuerte orchards betwenn Santa Barbara and the Mex. border during bloom; watching, wondering and studying in the effort of doing something to get a better fruit set for my clients. I think I am pretty familiar with this wonderful variety the buds of which you first took out of a package sent in from Atlixco and succeeded in getting it to grow in your dad's nursery in Altadena. I think you would grieve to see it go out of production commercially here.

With kindest regards as ever,

J. L. Popenoe

Jan 20-71

Dear Knowles and Wilson-

Because of this type of "nerve" rheumatism my fingers are so twisted up that I do not type letters except occasional business letters. Therefore please forward this to Wilson as it is intended for both of you.

Some ten days ago in answer to Wilson's questions about Bacon and Lantano crocody, I wrote a long letter and included answers. My youngest daughter Catherine, 51 yrs. old, single, grad Sawyer Business Co. in L.A. has long been private secretary to the head of Math. Dept. at Univ. of Colorado at Boulder. I, lately, have been scribbling out the long letter and mailing them to her to be neatly typed - when the above letter reached Boulder, she had just left on a two week vacation. I expect her return any day now and eventually will be able to forward it to Wilson.

In listing some old students Contemporary with Knowles I neglected to mention Elwood Trask. He is in good health, lives on his small ranch at nearby Carlsbad, and carries on as a professional Agriculture farm and land appraiser. He also attends all Am. Soc. Directors meetings.

Wilson enquired about "Camin-Ex" widely advertised cure for Arsenado root rot. Just fake and propoganda and sucker-bait. Advt. was refused admission to Arsenado Yearbooks

With respect to Dr. Ralph Allee, I am glad to hear about him. He has just arrived in Vista to retire here - I got him on the phone - sent unpacking, getting an automobile and studying to apply for Calif. Drivers License. He was very cordial but looked forward to visiting me here after they finally getting settled. Thanks for telling me about him. His home is at 634 Cortez Ave Phone 24-3036, only a few blocks from my home here in Sycamore Trails Park in down town Vista

(OVER)

With respect to Council group of faculty members in the old days - glad you were interested and remember all of them. Do not return it, keep or turn over to the Dean's office.

Delighted to hear you plan to call on me here in February. Please remember that I am still under the doctor's schedule in order to avoid another heart attack which he says would be my last. I am gladly available to visitors any morning up to Eleven AM and after 2:30 PM. During those I am either in bed or resting and cooking my main meal a day - My step-daughter Miss. Emily Tiney, 51 years old, single, a school teacher, lives in her own mobile home two spaces from mine. She drops in once or twice every day to see how I am and very kindly does some things for me I cannot yet do alone. My entire estate is now in the hands of my bank. They make all collections, keep accounts - pay all bills and allow me a small checking acct. to take care of groceries and petty cash. After the first year, all acct. were checked by Probate Court and every cent accounted for - and the net worth of estate was greater than it was a year ago. So now I can sleep nights and not worry about this and that.

I looked at the big old Kiwi Vine (actinidea) at the Chico USDA Garden years ago. Have tried to eat the fruit, you can leave it all.

I am distressed to read about the Communist heavy infiltration of the faculty at Berkeley. What do you think of the chance for a clean cut? The last time I saw them was in ¹⁹⁵⁵ ~~1954~~. I drove up with Well Miller, Edward Tusk and Walter Storey to confer with Expt. Sta. Director about funds for the Storey trip to Australia on a madamian exploration. We were so limited in time I only had time to go up and visit my old offices. They look just the same, but I missed seeing the ghosts of Babcock and Biedetti.

With respect to parsons I am quite a committee (in my little non-profits) any direction for quick softening I should have said that in Japan they put them in empt. Saki barrels for a day exposure to the fumes, ^{then} put in a covered bowl with a rag saturated with Vinegar water fine.

With the Board of Documentation, I wish for everybody. General of the Wisconsin, Pittsburgh, PA, one of them quite good looking!

Also, Income Tax Ex. Single, my tax returns to Comptroller.

SCIENTIFIC SUPERVISION
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COIT AGRICULTURAL SERVICE

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January 21, 1971

Wilson Popenoe
 Casa del Oidor
 Antigua
 Guatemala

Dear Wilson:

Thanks a lot for your interesting letter of the 18th. It would have been answered before, but for the crush of Christmas correspondence.

Please send me the address of Salvador Sanchez Colin. I greatly appreciate the kindness he showed me when I was last in Mexico. What is he doing now? Is he farming - growing avocados? Where? Is he making avocado oil for sale to the Michigan Cosmetic factory?

It is hard for me to believe that you have 7500 acres of commercial avocado orchards in Guatemala. Perhaps I do not understand the total market for avocado oil for all uses is indeed very limited.

I edited the Avocado Society yearbook for 16 years (1932-1948) and I approve of present commercial variety limitation to four: Fuerte, Hass, Bacon and Zutano. Bacon is a good fruit but is shy bearing. Zutano is a very poor quality fruit, but because it is frost resistant, a very heavy bearer, matures before Fuerte and grows like a Lombardy Poplar tree; it is chiefly used for windbreaks. A grower once told me that he could make money with Zutano at 5 cents a pound. The presence of Zutano on the late fall market reduces demand for avocados. Too bad! The original tree grew on the Truitt ranch at Fallbrook. Mr. Truitt asked me to come in November, 1932 and evaluate it. When I did I told him that, to my taste, it was a poor quality fruit. He never spoke to me after that.

No one knows what parents produced either Bacon or Zutano. I know of no way to find out. So what? Who cares nowadays?

We are all greatly distressed by the untimely death of my old student and close associate, Bob Hodgson. However, our grief is somewhat assuaged by the knowledge that his unexpected quiet death in sleep was not preceded by any painful illness.

Before I close I cannot resist opening a subject which disturbs me greatly although others, so far, pay little or no attention.

Wilson Popenoe
Casa del Oidor
Antigua, Guatemala

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January 21, 1971

Thank you again for your kindness in letting Louise and I occupy your interesting old home in Antigua in the summer of 1949. I have a good photograph of your old Fuerte avocado tree and am glad to hear that it is still in good health and production.

Fuerte is the variety on which the California Avocado industry was built. In its unique season, January through April, it is the only acceptable variety available. It is highly satisfactory to packers, shippers, retailers and consumers. Extensive advertising by pictures resulted in many consumers getting acquainted with avocados for the first time. So far, in its season, it has no competition from Florida or elsewhere. But the end of all this is in sight.

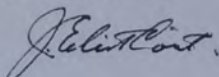
The number of old Fuerte trees is rapidly decreasing due to root rot, top-working to other varieties and encroaching subdivisions. The proportion of Fuerte trees sold by nurserymen has decreased to less than 10 percent of what was customary 25 years ago. The reason for this is because profit (on a per acre basis) is discouragingly low. The cause is that each tree in the orchard has a different yield habit from nothing to excellent. The reason for that is the necessity of using heterozygous seeds for root-stocks. The hybrid nature of the Fuerte makes it peculiarly susceptible to many and obscure influences between such diverse stocks and scions.

After 40 years of walking through Fuerte orchards I could not help but notice the great difference between blooming dates of trees in the same orchard. The earliest to bloom had little or no fruit, medium bloomers medium yield and the later the bloom the better the crop. We know that Fuerte bloom will not set before rising night temperatures reach a certain point. When that point is reached there are no flowers left on the early bloomers. It is evident that if the root-stock under the best bearer could be multiplied asexually and all nursery trees budded on that stock, the yield (per acre) would be decidedly profitable and the reputation of Fuerte among farmers restored.

The final selected best bearing mother tree must have its root multiplied asexually. That requires resort to "SINGLE CELL" development which is already being done with tobacco, lillies and several other plants. This would take time, but unless it is done Fuerte will fade out and its exclusive market, January through April, will be lost to the California Avocado industry.

When I broach this idea to the directors of the Avocado Society it results in a noise like a pin dropped on a carpet. I published one article about this precarious status of the Fuerte in the 1968 yearbook, but no one has ever mentioned it, let alone done anything to correct it. You had a lot to do with the original establishment of the Fuerte. Do you agree with me, and if so, what to do?

Cordially yours,



cc to Knowles

J. Eliot Coit
757 E. Vista Way, No. 107
April 16, 1971

Dear Mr. Popenoe:

Doctor Coit is far too ill to answer your letter. His trouble is his faltering 91-year old heart; he is in no severe pain.

He thinks that the main trouble with your fuerte avocado tree is because of the root-stock. I presume you do not know what your root-stock is.

He suggests that you refer to his article in the 1968 year book, page 35, and let him know what you think.

Sincerely,
Leone Whorton (Nurse companion)

Antigua, Guatemala, 24 Sept 1973

Dear Doctor Coit:

Knowles has bawled me out for not having written you in a long time. Mea culpa, mea culpa. But every year my strength grows less and it seems to me my correspondence grows heavier. You remember Ralph Cornell. His widow has been here for a couple of weeks and has been telling me I must get my papers organized and filed recently, and I ought to hire a secretary and dictate that final book on tropical fruits I have had in mind for so many years. The competent secretary is the hard part. It is a matter of neck and neck right now, whether I will run out of money first or die first, and getting a good secretary like the kind we used to have in David Fairchild's office is simply impossible down here.

So will satisfy my conscience by telling a few things about what has been going on in this neck of the woods these past few years. The big avocado program started by the government, 7500 acres in three years, is practically on the rocks. In the first place, they were not at all successful in propagating nursery stock, and in the second place we just don't simply have enough orchardists in this part of the world to put over a program of the size they had in mind. One man has developed one really good orchard of about 40 acres, mainly Fuerte, Booths 7 and 8, Choquette, Aztec and some Hass. Hass does beautifully here (we everywhere else!) but I don't believe our local markets will take to it. What they want is Choquette. My neighbor Arturo Falla brought me in a Choquette two months ago which weighed 4 lbs 5 ozs.

With enough effort, we could train people to be avocado orchardists, but what are they going to do with the fruit they grow? I have been asking that question for the past six or seven years, and the govern-

puree and ship it in cans to the U.S. We will ship by air to Europe. We will ship to Japan, and trade the fruit for Toyota automobiles. We will sell avocado oil to Max Factor, and so on. I really am not worrying very much. We have more avocados in the country right now than we can dispose of, so where would we be with 7500 acres more? Especially if they plant Pollocks at 7500 feet and if they dont spray for scab and anthracnose - which latter has ruined my crop of Fuertes this year. First time this has happened. I have not bothered to spray my one 40-year old tree; dont have the equipment and would rather give my time to something more important right now.

This is, the introduction and development of temperate zone fruits. I am sure you know I have been devoting a lot of my time and little strength I have to spare to this subject. We are making fine progress with apples, sticking to Winter Banana and Wealthy and to a small degree to Delicious (red forms), but are not quite clear year about rootstocks. We went in for Malling Mertons, with lots of advice from good old Harold Tuckey. And it is working out just about as he predicted. The Malling Merton stocks need good soil and good cultural attention and both these points are often overlooked. The government has pretty much settled down to local seedling rootstocks but we may do something with one or two of the strongest-growing Malling Mertons. All apple trees are dwarf here, that is, they dont grow like they do in West Virginia, and a dwarfing rootstock is the last thing we need. Winter Banana would be a fine stock but we cant get seed, with the fruit selling at 20 cts a pound and very few culls to utilize.

We must and will expend our list of varieties, but we must stick to varieties which have some red color, like Winter Banana. Just like the yellow plums. They are hard to sell, and in fact we have just about gone out of the plum business. Santa Rosa was out pet for a while,

but we cant seem to keep it in good production beyond 7 or 8 years. And this is the problem we are running into with the new peaches we have received, mainly from Florida. The first to get going here was Flordawon, but it had the handicap of that "beak" and the fruits ripened and commenced to break down at the apex before there eating ripe at the base. And then it developed that Flordawon - and since then the other new varieties from Florida - start off by coming into bearing at a very early age - probably the 2nd year - and going out of bearing after producing two or at most three crops. We havent solved this problem and Ralph Sharpe writes me from Florida they are up again tendency there, though are getting 6 to 8 years of production against our 2 or 3. We have some mighty nice peaches from Florida but I dont know what we are going to do if we dont find some way to keep them at work.

What I have been particularly interested in, these past few years, is PEARS. We had to start off by finding a good rootstock - manzanilla (*Crataegus stipulosa* or *pubescens* or *mexicana*, take your choice) is the only thing which has been used here up to 3 or 4 years ago. It is slow growing and hard to propagate in the nursery; they planted seedlings in orchard for and they cleft grafted or crown grafted when they were two years ago. As I may have told you, I got in touch with the pear boys in the western U.S. and decided to try *Pyrus calleryana*, to which my beloved chief B T Galloway called attention some 50 years ago. So far it seems to be the thing for us. Now we are up against the problem of varieties. There are two or three pure communis sorts which look good, if they are ripened properly, which means mainly picking them before they are eating-ripe. And then we have to determine the chilling requirements of promising varieties. Bartlett seems to have the highest requirement of all; it must have about 8000 feet, but

some of the other varieties go down to 6000 or even a bit lower.

We are now all pepped up about a variety from Tennessee, one which the late Dr Drain produced and which hasn't seemed to have made a hit in the SE U.S. but which certainly is delicious here. Dr Drain, with whom I maintained correspondence until his death, insisted it was his Ayres, and that its background is as follows: $3/4$ Anjou and $1/4$ Gerber. A pretty fine combination so far as quality is concerned, and the fruits we have been harvesting here these past two seasons are nothing short of delicious when grown at 7000 feet. We have another delicious little pear which seems to be communis, but which we can't name. But it grows well and bears large crops every year at 7600 feet. I am afraid pears don't have the future in Guatemala ~~that~~ that apples have, but I can't help feeling that we can ship such fruits as Ayres some distance and sell them at a good price. We are getting 25 cents a pound right here.

The strawberry business is going strong here (speaking in Guatemalan not Mexican terms) based mainly on Tloga, Fresno, and Florida Ninety with good old Missionary, which I think I had the honor of introducing about 1930, still hanging on in a few regions. I have not done any work on strawberries here; I have not needed to. I intend to spend what little time and strength is left to me on pears and peaches. I think the apples will take care of themselves and when someone finds a way of producing avocado oil which will take the place of olive oil we can enter that business in a big way.

I wish I could get up to California again to have a good visit with all you old timers but assuming somebody will give me money to pay from fare from Guatemala to Los Angeles I don't know where I would get the money to pay my bus fare to Vista.

With love and time regards, and all good wishes

Faithfully yours,