CITRUS IN FLORIDA AND CALIFORNIA— A COMPARISON

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Mr. President, Ladies and Gentlemen: Our President has given you the subject about which I am to talk—Comparisons. It has sometimes been said that comparisons are odious, and it is not my purpose to make comparisons, but to give you some impressions of the industry as I saw it in California and perhaps some suggestions as to how it differs from our own.

I might say this, by way of saving myself from undue criticism—that any person who surveys an industry in another land or under new circumstances, sees one thing, and that some other person with a new set of eyes and thoughts might follow him the week after and see entirely different sets of things, and when they come to compare notes, they might differ radically in their conclusions.

From a historical point of view, I want to clear up a certain amount of misconception in regard *to the time* when the citrus industry of the two states started. I read an article not so long back, in which it was said the first orange trees planted on the mainland of America were set in California. If the person who wrote the article had dug around a bit longer, he perhaps would have found out something else about it.

In the patent from the King of Spain to Juan Ponce de Leon, for the *settlement* of Florida, dated, as now definitely determined, September 26, 1514, there is this passage:

"Furthermore, that I shall give license, and I do hereby give it, to the said Juan Ponce de Leon, to make and build houses in the said island of Florida (Florida at that time was supposed to be an island) and villages of habitations of the sort that are built in these realms, provided the foundations of such may be with one tapia height of stone and another of earth; and likewise to make whatever provision he sees fit for the raising of corn and grapes and fruit-bearing and non-fruit-bearing trees, and whatever other things there may be afforded in the said region."—(Colleccion Documentos Ineditos, Vol. 22, P. 33.)

While not specifically mentioning orange trees, I believe this to be the first reference to agriculture on the mainland of North America. Following that, we have the letter of Bartolome Martinez to the King, dated from Havana, February 17, 1577, as follows:

"I have traveled over the larger part of the coast of these provinces and thirty leagues around about Santa Elena; and what may be said to your Majesty of this country, whereof everyone speaks ill, is that it is marvelously good, for where I have gone there are the richest lands for cultivation and cattle-raising; mighty fresh water rivers; great plains and mountain ranges inland; very great indications are there of being therein very fine pearls and mines of silver. And what may be truthfully told to your Majesty is that in Santa Elena I planted with my own hands grapevines, pomegranate trees, orange and fig trees. All the vegetables that are grown in Spain were raised in that fort; and although I know there are persons in those kingdoms who have a contrary opinion, I offer to prove what I say with reliable witnesses, and I wish I had the opportunity to beseech Your Majesty to give me some grant of land there, where I might live always, for it is the healthiest country, with most abundant shooting and fishing, and very good for cultivation, which is all that can be desired."

And then, we have the letter of Pedro Menendez, Marques to the Audiencia of Santo Domingo, written from St. Augustine, April 2, 1579:

"When I arrived here, when I came from Spain two years ago, I found all of the people in revolt, for if they had had the opportunity they would have abandoned the country; but when I came, and built the fort of Santa Helena, and divided them up, they quieted down, particularly when I told them Your Majesty's wish, namely, to keep this land on a firm footing, and last year

I made them so much maize, for in this one fort alone over 1,000 fanegas were gathered, and this season they will gather many more. There are beginning to be many of the fruits of Spain, such as figs, pomegranates, oranges, grapes in great quantity; there are many mulberries from the mulberry trees produced in this same soil; vegetables and grains in large quantities, such as beans, kidney beans, melons, pumpkins, lettuce, cardoons, onions and garlic; all of this in abundance in such manner that I assure Your Highness that if there were those who would farm the land, it is ready for them."

In the City of St. Augustine in 1579, fourteen years after the founding of the city, oranges were grown in some quantity. Now, then, with regard to the first plantings in the State of California, in 1769, approximately *two hundred years* after the writing of the letters I have just read to you, the Franciscan monks left Lower California for the Upper California and with them took oranges, figs, grapes and olives, so, Mr. President, I think I have proved to you tonight that the planting of orange trees in Florida antedates the planting of them in California by approximately two centuries.

We in Florida are much interested in California. We are so much interested in California that we fail to recognize what California really is. That state is a sort of empire and one unto itself. May I remind you that it is the second largest state in the United States? It is 780 miles long; it is from 150 to 350 miles wide, and if you were to pick it up—you would be some giant to do it—and set it down on the Atlantic Seaboard, you would find its southern boundary somewhere north of the city of Savannah and the other end at Detroit, Michigan. And if you will keep that in mind, with regard to the State of California and its location, you will have a better idea of what may be grown in that state. California is a tremendous producer of practically everything that may be produced from a piece of land in the United States. In commercial quantities they produce a tremendous range of fruits, over a territory that would extend all the way up our Atlantic Coast from here to Detroit, Michigan. Then, in addition to that, may I remind you of what has a further effect upon their production—that agriculture goes on from 280 feet below sea-level, to as high in the mountain ranges as anything can be grown. The highest point, Mount Whitney, is 14,502 feet above sea-level, and there are 1,100 peaks in the state more than 14,000 feet high.

Not by way of comparison, but just to remind you of it, our highest point in the State of Florida is a few feet over 300 and if you go to some places in the state and say that some other point is a little higher, though only ten feet, you can get yourself into a rather hot argument.

Now, if you will just remember that distance north or south of the equator is equaled by sea-level, you will get a slight idea of the possibilities of production in California. The climate of California is much broken up. It is greatly and tremendously localized. It is localized because of the little canyons or large ravines that break back into the mountains, and each may have its own private climate, so that all of these things make for a great diversity of products and a great diversity of problems.

I am reminded of the donkey through whose pasture the fence was built; then he always wanted to eat on the other side of the fence, because the grass was better. I sometimes think this applies to our estimation of our own problems as compared with those of California. Don't run away with the idea that all things good are in California and the worst here, or vice versa, but that each area has its problems that are different and perhaps in some instances the same.

With regard to the climate of these citrus districts and again emphasizing where citrus is grown—the northern limits in California are about the latitude of Philadelphia and developed on a large scale as far north as Washington, D. C. In the main, these districts are short of rainfall. We sometimes think we are short here. I came back to the state here and saw our lakes and rivers and thought what a tremendous blessing we had in the state in the way of fresh, clean water and plenty of it, and how little use we made of it.

Remember, in the citrus districts of California, rainfall may run from nothing in a year or three or four inches, up to ten and possibly twenty-four

inches. I shall refer to this matter of rainfall in California again because you can discuss no problem in California citrus industry that you don't get back to water.

California has entirely different soil from ours. I do not know what the proper term for the California soil is, but shall I say that in essence it is a transported soil. There is a certain amount of alluvium in it, but it is not an alluvial soil, but has simply been washed down from the hills and mountains just so, and whatever the composition of the hill or mountain, it is reflected in the composition of the soil that is used for agricultural purposes. That soil may not vary in composition. Talk about surface soil—why, that is a foreign term to much of California's soil. You have a foot of soil at the top and examine it, asking if it would not be better to look six or seven feet lower, and you find it is just the same thing. Those soils are different from ours. We think if we have six or eight or twelve inches of fairly fertile top soil, everything is all right, but when we begin to talk about the soils below, some are so poor they are unmentionable.

In regard to the matter of Florida and California soils, these soils as measured by actual standards in California, are rich. I have heard in my time a lot about rich soils in Florida. If you get with the right real estate man, he will probably bear me out that there is rich soil in Florida, but I have found a tremendous amount of fertility in our soil came out of a fertilizer sack. *Not so in* California. In regard to fertilizer problems, I must say they get no response except in isolated instances, from applying phosphorus to the soil and from application of potash. That appeals to you as a basis for heaven to a Florida fruit man. They are interested in California only in the results they get out of the use of nitrogen, and they never talk about fertilizing without bringing organic matter in with it, and organic matter is secured in various ways.

It is secured by the growing of cover crops, grown in the winter time because the water that they get from rainfall comes in the winter. Our cover crops are grown in the summer time. There was a time in California when they grew legumes of various kinds very largely, but today the cover crops, insofar as legumes are concerned, have completely changed over, and legumes are rarely seen. They have gone over almost completely to non-leguminous cover crops. The only cover crop I saw in six weeks in California, worth mentioning, was down in Santa Fe, the property of Douglas Fairbanks, where vetch was being grown in the orchard.

Elsewhere in California, four or five species of mustards were used. Barley, some oats, but in the main, mustard, and occasionally some acres of radishes. Why this change from legumes to mustard and radishes? First, because in the cool winter of California, they can grow mustard and these plants to better advantage than they can grow clover or other legumes, and if they grow clover and other legumes they have to hold them over into the spring later than they want to, and they get into the ground and develop an interference with their spring water supply, and so the leguminous crops in California have almost gone out of the picture as a supply of vegetable matter. You can get a fair crop by the first of February of these crops. I saw some practically shoulder high, and they were beginning to turn them back into the land because rainfall was short. Their ratio of nitrogen to cover crop is approximately one pound of nitrogen to ten or fifteen pounds of carbonaceous matter, as represented in the cover crop; and then, in addition to the material that they get from the cover crop, great quantities of bean straw, alfalfa, hay and cereal straws of different kinds are hauled in and put upon the ground. This is usually done in October and the material incorporated with the soil. They are going very largely again to the cereal straws and getting away from the legumes.

Now, then, a further mention of soil conditions. You have heard a great deal today about soil reactions, acidity and alkalinity, and we bemoan the fact that our soils are so acid. Thank God they are! Because it is a great deal easier to correct an acid soil than to get rid of super-abundance of alkalinity. When you come to the discussion of calcium and its use in land, be careful you don't step over the wrong side of the line.

You will remember your medial (?) sign is 7. The soils of California will run to 8 and over.

Because of that fact, I got a new conception of rainfall in California. I thought it was just plain rain. It isn't that at all. Rainfall will replace irrigation water, but it is fresh and clean, and the irrigation water oftentimes is not, and it is consequently in many instances adding to the alkalinity of the soil, and of course the drainage has to be given careful attention; but now, when a certain amount of irrigation water can be replaced with rainfall, you see what happens. No limit to the amount to wash out the soil; no alkalinity coming in—it has a different value from what we think of rain having.

This is a sort of hit and miss discussion I am giving you. Cultivation in the summer in California consists in the main of making irrigation ditches or irrigation furrows through the orchards and then, those having served their purpose to distribute water, are torn down, made again when necessary, and torn down again. There is heavy cultivation to prevent the loss of moisture from any source whatever.

Dr. Camp referred to the matter of boron this morning. Boron is a problem in many areas, particularly in the San Fernando Valley. Not only is there boron in the soil, well up to the point of tolerance for the trees, but the water in that particular area also carries a certain amount of it, and so in that section they are in a hitch as to whether the tree is going to be injured or whether they can apply enough water to take care of it.

There was one matter with regard to climate I failed to mention. The humidity in California is extremely low in most places. There are records of a humidity of less than ten per cent. Now, that comes pretty close to having an air that is thoroughly dried out, and we think sometimes we have bad situations in our state created by hurricanes. They don't have hurricanes in California, so if you are afraid of them, it is a good place to go, but when you set out an orange or lemon grove in some part of the state, don't forget you may still have some trouble with wind. Last October the citrus area in Orange County, California, was reduced more than one-third by a hot, dry wind that came out of the east and passed over it, until one would think somebody had taken a torch to the trees on one side, and on the side not reached by the wind there would be some leafage, but everywhere else there was not a leaf. I don't know that any of it ever got into the papers.

Now, then, with regard to the matter of frost. I really believe that insofar as cold weather is concerned, if I were an orange tree and could move about, I would leave Florida and go to California. California is cold in winter. There is an enforced dormancy of citrus trees which is very much in their favor as regards the resistance of our trees. Our plants like their climate so much they try to grow in winter, and that brings on trouble. But those orchards are very thoroughly equipped for protection out there.

We give in Florida too little attention to the elevation and location of groves. In those groves in California, they have it figured to almost a few inches where frost is going to attack them when certain temperatures come, and you may find a grove where there is ample protection from the edge of the grove for ten or fifteen rows, and then no protection, because the owner of that grove has studied and knows where he needs protection, and where not.

Their weather service for forecasting weather conditions has been very thoroughly worked out. The weather service in California is A-1. Why? Because those men have been at it a long time, and some of you, this winter, got out of sorts a bit with Dr. Ellison, because he didn't tell you something more exact about it, and said the temperature would be a certain point. But you happened to be higher up, and that made a difference, and you complained about "inaccuracy." Others didn't like it because they said publishing the forecast of temperatures made their sections look too cold. Piffle!

Sometime, Dr. Ellison and his successors will have worked out this problem in Florida. But you are not going to get anywhere with it unless, at the same time, you are prepared to take advantage of the information given you, and I firmly believe that if the citrus industry of Florida is to be put upon a solid basis, more attention will have to be given to the protection of groves, based upon forecasts, than we are thinking of giving at the present moment. What good are forecasts

going to do—they may keep you awake that night—and perhaps some of the ladies may take out some bed-clothing and protect the plants around the house—but that is not the effective or proper method. There is another thing we will have to give attention to, and that is the application of water. Because we get a lot of water—55 to 60 inches in the course of six months—does not mean, by any chance, we are going to have the benefit of it twelve months of the year.

I will give you an instance. I saw in California—I don't know if this will apply here—I saw in the Riverside groves in California a lot of trees that had been allowed to come to a condition of wilt, leaves curled. Mind you, there is this difference, that that wilt is taking place in a very dry air, and although the leaf may have wilted, the damage may have gone further than with us; but after a space of two years, they had not yet caught up in growth or production with the other trees. How much are our Florida trees suffering from wilt? I don't know, and neither do you.

I think the thing that is bothering California growers today more than anything else is the matter of stocks. A little while back, it was bud selection. I have never been an advocate of the radical systems of bud selections that were at one time advocated. I have the feeling, after looking over the situation in California, that perhaps the same thought is permeating. They are terribly concerned about root stocks. In fact, the situation is that they are about on a 20-25 year rotation basis. You growers in Florida would think you were up against something, if you thought your plantings of citrus trees, at the age of 20 or 25 years, would have to be re-set. What's back of that, nobody knows yet, but it is believed stocks have something to do with it. Oranges are not in as bad a situation as lemons, but the indications are they are not the long-lived trees they are under our conditions.

There is not so much difference in fruit grown on four or five year old trees and that grown on ten to fifteen year old trees in California as there is with us. In fact, I sometimes think if a man sells any fruit off any tree in Florida until the tree is seven or eight years old, he is perhaps making a mistake. It is an extremely difficult problem in California to keep sizes up on fruit. After the trees get old, the sizes go down and there does not appear to be much that can be done about it. It changes with the season and rainfall, somewhat, but I should say that it is true in the main. California emphasizes small sizes in fruit shipments. I wonder why Florida does not emphasize large sizes in fruit shipments; but when you begin to think about four hundred and some in a box, I begin to wonder if you are picking golf balls.

Now, then, there is one thing about these people in California that is wonderful. That is the unanimity of opinion when it comes to tackling a problem. That citrus industry in California is run as though it belonged to one man. You, in Florida, are running your citrus industry by 510 men, and everyone has got to have his say about it. Some of these days you will have to get away from it. We think of the wonderful co-operative spirit in California, and it is there through the whole structure. Perhaps, after all, they are not serving of some of the credit. Co-operation was forced upon them—either co-operate or quit! I have a piece of land and I want water out there—how can I get it? Maybe it comes from 200 miles away. It costs millions to get it. How can I get it? I better get my next-door neighbor to lend a hand. Co-operation had its inception that way.

You must remember that in 1902 or 1903, California was rolled out flat. Florida has never been properly rolled out yet, but I sometimes have thought we were getting close to the verge of it, and that if we were, perhaps we would co-operate.

Ninety-five per cent., approximately, of the fruit in California, is handled by two co-operatives, the California Fruit Exchange and the M. O. D. If you don't like one, you can go to the other. Same pan, same fire, you are just stepping back and forth. The other five per cent.—you will probably not be one of them if you have ever been in these. The things we do in Florida—I was glad Mrs. Thursby got at you a little bit!

The trouble is just what I said—too many cooks, and I never saw good broth made that way. One leaves out the salt, and the broth isn't good that day. The next day, both put in salt. The broth is not good that day. Sometimes I think the broth

in Florida is never good! I have studied and watched this situation for 35 years. Now, then, things are too easy for you in Florida. Let me indicate this to you. I put this question time and again. How much will it take to develop an acre of lemons, or oranges, in your section? What is the reply? Plant it, take care of the land, get it ready for irrigation, get the water to it, plant the trees and bring it to bearing age. How much? The estimates ran from $2,000.00 to $3,000.00 per acre, against our folks who get a job down here as a carpenter and work four or five days a week and piddle around in the orange grove and in five or ten years have the grove and don't know if it cost anything or not. Just too easy to get started. I am pointing these things out to you, because fundamentally these are the things that are wrong, and the reasons why California is in a different situation as regards the marketing problem. We are missing the greatest chance of our lives, but you can't sell people chaff and make them believe it is wheat.

I bought a sack of grapefruit in the market for $1.00 the other day. How many grapefruit did I get out of it and finally use? I got twelve. I used to pride myself I knew oranges when I saw them—I may get fooled sometimes, but not often. I can look at a bunch or oranges and tell pretty well what I get if I buy them. I bought some color-added ones last winter. I have not forgotten them.

Do you know in Florida you have the tangerines of the United States sewed up? Then you wonder what to do with them. They don't grow tangerines in California, or if they do, they are very small and practically juiceless. Occasionally you get hold of a good one. No tangerines in Texas; None that I know of any better in Arizona. You have the tangerine market and wonder what to do with it. You have the grapefruit market, except for Texas. Let me see, I had some figures here—the average production of grapefruit in California for the last five shipping seasons, 1930-1935, was 1,546 carloads. Against our average, for the same period, 18,559.

California has the oranges—about twice as many as we have. They had, during the same period, an average of 59,000 cars, against our 26,000 cars. Lemons we do not grow commercially. California's production at the present time—they have the market sewed up—is 17,000 cars annually for the last five years. Our tangerines over the same period averaged 2,8881 carloads. We have a lot of advantages in Florida, but we have got a lot of disadvantages, and the advantages are *those* Nature gave us in the control of insects. There was a time in California when they thought that hydrocyanic acid gas was a panacea for all insects, and they used it, but the insects got wise to it, the dose came too frequently, and some of them said to themselves, "We will just breed a stronger and better race of insects," and they did it, until now it has got to the point as to whether you will kill the insect or the tree, and the odds, as far as hydrocyanic acid gas goes, is in favor of the insect.

No, they are fumigating, spraying and dusting, and they are getting a bright fruit, highly colored fruit, but the high color is not from the spray. The main factor is cold weather. The thorough dormancy of the trees. Perhaps we might get to this point in Florida, where somebody might undertake the breeding of oranges of high color. There are other things that might be done about it, but leave it to the fertilizer people!

I came away from California with one peculiar thought in mind. I went to the Riverside Citrus Experimental Stations. The buildings cost approximately a quarter of a million dollars, and their income for the use of investigation of citrus problems amounts to more than a quarter of a million dollars per year. They spend more money in various ways in citrus investigations in the State of California alone than Florida spends on its whole experiment station system. I came away with this thought in my mind—that the future of the California citrus industry is tied up inseparably with its experiment station in Riverside.