

Citrus Hall of Fame Oral History Interview
Florida Southern College

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| Interviewee: | Robert Carter |
| Interviewers: | Thomas B. Mack |
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Mack: *We're glad to have with us this morning Robert Carter, we all know him of course as Bob Carter, a research chemist at the Department of Citrus station at Lake Alfred, in the Citrus Research and, and, and Education Center. But Bob has done a lot of work in citrus products. And his work has been well-known, well-published. There are many bulletins, lots of scientific papers that he has written, and he has done a lot for the citrus industry, and as we look at it we can say that his contributions in one way or another has a lot to do with the success of the industry through the years.*

Bob we welcome you this morning, and we're going to ask you to say something about your life as a research chemist, and after, I know that now you're still a consultant and you're still busy even though you retired from the station. And I would like now for you to go back and tell us, I know you came from Vero Beach. Tell us something about your family and how you came to be working with the Department of Citrus.

Carter: Well thank you, Tom, for having me here in your archives, which is excellent for the citrus industry.

Yes, I was born in Vero Beach, and into a citrus family; I'll tell you a little bit about that. My grandfather, Artie Carter, they came in 1910 from North Carolina. He was a civil engineer and got jobs in the early days as ... in engineering and surveying the wetlands around Vero Beach, enabling them to dig canals and drain the water from these lands and plant citrus and vegetables on this land.

And in 1912, two years after being down here by himself, he brought his family from North Carolina in Homestead and ended up in Wabasso and established there Carter's Dairy, a large viable dairy in Indian River County, later on, and then he planted citrus, of course. And then he started an engineering company on his own, and it was later after his death managed by my father, E. E. Carter, and now it's managed by my brother, Marvin, who carries on the name of the Carters in his business, and the business is of course over 90 years old now.

And my brother Stan is production manager for McArthur Citrus between Ft. Pierce and Okeechobee. Our sister Milly, who passed away a few years ago was active in civic accomplishments including leading the restoration of the old civic center they're owing to the Vero Heritage Organization, and I wanted to give her credit because she insisted in including in this restoration and development of the Heritage Center, she insisted on including a citrus museum, Tom ...

Mack: *That's where, where, we, we have visited that and we're well aware of that. It was in our, it's still in operation I guess.*

Carter: It is still in operation.

Mack: *Last time I was there I went over there.*

Carter: I, I think it's good to have a place to preserve items from the citrus industry and I encouraged her to, because of my processing background to put more processing in that. And I discovered one thing in doing research for her, for her museum, that Vero Beach was one of the first locations where, where grapefruit sections were canned. And no one knows that they were canned in Vero Beach one month before they were canned over in Haines City, which is usually recognized as the place where citrus ... grapefruit sections ...

Mack: *C. E. Street and Company in Haines City.*

Carter: Yes.

Mack: *They canned grapefruits there.*

Carter: But Vero packed them in December and Street, I think, packed them in January. Tom, remember that, Tom, you were in Vero Beach for awhile, and because of our age, little age difference there I didn't know you at that time, and your father operated an agricultural supply store.

Of course growing up in a citrus family and other businesses I did engineering work, you know, while I was going to school, in high school, and that. And I did grove work, became familiar with groves, and of course working in the dairy. I graduated from the University of Florida in 1949 with a degree in agricultural chemistry, and my professional employment years numbered 43 years total, in three different areas of work.

First of all after graduation I went to work with the United States Department of Agriculture Processed Food Inspection. And this included, of course, inspection of citrus processing during the nine months, the winter months, the citrus months in Florida, and working then in Maine for three summers inspecting processed vegetables, corn, and beans, and blueberries and things like that. I worked five years for the USDA, and I worked 15 years in the processing industry itself as, in quality control. And the longest plant, or most of the years were at Simon Groves in Winter Haven; it later became Cypress Gardens Citrus.

And then of course 23 years, 43 total, were at the Citrus Experiment Station with, employed by the Department of Citrus, working with University of Florida researchers there at the Citrus Experiment Station in Lake Alfred. I'll tell you a little bit about the USDA work because it's interesting and of course there's some history there. My first work, of course five years USDA, worked at Pasco, it was the site of Pasco Packing Company ... processor ...

Mack: *I see. You worked in the plants?*

Carter: Yes, in Haines City I was the inspector.

Mack: *Ah, yes.*

Carter: This is looking at these three areas of my life quickly. They, Pasco was one of the largest plants in the state. They had a juice line, of course hot-filled canned juice, and they packed a hundred thousand cases a day there in that plant. And then after November and December in the cannery I was transferred to the concentrate plant, and that was the place where I was really more interested in working, and was attracted to that in, during college, and that's one of the reasons I decided, you know, to go into this type of work with citrus canneries and concentrates.

Transferred over to the Pasco's concentrate plant which was, included several evaporators, Buffalo Vac manufactured one and these remember were low temperature evaporators. All over the state at that time other concentrate plants in the state had low temperature evaporators and Buffalo Vac was, manufactured a lot of these. Also there was a new evaporator that was designed with the help of [C. D.]

Atkins at the Experiment Station of the Department of Citrus. He designed a new, but still a low temperature evaporator and there were three of those that began work that season.

Nineteen forty-nine was the year that I was there, three of those evaporators each were removing 10,000 pounds of water per hour from the juice and produced citrus concentrate, which we thought was wonderful. There was one drawback, these evaporators are low temperature, of course use non-pasteurized juice. That was common in those days of no pasteurization. And they had a problem in the length of time that they could run. Usually 30 hours and a cleanup was required because of the juice, the concentrate sometimes tasted like buttermilk and they realized this was a problem. And some of the researchers came to look for this problem, and Elmer ...

Mack: *That's a strange ... buttermilk?*

Carter: Yes, it was a defect, and this was something that they determined was growing within the evaporator and some researchers began some work on that, and one named Ellis Byer was working with Bird's Eye and then Elmer Hill working at the Citrus Experiment Station where I later worked. Elmer Hill, a bacteriologist, a University of Florida graduate, He and Ellis Byer together, and some others, worked and found the problem, and the problem was coming from bacteria that was growing as the concentrate process progressed over a 30-hour period. And the bacteria was identified, one of them *Lacto lukinostok* or *Lactobacillis*.

And they finally, somebody identified the material that was causing the buttermilk flavor was diacetyl, and diacetyl is what gives buttermilk its good flavor; people that manufacture margarine like to use diacetyl and put it in butter, make it taste like butter. So it's good in dairy work, not good in citrus.

And they developed this test where they could run the concentrate through this test and it could determine that the diacetyl was just beginning to build in the evaporator, not taste it, it was just beginning to build, that was time to shut down the evaporator and clean up. So that was so much for the low temperature evaporators, which later were replaced, and we'll say a little bit about that, by high temperature evaporators, and were called the TASTE, T-A-S-T-E, an acronym, and it stands for *thermally accelerated short-time evaporation*, and we'll say a couple of things about that a little bit later.

After, after the USDA work I was hired into the citrus processing industry as, in the quality control departments, and as I said I was the Director of Quality Control for Snively Groves, 13 years there with Snively Groves in Winter Haven. And a wonderful place to work, enjoyed it, enjoyed every minute.

They had the full range of citrus products, they produced the full range of citrus products. Things that made may be forgotten about because they've gone by in Florida but things like grapefruit sections, canned sectioned, hot filled, cooked cans, and then there was chilled sections that weren't cooked and they were packed in glass. People remember those, and those are still sold in supermarkets but many made out of the country.

Then of course they have a concentrate plant and produce concentrate. And they changed when I was there from a low temperature evaporator that we talked about to a high temperature evaporators called TASTE, T-A-S-T-E.

In, after 15 years working in the industry I was hired by Dr. John Attaway of the Florida Department of Citrus, he was Director of Scientific Research for the Florida Department of Citrus, and this was done at the Experiment Station as you mentioned earlier in Lake Alfred. And we worked, there were other researchers there, some 20, 25 Department of Citrus researchers worked there, and the University of Florida researchers also worked, and many times in my mark we cooperated on projects together.

Dr. Attaway had me working in a grove working the Fresh Fruit Department to learn a little bit about fresh fruit because I'd always been in processing and I did some work with Dr. Gussen on acidity

reduction of grapefruit by spraying different materials on the tree at times and then watching the maturity and then analyses for acidity to determine the effectiveness of these materials, and of course we were looking for a replacement for arsenic which had some bad press as a poison, and we weren't too successful in the work while I was there, two years.

After two years I was transferred to the Processing Department where they were doing some work, just beginning a project called Juice Definition Program, or JDP, I might refer to it. After one year there I was asked to coordinate this program, which was a four-year program, and the program was set up to identify constituents, which would indicate quality of orange juice, and this was important to identify chemically what good orange juice is, and that way promote the awareness of these chemicals and constituents in the orange juice and emphasize the good ones, promote them, and reduce or eliminate the ones that are not too good, but.

We, in setting up this experiment we used equipment from both extraction equipment manufacturers in Florida, there were two that were represented throughout the state and we used both of them in the Alfred plant, in the Experiment Station. And we used for a sample 900 pounds or 90 boxes of fruit, not just a small sample of fruit that you could squeeze with the hands, we needed a mixer, commercial machines that we used to extract the fruit, and then we'd pack them in sample form, and we concentrated them. And before we started the concentration process we did upgrade evaporators at the Experiment Station.

Atkins, as I said earlier, had designed an evaporator for Pasco, or helped in the design and manufacture. Atkins constructed the one at the Experiment Station, we're going way back now before I was even at the Station. And so at the time of this Juice Definition Program, we saw fit to take his low temperature evaporator which was great in the time that it was built, but the industry had passed by low temperature evaporators, and at this time we thought we needed a high temperature evaporator at the Experiment Station to do this work to be relevant and consistent with what the industry was using. So I was able to help with coordinating the design and manufacture of this evaporator, and the setting up and that with Gulf Machinery Corporation that does evaporators, and we had a high temperature evaporator, the first one at the Station.

And we did some variations of, not only the tightness of the squeeze, but tightness of finish. We had hard squeeze soft finish, soft squeeze hard finish. And we picked the fruit from the three different seasons, the early season, and then a different variety from the mid-season and the Valencias from the late. And all of these we did three extractions for each variety in each season, so you can see we were busy. Kept busy working to try to relate our tests to the actual industry itself.

The evaporator we did put in there was monitored at various places throughout that evaporator, and this gave us a TASTE evaporator that was consistent with the industry, but ours probably had more monitoring points than the industry. And ... it, it's something that the industry did see that was important. We did ... in monitoring and we set up a control for this evaporator to control the juice flowing in and the steam going in to things that control the evaporators' work and usefulness. And it's interesting that later the industry did pick up many of these procedures and one of the industry's companies asked us to try to make ... their evaporator following the procedures that we used, and this was successful as it was successful at our own research center.

The juice definition, all of these things that I'm talking about are kind of going on simultaneously, we didn't of course just have one research project, get through that where we could get evaporator monitoring set up with the juice definition program.

Mack: *You were almost on a 24 hour basis 'round the clock with all the work you were doing.*

Carter: Well, we could have, but it, it got interesting. We did, we had four annual publications on the Juice Definition Program, and the industry did recognize that this led to better quality juice. And looking at finishers and how they were constructed and the industry was able to take those points that we made and improve their extraction equipment. The, we, we sampled, I think maybe I mentioned 32 different, we analyzed 32 different constituents like formal number, and different polyphenols, and some of the things that may not be too aware or apparent to the industry, and of course along with Briggs acid ratio and that sort of thing.

In our, in our work for the Juice Definition Program the Food and Drug Administration in Washington got on to that and they liked what they saw, but they wanted a different set of tests and they wanted tests to ... they wanted a different set of tests. And they wanted to control themselves the picking of the fruit and the delivering into our plant, and they wanted fruit not only from different parts of Florida but from overseas, where concentrate was coming from Mexico, and Belize, and Brazil.

And they wanted this, they didn't want the Department of Citrus to do the analyses of these samples, and the purpose of, maybe I said, of this whole testing program that they were proposing was adulteration studies, that they were very conscious that adulteration was possible coming from, concentrate coming from foreign countries, and so they wanted something of known purity to hold up and decide the concentrate that was really purchased and shipped to us.

Mack: *That was quality control; I mean that was to be sure that we had that Florida product that we thought was so great.*

Carter: That's right. And Food and Drug Administration in Washington. And that of course cost them money and they of course ... convinced the Department of Citrus to pay all or most of this money themselves for this project, and it was quite a challenge.

For instance, a pallet of fruit, 900 pounds of fruit was picked in Mexico three different times and shipped over here to Lake Alfred, but it had to be fumigated and ... to ensure that it was lawful to leave that country and lawful to get into this country and get to the Experiment Station. All this in time for fruit that can't hold forever. But that's just an example of how refined this, this was. Well, we ... and it was paid for by the Department of Citrus which was a way of spending the growers' money to establish something that would guarantee purity of concentrates that were not only made in Florida, but those that were made outside of the States and sold here.

Mack: *But we didn't realize actually, or I didn't, that it was all that much work going on behind the scenes. That's what makes our juice so good.*

Carter: And anyhow, ...

Mack: *You chemists really went into the details.*

Carter: And the Food and Drug had these samples shipped to Washington. We, we didn't analyze them, they didn't want us to analyze them because it said, "Well, the Department of Citrus is a ... is a biased organization to Florida ..."

Mack: *Self serving, too.*

Carter: And they said, "This is going to look much better to have an impartial party like the Food and Drug Administration." So all these samples were concentrated on an evaporator that we had upgraded after I was there and ... it worked out all right.

The ... the Department of Citrus was involved in another program that I was involved in called, called the Three Party Program. And the Three Party Program was set up to aid in the sale of Florida concentrates

to overseas buyers, especially dairies that were realizing orange juice was a good item to include with milk. So the Three Party Program, I was asked to do some monitoring on that.

Part of the Three Party Program was to come up with an advertising program and I wasn't involved in that because my background's not in advertising, but the Department of Citrus contributed to a proposed advertising program, a plan for newspaper advertising or advertising in the point of sale at the supermarket. And the Department of Citrus would put up some money, maybe 10,000 dollars, and then it was the United States Department of Agriculture in helping international trade and helping Florida citrus put up the 10,000.

And the company that was doing the work and the sales put up the other third and after approval somebody at the Department of Citrus, not a scientific researcher, would go to the operation and look at the marketing, and look at the newspapers. But they wanted somebody with scientific knowledge to look at these organizations from time to time, and I made maybe one or two trips a year to 14 countries, 14 countries, Norway, Sweden, Finland, Germany, Italy, England, ...

Mack: *So you became somewhat of a world traveler then when you go to work, you work in Florida, yeah.*

Carter: It did, it did get exposure overseas, and I enjoyed that. Iceland even, Tom, if you can imagine that, they would joke up there, our slogan was "A day without orange juice is a day without sunshine," and they said, "We have a lot of black days up here so we have to get our sunshine from the orange juice."

But, and the, so I looked at the organization that was doing the work and they all were good, reputable, and they also required a partial laboratory at the city of production that would take and analyze orange juice to show that there were no adulterants in it. And this was often a state laboratory, a government laboratory with a reputation, so I could go in there and look at their reports and which they were sending through the mail, but we wanted to be on the spot from time to time. And that worked out very well.

One thing I did, Tom, also, was write a technical manual on how to reconstitute Florida concentrate, and this served to go into organizations like the overseas organization that were buying Florida concentrate in drums from different concentrators, and Three Party cooperators, we called them, and they, people in the United States, dairies, bought an awful lot of concentrate from Florida. And many of them said, "What do you, how do you handle this?" and, "Well we'll just add some water to it." But they needed a manual that showed them, took it stepwise, so talked with them and I could see that, and they were overjoyed when I agreed to write a manual on how to reconstitute Florida concentrate. It's really not like you and I would need that ...

Mack: *No, you're right.*

Carter: ... but I started off in the beginning with why you would need to pasteurize your orange juice, and I think I maybe mentioned that in the TASTE evaporator proposition the juice was pasteurized during the process and was reversible from the original way, so packing orange juice without pasteurization. But the manual on orange juice was revised about seven, eight times, then I wrote one about grapefruit juice which wasn't a lot different, but it did have grapefruit on the front.

Mack: *We have copies of those manuals ...*

Carter: Yes you do.

Mack: *... here in the archives. Glad that you were able to provide those for us.*

Carter: You've got, on overseas trips, too, you've got copies of my trip reports.

Mack: *Of course we've got other, you added other publications, I mean ...*

Carter: Yes, and you've got a file of all my publications ...

Mack: *I sure have, yes.*

Carter: ... downstairs here, and people can look at that and I can look at it when I forget where I went, sometimes, and when.

As I say I worked 23 years with the Department of Citrus. Scientific research with the Department of Florida Department of Citrus with Dr. Attaway, and then retired in 1992. And I've done a little bit of consulting since I've retired, travelled to six countries that, for instance one, one required some lecturing, and this was in Colombia. I was invited to lecture at, sort of a course in Medellin, Colombia, and it was a rather rigorous assignment, and it was consulting. And the rigorous part was the lecture was a four-hour lecture, and it was six days in a week at the university facilities, very nice facilities. They filmed a video during that, but, but for lecture for four hours with a little break in the middle. You know, you've been this route yourself.

Mack: *Sometimes those things get a little boring and long-winded.*

Carter: But I enjoyed it because it was my work and they were interested in it and I divided it into different sections. So that brings me now to the end of my professional life, Tom. Nineteen ninety-two I retired.

Mack: *Now take us, for just a moment, into what, you're now in consulting. You're still working, you're not retired. Tell us a little about that.*

Carter: I do a little bit of consulting, yes. Well, that was one that I just told you. And I have also been to Mexico as a citrus processor, and went to two plants in Venezuela, two different plants, and went to Peru to lecture at a University in Lima, Peru, University of Molina, that sort of thing. And then helped the processors here in Florida, and looked at some freeze damaged trees and the juice that was being made from freeze damaged fruit for one processor in South Florida. So I keep busy. But I am backing off and not doing so much now, Tom.

Mack: *But you can't retire. I've always said to people, "Don't retire." I never retired because when you do slow down your health begins to break so you've got a problem there.*

Carter: Yes.

Mack: *And I'm sure glad, I'm sure glad that you were able to come today and be part of this program where we are trying to preserve for the future the works of some of our scientists and growers and so forth. And your work has contributed a great deal to the fact that, we can place a seal on our fruit products now saying "One Hundred Percent Florida" and "Pure."*

Rather than it be something we're not proud of, you have made it possible for us to produce a product with high quality, and that's something we can be proud of. I want to thank you for coming in again, and I want to shake your hand and say that you have been so much of a help to the citrus industry through your work.

Carter: Well thank you, Tom. It's a pleasure to be here and talk with you, and thank you again for your work with the archives.

[END]