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E. Charlton Prather (CP): We are very happy to have with us this afternoon Andrew J. Rogers, PhD, who was a long time practitioner of medical entomology in Florida in a number of capacities. He is a graduate of the University of Florida, but he got his PhD from the University of Maryland in entomology with a special emphasis in medical entomology. I knew him, or I met Dr. Rogers, when he was my professor of entomology at the University of Florida and I would like to tell a lot of stories on him from those days, but I will constrain myself only to remark that he was the chief professor for my minor in medical entomology.

One of my best friends and one of my most memorable professors, but we are here to talk about his participation in the public health aspects of entomology in Florida and he comes as former director of the state entomology program. He comes as a former professor of entomology, University of Florida, comes as a former researcher at the Vero Beach Entomological Research Center, and he comes as a director of the West Florida Entomological Research Center that we called the Black Fly Center. I am sure it has a more special name than that.

He is now retired in Panama City, but is willing to come and share with us his exciting and fun and productive history in Florida's public health. Dr. Rogers, it's truly a pleasure to have you here today. And, on the behalf of the University of South Florida and the College of Public Health, I thank you for your willingness to come. If I am remembering your curriculum vitae, you actually got your professional start right here in Tallahassee; that's a funny place to start an entomological—entomology career. Is it fair to ask you about that early beginning here in Tallahassee?

Andrew Rogers (AR): Yes, I think so. When I completed my master's degree residence requirement at University of Florida, an old friend of mine and yours came down to the university one day looking for young entomologists to help in a new program by the Florida State Board of Health and the US Public Health Service. And this program was for the control of malaria in war areas. That was the title of the program in any community like Tallahassee, Perry, many others that had a large number of military personnel in Florida was included in the

program, presumably, to protect the military personnel from malaria because, in those days, malaria was very prevalent.

CP: Even in Florida, in these areas?

AR: Right here in Tallahassee and throughout especially North Florida. So, that is how I came to be in Tallahassee for my first professional work in medical entomology.

CP: You said a mutual friend of ours. For the record, I know you are talking about John Mulrennan[1]?

AR: John Mulrennan.

CP: Yeah. For the record, I wanted to get that onto the tape. And he was director of entomology?

AR: He was the director of the statewide program for entomology at that time with the state board of health, medical entomology.

CP: Were you especially interested in medical entomology that early, or were you just a general entomologist?

AR: No, I had been interested in medical entomology throughout my tenure as a student at the University of Florida and had worked with mosquitos on the campus there. Not in a serious research program, but just as a matter of personal interest.

CP: I remember when I was there, I worked with mosquitos too, but it was because the mosquito control people didn't control them very good.

AR: That's right.

CP: I'm sorry. That's an aside.

AR: That is quite all right. I agree with that. That was before we had really effective techniques and materials and personnel.

CP: About all you could do then was film and drain.

AR: Just about, yeah. When I came to Tallahassee in 1942, we had only shovels and, as you suggest, to drain the swamps and what are now called wetlands.

CP: Yeah, they were swamps.

AR: And Doak Campbell Stadium[2] was a marsh that was producing malaria vectors. And one of our projects was to drain that. It was a cow pasture really, and so, we drained it and then the

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1John Mulrennan Jr. was interviewed on behalf of his father, John Mulrennan Sr., for the College of Public Health Oral History Project on June 23, 1997.

university eventually built the stadium on it. Being a [University of] Florida Gator, I have always kind of regretted draining that pasture.

CP: Dr. Rodgers, that is terrible.

AR: That's all right.

CP: Let me back up a step.

AR: All right.

CP: From your high school days, pre-University of Florida days, what stimulated your interest in entomology as a profession?

AR: Well, actually, it wasn't so much a life long interest or anything of that nature. If you recall in the 1930s, the height of the economic depression that our present generation knows nothing about at all.

CP: That's right. And they look at us as scants when we talk about it.

AR: When I registered at the University of Florida, my first ambition was to be a forester. I am a native of a forest area and was very accustomed.

CP: And where is that?

AR: Perry is my hometown. And I grew up hunting and fishing and camping in the woods in the pastime, so that was my first interest. But, at that time, foresters were, you might say in the breadline so to speak with a lot of other people. They get paid very little money, and it so happened that entomology was a good place to be employed at that time.

CP: Potential good pay. Pay-boss, potentially. Yeah, okay.

AR: So, that influenced me more that I had to have a job when I got out of college, so that is why I was interested in entomology or became interested in entomology.

CP: Who was the professor of entomology and chair of the department at that time?

AR: Dr. John Crayton.

CP: John Crayton. And you went there in '38?

AR: I went to the university in '38. I got into the entomology department in about '40, I guess.

2Bobby Bowden Field at Doak Campbell Stadium, commonly referred to as Doak Campbell Stadium, is the home football stadium for Florida State University's Seminoles football team. The stadium is located on the university's campus.

CP: Yes, that sounds pretty good. Okay, so, it was not a lifelong ambition to study books, but it was one of an economic decision. But it was a good one, as you have made specific contributions to entomology. If you haven't had made that decision, I think that we would be in a different place than we are now, thank you.

AR: Well, thank you.

CP: Yeah, but you got then to FSCW [Florida State College for Women]. I am surprised they had a good Florida man like you coming over to Florida State College for Women at that time. But, for our audience, that is the place where the University of Florida's men spent their weekends was in Tallahassee, because that was where the girls were.

AR: That's right.

CP: And then, you were privileged to move here with a job. And so, your duties were fuel control, in so many words. Tell us what you had to do.

AR: I came here as an entomologist primarily to supervise and do inspection work on the control program. There was an engineer with the US Public Health Service, actually in charge when I first came here. And he later left, and I became the director of the program. But this was a pretty malaria-ous area at that time. We had almost no insecticides except the older one, Paris green[3], and for the larvae, and we use that as a dust to treat the larval areas where the larva formed into mosquitos. And didn't have area sprays and things of that kind, you know. We did lots of drainage—

CP: How effective was it? As compared today to our aerial spraying, how do you compare the effectiveness of what you used versus what they are using in 1999?

AR: Well, it was just two different things altogether, I mean—

CP: So, you can't compare those apples and oranges?

AR: No, the first important, new insecticide was DDT [dichlorodiphenyltrichloroethane], and I was fortunate to be one of the first to test DDT right here in the backwaters of Lake Bradford.

CP: You were?

AR: Yes.

CP: Tell me about that.

AR: Well, the US Department of Agriculture had, they didn't discover this. They discovered it late, but it was a German chemist had developed DDT in his laboratory[4] and found no use for it apparently, and put it on the shelf. So, during the early parts of World War II, the US Department

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3Paris green (copper (II) acetoarsenite) is a highly toxic, inorganic compound named for its original usage of killing rats in Parisian sewers and vivid green hue. It can be used in many ways, including as an insecticide.

of Agriculture was looking for new insecticides because we had terrible situations overseas and in this country, though, protecting personnel[5].

And they came across this chemical compound that had not been used up to that point—to my knowledge, it hadn't—and tested it in the laboratory and found that it was not only very toxic to mosquitos and other insects as well—not all insects, but especially to mosquitos and flies and that sort of thing. And so, they ran tests, field tests, and they sent a sample here to me. And I tested it as a dust, as I said, in the backwaters of Lake Bradford.

CP: In real life, real environmental conditions in contrast to laboratories.

AR: Oh yeah.

CP: Well, what happened? What did it do?

AR: Well, it was excellent. Some people claimed that ducks lining in the water that had been treated could fly to another place and it would automatically—I don't believe that, but that was indicative of how important and how effective it was.

CP: Did you get 100 percent kills?

AR: Yes.

CP: It kills both larvae and adults, though?

AR: Well, yes. Of course, you applied it to the water to kill the larvae and, then, the other thing about DDT was that it would—on like pyrethrum[6] and some of the other what we call space sprays[7], which were good only at the time you used them and had no residual effect, DDT had residual effect. And that led to a program later during the latter part of World War II and after World War II, of spraying DDT on walls of the homes in malaria-ous areas inside the house. And this would break the transmission cycle, because it killed off the infected mosquitos.

CP: Yes, that would lie on the walls to rest after feeding.

AR: That's right. And this would last for months on the walls of the homes.

CP: I wish to tell you that my home was one of those sprayed.

4A Swiss chemist, Hermann Mueller, first synthesized DDT in 1939. Mueller was awarded the Nobel Peace Prize in Physiology or Medicine in 1948 for his discovery and the connection made between DDT as an insecticide.

5During the second half of World War II, DDT was used to control malaria and typhus amongst civilians and troops by the United States and Great Britain.

6Along with being the name of a genus of plants, pyrethrum is a natural insecticide made from the dried flower heads of *Chrysanthemum cinerarlifolium* and *Chrysanthemum coccineum*.

7A space spray is a liquid insecticide dispersed into the air in the form of hundreds of millions of tiny droplets, much like a fog or aerosol. The insecticide is only effective while the droplets remain airborne. They can be applied either in a thermal fog or cold fog.

AR: It was?

CP: In Jasper. Yes, yes it was.

AR: Well, there were thousands of homes sprayed at houses. And this was actually the thing that eliminated malaria in the United States. It had been on the downhill side over a period of previous ten years or so, but DDT actually eliminated malaria—

CP: Took care of it.

AR: —as a public health problem in Florida.

CP: We haven't had any indigenous transmission of malaria in Florida. I think the last case was in '46.

AR: Forty-six or '48. I am not sure which. It may have been '46.

CP: It may have been '48 too, but that is pretty close.

AR: So, that is sort of the beginning of my work.

CP: They grew out of that, apparently, out of what you are doing here, a very formal program of the military of malaria controlled in war areas. And, from other sources, I have strong feelings that most of the major field activity for malaria controlled in warriors was done right here in Tallahassee. The research, the application was done, and I have a strong feeling to believe that you were a part of all of that.

AR: Well, yes. Dr. Mulrennan developed a program of training military personnel to do mosquito control and disease control, transmitted vector control, I should say. And this program started—this was in 1942, '43, along in that era. We had medical doctors; we had engineers and entomologists in this program. And he would start with them in Jacksonville, which is where his headquarters was.

CP: That was the classroom element.

AR: Yeah, more or less. And then they came to Tallahassee, and Dr. Mark Boyd had a laboratory, as you know, on the campus of Florida State College of Women. And his work was with malaria as a therapeutic procedure to treat paresis[8]. And he used the people that had paresis over at the state hospital at Chattahoochee.

CP: Okay, can I add another synonym for paresis?

AR: Yes.

8Paresis is a condition of slight or incomplete paralysis seen in cases of tertiary stage syphilis cases as a result of chronic meningoencephalitis.

CP: Late-stage syphilis[9] for our listeners.

AR: So, naturally, his staff was very familiar with the parasites that cause malaria. And so, Dr. Mulrennan would bring his group of trainees from Jacksonville over here, and they would study malariology under Dr. Boyd and Mulrennan and their staff here in the laboratory, mostly the parasitic stages and that sort of thing and identification. And then, as time progressed, as they progressed in that, we would take them in the field here, and show them how to look for mosquito larvae, and how to sample them, and show them the work that we did as far as control with water management and insecticide, such as what we had at that time.

And after a period of perhaps a week or ten days here, they would go over to Pensacola. The naval air station[10] there had a malaria problem, and they drained the swampy areas on that military post, the naval air station with a unique underground—I call it a French-type drain. And they buried pipe, perforated pipes in the ground, and the seepage from the higher elevations would seep into these pipes and be discharged someplace else. You never knew there was any drainage there, but all these low areas that formally produce mosquitos dried up.

And so, Dr. Mulrennan would take them over there and show them that and whatever else was interesting there. So, this went on for a couple of years, and I had the pleasure of meeting and working and helping to train those people. And then in 1944, I went in to the service myself, US Navy and Marine Corps, and ran into some of those former students overseas on Guadalcanal or China or someplace.

CP: Did the Navy use your professional background, or did they make you a common swabbie[11]?

AR: I thought I might turn out to be a fireman or something, but they didn't—they took me in, commissioned me as an entomologist. And I served with the Navy until 1946, when I was discharged in China. Well, I wasn't discharged—

CP: Discharged in China?

AR: I wasn't discharged there. I got my notice to come home while I was in China. And I was discharged in Jacksonville actually, I think.

CP: Okay. Yeah, they paid your transportation home.

AR: Yeah, they paid my transportation home.

CP: What were your entomological duties with the Navy?

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9 Syphilis is a chronic venereal disease caused by *Treponema palideum* and produces rashes and lesions in a course of three stages.

10 Naval Air Station Pensacola (NAS Pensacola) is a US Navy base located next to Warrington, Florida, near Pensacola, Florida.

11 A swabbie is an American slang term referring to a sailor.

AR: We had to try to protect the Marines from malaria. My first base was on Guadalcanal, and we had *Anopheles farauti*[12], which was the main vector there.

CP: Did you know that before you got to Guadalcanal? Did you know the vectors?

AR: We had a pretty good idea there because—well, we didn't know a whole lot about them, not really, but one of my most memorable experiences on Guadalcanal was being called before the commanding officer of the Fourth Marine Regiment. And I didn't know what I had done wrong, but I had been working in his area. And so I reported to the colonel and he said, "I just wanted you to come in lieutenant, and I wanted to thank you for what you are doing. I have had my whole force die with malaria in other campaigns. I just want you to know we appreciate what you are doing." That was a tremendous surprise.

CP: Yeah, boss, how about giving advance notice that you are bringing me in to congratulate me.

AR: Right. Anyway, it was very interesting.

CP: That's nice.

AR: And incidentally, although we had no DDT to use in this country, when I went overseas, the military had it all at that time, and we had people spraying DDT with airplanes on Okinawa. My division was part of the 10th army that went to Okinawa in that campaign, and we sprayed the—I say we, I was not part of that particular program. I was doing other things. But they sprayed DDT in the rice patties and places that were breeding vectors, not only of malaria, but filariasis[13]. We had a big problem with filariasis.

CP: In the troops? Among the troops?

AR: Well, no, among the natives. We were aware of it. And you could see in the population walking around with enlarged knees and legs and so forth. So, we didn't have much trouble having the troops cooperate, because they didn't want any of that. Well, I am afraid we have strayed a little bit from your original point.

CP: No, no all of this is germane. This is all germane because I want the record to show that you were a very important part of the collection of knowledge for the control of vector-born disease in war areas not limited to malaria. Your activities were important at large. And the Second World War was unique among our wars and among American wars in tropical areas for the absence of malaria and yellow fever. The Second World War was unique in our history, and I want to believe that is because of what the entomologists did. And I think it is very important that you were a part of the fieldwork that established the wherewithal, the 23know how, to do that. And that is the point that I am trying to make.

12*Anopheles farauti* is a complex of seven species distributed in the Moluccas and extend eastward through Papua New Guinea, the Solomon Islands, the New Hebrides and Australia.

13Filariasis (or philariasis) is a parasitic disease caused by an infection with roundworms of the *filarioidea* type, spread by blood-feeding black flies and mosquitos.

AR: Thank you.

CP: Yeah. And just a young whippersnapper at the University of Florida, hardly dry behind the ears.

AR: Incidentally, when you are doing vector control with mosquitos like *Anopheles quadrimaculatus*, which was the, as you know, principle vector of malaria here, people of Tallahassee, for example, they didn't know they had mosquitos. They were not concerned about mosquito control because they were not pests, mosquitos. They would bite people at night when they were sleeping and this sort of thing.

CP: They don't particularly hurt.

AR: No pain involved. The only compliment that I can recall ever receiving about our work in Tallahassee was—I did business with a druggist on Adams Street over here, behind the Capitol. And, one night, I was in his drug store, buying something, and he said, "You fellas must be doing a pretty good job. I used to sell lots of quinine. I hardly sell any anymore."

CP: Oh, really?

AR: That's the only compliment—

CP: That was a nice compliment.

AR: It was, yeah.

CP: Yeah, it was.

AR: Of course, after World War II, the emphasis in malaria was pretty much taken care of.

CP: It was in this country.

AR: Yes. The emphasis shifted to pest mosquitos and primarily in South Florida along Gulf coast and the Atlantic coast, you know.

CP: Those salt-marsh boys, huh?

AR: Salt-marsh mosquitos[14], primarily, and that was an entirely different thing from the early work we did here.

CP: Yes. Let me ask you about Dr. Boyd; did you have much track with him?

AR: Dr. Boyd?

14*Aedes aegypti*, also known as the yellow fever mosquito, is considered to be one of the most widely spread mosquito species. The mosquito is a known vector for transmitting several tropical fevers and diseases.

CP: Yes.

AR: Not personally. Now, Dr. Mulrennan worked with him at the laboratory when he was a young entomologist right out of the University of Florida also. He developed the methods for maintaining colonies of *Anopheles quadrimaculatus*, the malaria vector, at Dr. Boyd's laboratory. And that was his main job was to keep Dr. Boyd supplied with an ample number of mosquitos to do his work with paresis.

CP: Yes. Two points to adjust for our audience: I want to make the point there on paresis and Dr. Boyd. Dr. Boyd was the author of the first standard textbook on parasitology, and he is noted for that in academic circles. Our Dr. Boyd, right here—

AR: I didn't know that.

CP: —that you are working with, his textbook is still kind of the standard of reference for general parasitology work. And he wrote that between here and the School of Tropical Medicine at Louisiana. But our Dr. Boyd right here in Tallahassee, with whom you were associated, is a famous person in parasitological circles, point one.

Point two for Dr. Boyd, just for the record, his work with paresis—we had no way to treat syphilis; we didn't have antibiotics. And through, without reviewing the history, Dr. Boyd demonstrated that high fever or high controlled fever in late syphilis cases was very beneficial. And he produced that fever by giving these people malaria, high fever.

Growing out of that—this is not my show today, but I want to make a point about Dr. Boyd—that fever therapy or syphilis became a standard in the US Public Health Service based on Dr. Boyd's work at Florida State Hospital at Chattahoochee. Outfitted a number of fever ships, fever ships that traveled around in several places in the United States where fevers in late syphilis cases were carried up and maintained at about 105 degrees for a period of time as treatment of third degree —third stage syphilis. That is a direct result of Dr. Boyd's work with malaria, and that was the treatment of third stage syphilis until penicillin[15] came along.

AR: That's interesting.

CP: And you were here as a part of all of that, Dr. Rogers.

AR: Well, not the paresis part.

CP: You weren't one of the experimental patients?

AR: No, I was not a patient. I was just an assistant.

CP: Go back to your war years, if I can. It seems like, to me, there is more in your history that you haven't said yet, during your war years.

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15 Penicillin is a group of antibiotics derived from *Penicillium* fungi. These groups of antibiotics were some of the first medications to be found effective in treating bacterial infections caused by *staphylococci* and *streptococci*.

AR: During the war years? Well—

CP: Didn't you do some work outside of mosquitos? Didn't you get involved in some of the other vectors?

AR: Well, we did later with encephalitis. But this was not during the war years. This was later. Afterward, teaching at the University of Florida for about 10 years, as you—

CP: Whoop, now how did you get there? I've got you in China, getting out of the Army—getting out of the Navy, I mean.

AR: I came home from China and was offered a position on the staff at the University of Florida in the Department of Entomology. That's how you and I got to know each other.

CP: And I am very proud of it.

AR: Eventually. So am I.

CP: I am very proud of it.

AR: So am I. And from there, after 10 years of teaching, I was offered a job in research at the Vero Beach lab, which you have already referred to, the entomological research center of the state board of health. So we went down to Vero Beach, and that launched our programs on control of pest mosquitos.

CP: I want to interrupt you to back you up a minute. How did you get through the University of Maryland? I am aware that you got your doctorate in entomology, University of Maryland, and I'm wanting to make a point about that. When did you go there?

AR: Oh, from about 19—while I was teaching at the University of Florida, I took one semester off for residency purposes and did the other by summer schools and that type of stuff.

CP: So, you really weren't in residence there but just one semester, for all practical purposes?

AR: One semester, yeah.

CP: Good, what was your dissertation in? How did you do your doctorial work for your dissertation?

AR: Well, I did the study of the ticks of northern Florida.

CP: Oh, you did?

AR: Yes, and that recently had become a point of interest because of lyme disease.

CP: Yes, it is. Keep talking.

AR: Fortunately, nobody had done the biology and life history of the so-called tick, I mean, cattle tick or—what do they call it now?

CP: They changed all the names on you.

AR: Deer tick[16].

CP: Deer tick, okay.

AR: Deer tick. Well, the deer tick was not really just a deer tick, and it's not—the common name accepted for it is blacklegged tick.

CP: Oh, okay.

AR: And I did the biology and the history of that tick, and all of the sudden here two or three years ago, three or four or five, something like that, there was a great demand for information about the deer tick because of lyme disease.

CP: Yes. So, your thesis got exhumed?

AR: My thesis became alive all of the sudden.

CP: That's great. Now, I didn't know that piece.

AR: It's interesting, isn't it?

CP: Yeah. Well, I have to tell a story on you from the audience point of view. As a student of yours, a graduate student of Dr. Rogers, we had to do a collection of medically imported insects. And I got mine done, delivered them into Dr. Rogers, he opened up my tick collection, and, in less then 150 thousandths of a second, he had picked one insect of, I think, about 50 on pins in this one box. He just opened a box, and he pointed to one particular insect and he says, "Where did you get this?"

I was caught because my wife-to-be was in training in Washington D.C. And she had caught me an insect and mailed it to me, and I included that in there. But this Dr. Rogers recognized it in less than a split second that this insect was not native to Gainesville and it was of the Washington D.C. area, and he so informed me. There was only one way you could have known that, that was by collecting insects in the Maryland area. So, how did you know that? Or do you remember that incident? You aren't supposed to remember that incident.

AR: No, I don't remember that exactly.

16The *Ixodes scapularis*, commonly known as the deer tick or blacklegged tick, is a known vector for several diseases, including Lyme disease.

CP: You didn't knock me off for it. You accepted the insect, but the fact that you recognized it. I mean, it was just like that. You opened that box and, "Where did you get this insect?" And that was the one my wife-to-be had sent me from Washington D.C.

AR: Is that right?

CP: And you picked that sucker out. Oh, shoot.

AR: Caught. You were caught.

CP: I was caught. Yeah, I was. You didn't detract from my grade because my insect collection was fine, and you let that one go.

AR: Sure.

CP: But I remember that, and my wife and I still laugh over that. So, I was wanting to hear that you spent some time in Maryland, and thus, knew all their insects; and now, then, I am even more impressed.

AR: Yeah. Well, I did spend quite a bit of time in Maryland, and all of three or four summers doing coursework and pressure projects. That sort of thing.

CP: Yes, and all for your doctorate. Okay, how did you like your teaching at the University of Florida? Was that fun dealing with or having to put up with students?

AR: No, it was fun, I enjoyed it. It wasn't very rewarding, financially, and that sort of thing, not like today, you know.

CP: Oh, I am sure of that. Yes, yes.

AR: But I enjoyed teaching and still do when I have a chance. You know, not professionally, but just—

CP: Well, you are a good teacher. You are a good teacher. I remember a particular field course that I now recognize some of the significance of it, but you had a group of us out in the woods catching slinks, sninks—

AR: Skinks.

CP: Skinks.

AR: Yeah, skinks.

CP: Yeah. We were out catching skinks. But we weren't interested in the skinks; you were interested in their ectoparasites.

AR: That's right, ticks.

CP: Ticks. He was interested in the ticks on them skinks, and we scurried all over those woods the whole semester, finding skinks, and we picked them ticks off of them. And you made us identify those ticks. You did. I had enough trouble identifying the skinks. But I am not sure I would have put up with a class like me, Dr. Rogers.

AR: Oh, I don't know. It was a lot of fun.

CP: But you got to Vero Beach, and what were your duties there?

AR: Well, at the time I arrived at Vero Beach, no one was doing research on mosquito control, per se.

CP: Oh, what were they doing?

AR: They were doing biological studies and that sort of thing.

CP: Okay, the laboratory had been established by the legislature at the request of the board of health, Bureau of Entomology, when? What year was it established?

AR: Well, I was there at the time it was established. I can't remember the exact date. I went there in 1956.

CP: Fifty-six, okay.

AR: And I think the lab was established about four or five years before that.

CP: Okay. But the focus of the researchers were biology, the biology of the mosquito. And then you come in with insecticides, did that cause them anxiety?

AR: Did it do what, excuse me?

CP: Did it cause the biology workers anxiety that you were bringing in insecticides?

AR: Well, I guess I could answer that by telling about a comment by one of the biologists. He said when he first met me he thought I would be harmless, but I had done a pretty good job. He didn't have as many mosquitos as he used to have, something like that. That was Dr. Nielson.

CP: I remember Dr. Nielson.

AR: He was from Denmark, you know. He was interested in mosquito swarms and that sort of thing. But I thought that was quite a compliment.

CP: This was a new effort though for Florida for special research into mosquito control.

AR: Right. We, of course, were testing it. By this time, DDT was gone more or less. It had been —well, it was banned[17] in 1972.

CP: Yes, totally.

AR: Because of its supposedly harmful effect on birds.

CP: Yes, and it is lasting, and it lasts forever.

AR: Pardon me?

CP: It is lasting, and it lasts forever.

AR: Yeah. In the meanwhile, it had saved millions of lives. I have to defend DDT from a public health standpoint.

CP: I will only say, amen.

AR: It had saved millions of lives from diseases like malaria worldwide.

CP: Yellow fever. Polioviruses. And a bunch of others.

AR: That's right.

CP: Don't overlook typhus.

AR: So, in Vero Beach we didn't have DDT anymore and another aspect of that was to continue intense usage over large areas. The pest mosquitos that we were working on in Vero Beach, salt marsh mosquitos, about 1948 became resistant to DDT.

So, that put us on the spot to develop new formulations or test new insecticides DDT had spawned, so to speak, down through the years. And that was our main work. And also impounding water management, controlling the water levels in the salt marshes to interfere with the normal breeding cycle of salt marsh mosquitos, so, that was what we did there, mostly. Then we had the dog fly[18] problem over in West Florida.

CP: Let me back up to salt marsh mosquitos, too. I think the record is just replete and filled with strong evidence that salt marsh mosquitos, the reason that Florida from Gainesville down was so slow in developing and that if somebody hadn't learned how to do something about the saltwater mosquitos, we would still be a frontier state with only population scattered along the border.

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17 In response to increased outcry by scientists and Rachel Carson's popular book, *Silent Spring*, DDT became a target for growing anti-chemical and anti-pesticide movements in the US. After a toxicologist discovered DDT's effects on certain bird populations, the compound was banned except for select public health uses in 1972.

18 *Stomoxys calcitrans* is commonly referred to as the stable fly, barn fly, biting house fly, dog fly, or power mover fly. The fly is known for feeding on the blood of mammals and is vector of different types of diseases and parasites.

AR: Well, I'll just tell, if I may, you wanted two stories about that.

CP: Please do.

AR: There were people living at Vero Beach that we became acquainted with after we moved over there that had been there most of their lives. And I remember one lady who used to babysit for my wife and me when we had other engagements, and she said that they had to wear bee veils around their head and neck sometimes to go down to the boat landing where the mail came in and that sort of thing in the early days, when there were no bridges across the Indian River.

And another thing, that because of the salt marsh mosquitos, just swarms of them, and the merchants—back then, we are talking about back in the '20s and early '30s or maybe late '30s, as well. And the merchants would build on the entrance to the stores. They had two doors. They had an outside door, and you came in, and you did what you could to get the mosquitos off, and then you opened the second door to go in the store.

And the store is about trains traveling the Florida East Coast Railway[19], and they would fill up certain areas in Indian River County and Brevard County, when the train would go through that section during the mosquito period of activity late in the evening, or at night. The trains in those days didn't have air conditioning and people kept their windows open so it would be cooler until they got to the salt marsh mosquito area, and then the coaches would fill up with mosquitos. And they had a hard time with that.

These were the conditions that were not quite that bad when I went to Vero Beach in 1956, but they were still bad enough. And there are lots of other stories. They had what they called mosquito switches and these were the heart of palms, cabbage palms. They would cut the heart out of the palm, and the leaves had still not opened up. And they tied the handles together at the bottom, and then they made mosquito switches out of them. You'd walk down the sidewalk, doing like this, keeping the mosquitos off of your back. So, your point about development of the Florida East Coast and the West Coast is well made about mosquitos.

CP: And I do that to make the point of what are we now, as down there, one of the major megacropolisis (sic) of the United States is from Vero Beach onto Florida Key West. That would not have been possible had you all not done something about controlling salt marsh mosquitos, and you were the beginning of that effort.

AR: Yes, we were involved in research on flooding the salt marshes. It sounds like a contradiction to say you flood something to control mosquitos, but this mosquito is different from the malaria mosquito in the sense of the way it lays its eggs, the place where it lays its eggs. These the floodwater mosquitos, so called because they hatched during flooding, but their eggs are laid only on moist soil, not on the water like the malaria mosquitos.

So, actually the credit for this belongs to a mosquito control commissioner in Brevard County, and I don't recall his name at this moment, but he suggested years ago that, if this was the case,

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19 The Florida East Coast Railway (FEC) began in 1885 by Henry Morrison Flagler and is still in operation. The line opened the eastern coast of Florida to commerce and tourism, including Key West.

rather the eggs had to be laid only on moist soil and not on the water, why not impound the breeding areas for these mosquitos so they couldn't lay their eggs anywhere except the edge of the water. So, this was the beginning of impounding for salt marsh mosquito control.

And it is still used. Lots of people are around today that don't know anything about the background, and don't care much about the background, of whether Florida was developed or not, who don't like this because they say it interferes with some of the—

CP: —economic development.

AR: Well, it interferes with the natural biology of the—and it does. There is no question about that, but through research at Vero Beach lab, we showed that you could flood the salt marshes by pumping water into them by tide gates and that sort of thing. We did all of that type of work only during the spring and summer months and early fall. And then you open them back up again because you don't have this problem in the wintertime, even down in South Florida. So, at this very moment, as we speak, there is still lots of opposition to flooding salt marshes, but I can say this: in my professional opinion, and personal opinion, if they ever open those marshes back up like they were in the old days, they won't stay open long. I can assure you.

CP: Politicians will have you all to put those dams back in there, won't they?

AR: That's right. Somebody will.

CP: Well, they'll be moving out of South Florida.

AR: That's right.

CP: Yeah, they will all move.

AR: So, we developed that, and we developed the program of fogging for mosquitos. And that led to, eventually, to control of disease vectors of encephalitis. We had the tools then, by that time, we began to have serious outbreaks of encephalitis in Florida. We had some tools to work with at that time.

Pause in Recording

CP: And the original experimental work with fogging was done at Vero?

AR: That's right. Well, not originally, no. The US Department of Agriculture probably was the forerunners of that.

CP: But you all did the—

AR: We did the—

CP: —applied research.

AR: Yeah. We did the applied research, and just as we finished our experimental work on material, on a new mosquito-cide called Dibrom[20], was when the outbreak of encephalitis occurred in Clearwater and Tampa Bay area—in St. Petersburg, primarily, but also in Tampa and down in Clearwater and places like that.

CP: Even into Bradenton and Sarasota.

AR: Yeah. And so, we were kind of ready for that one.

CP: Had you been using fogging otherwise for control?

AR: It was for pest mosquitos, yes.

CP: Yes. Around communities you had been using fogging, that is killing adults?

AR: Yes. We tested new insecticides and methods of fogging, that sort of thing, and new equipment was being developed all along.

CP: And that is now kind of the standard for mosquito control around population areas?

AR: That's right. It became partly political, unfortunately.

CP: Most everything we do—

AR: Some politicians saw an opportunity to use this to gain favor with the voters.

CP: To make a point, make a vote.

AR: We will fog this area whether it is needed or not and let the people see it, you know.

CP: Oh, yeah. Well—

AR: It was an unfortunate that a method that can be very helpful in disease control would become a political fuse in some locations, not every place, of course.

CP: But almost everything you and I can think of becomes politicized one way or another somewhere.

AR: That's right. That's right.

CP: It does. Yeah, we appreciate them. I appreciate that fogging, though. In my own personal situation, the fog truck comes by. But we used to worry about the insecticide that you were

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20Naled (trade name Dibrom) is a compound that was formerly used as a nerve agent but is now used as a mosquito pesticide. It is the most toxic of mosquito adulticides and is the only mosquito adulticide in class 1, the highest toxicity.

spraying on us. Then you all have done something low volume, low concentration, you all used —

AR: It's called ultralow volume, where you take the active ingredient of a particular insecticide to concentrate and instead of deluding it with oil or water or whatever and putting out large volumes of it, and put the same amount of active ingredient, or even maybe slightly less, in a given area, by using a smaller particle produced by equipment that was being developed all along for that purpose. It's called ultralow volume fogging. And that's what you have now; you never see the old thermal fogs where you have big clouds of smoky looking clouds—

CP: We didn't mind those, though, because there were no mosquitos when the fog settled.

AR: That's true. That's true.

CP: But the smell of diesel oil.

AR: Low diesel oil, that's right. Diesel oil smell.

CP: These low volume things, speaking from personal experience now, if you look right at the jet just on the back of their truck you see a little bit and you get a slight smell of diesel fuel. But the contrast it doesn't look like this current stuff should be working, as compared, because you can't see nothing, and you don't smell nothing, you know? But I witnessed to the fact that it takes care of the mosquitos, because I live right next door to a wetland, and the city comes by, the county comes by, the county health department and the mosquito control people come by periodically.

AR: A truck came by fogging down at my camp on the Aucilla River yesterday or the day before.

CP: Oh really? Out there in the woods? Trying to kill all the mosquitos in the woods?

AR: Well, there's a little community there, you know.

CP: Oh, okay. Okay, and so, Jefferson County is taking care of you.

AR: Taylor County.

CP: Oh, that's Taylor County?

AR: I am on the other side of the Aucilla River. That is the county line.

CP: You on in your own county. Well, what caused you to go to West Florida and the black fly issue?

AR: Dog fly.

CP: Yeah, dog fly, not black fly. Sorry.

AR: Well, those people had had no research or not much, almost no help at all on the dog fly problem, which was not a disease problem now, this—it is important in public health only because it's a biting insect. It is not known, in this country, at least, as the vector of any disease. But it has a tremendous economic impact on the West Florida beaches; and the reason it is because these flies, we've determined through research, have long flight range.

But to back up why we went there, Dr. Mulrennan had been talking with the people of West Florida, and they wanted to know what—since mosquitos we had been done a pretty good job on mosquitos in South Florida, why not—

CP: What you going to do about these flies?

AR: What you going to do about these flies, dog flies? This is really the stable fly. It is a common insect, and it is worldwide, really, and all over the United States. But it is peculiar in West Florida. It is a unique problem there because we—that area in the panhandle of Florida is directly downwind from a very large agricultural area, and these are agriculturally produced flies, livestock primarily.

And this time of the year, during from about mid-August onto November and December, the northeast winds move these flies down from the farming areas of Georgia and Alabama into the Gulf Coast area. And actually, it extends from about Cedar Key on west, around to Pensacola and beyond. So, Dr. Mulrennan asked me to leave Vero and go over to Panama City, and design and build a laboratory to do something about the dog fly problems. So, that is how we happened to be in Vero Beach, I mean, in Panama City. So, we did that, and we have had very successful results with aerial spraying on the beaches over there.

It is almost impossible to get farmers not to produce these flies, because they breed in decaying hay, animal waste, places like this, and farmers just aren't interested in cleaning up those sorts of places to protect the beach people.

CP: But you are maybe a hundred miles away.

AR: That's right. And we ran tests on the flight range of these flies and found that they can fly well over a hundred miles.

CP: Wow.

AR: Yeah, and they come down in the fall, when the woods are full of yellow flowers, and mostly goldenrod, that sort of thing, and they take nectar out of the flowers just like moths and butterflies do on their way to the beach.

CP: Well, they want to go to the beach too, I guess. That's all right.

AR: So, we sprayed the beaches with aerial spraying. We have a DC-3 airplane[21], and we developed that program at Panama City.

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21 The Douglas DC-3 is a fixed-wing propeller-driven airliner.

CP: Okay, and this kills the adults. Where do the flies do their breeding? Do they fly back up North? Or do they lay their eggs when they come?

AR: No, no, they don't go back north. If the wind blows from the gulf, they will move out away from the beaches, but they stayed locally in the wooded areas around and if the wind switches around, comes out of the north or northeast again, they're right back on the beach. So, if we catch them down on the beach, we can pretty well wipe them out for that brood. And then, a week or so later, there might be another brood that will come in, and you have to repeat it. It is temporary control type thing, but that's the best we can do.

CP: And that's so today?

AR: Yes.

CP: But you went over there in—

AR: Sixty-four.
Pause in Recording

CP: And you stayed there. There was not a lab.

AR: No, there was nothing there.

CP: There is a building there now, beautiful laboratory.

AR: We designed and built the laboratory. Now, it was about three buildings.

CP: Now yeah.

AR: We built three buildings, originally. Now, there are more that have been added.

CP: And that belongs to the Department of Agriculture now. Is that true?

AR: No, it was assigned to the—now, the dog fly control program is agriculture, Department of Agriculture, but the laboratory itself was assigned to Florida A&M University.

CP: Oh, in '76 or in '69? Must have been '76 or even later.

AR: About mid '70s, I guess. Something a little later than that.

CP: Okay. But you went in '64, and what you developed there is now the routine control method carried on by the Department of Agriculture, and they obviously maintain some sort of surveillance system to keep up with when do they need to spray.

AR: Well, each county has its own mosquito control program, you know, and they do the monitoring, supposed to on the beaches when the flies—and then they call in and say, We have flies, and will you bring your airplane and spray them? That is the way it is supposed to work. Sometimes they're negligent and don't do that, but that's supposed to be the system now.

CP: So, that's first. And when you went over, our knowledge of the biology of the dog fly was nil?

AR: Well, no, it is pretty well known. It has been around so long and is so universally dispersed that, as I say, it's really the stable fly and—

CP: And we have had stables forever.

AR: Yes, and animals. It's associated with animal waste and animal feeds and the farmers over in North Florida, along the Alabama-Georgia line, in the dairies and places like that that have a lot of animals. They have a system of putting feed troughs out in the pastures, and they fill them up with silage[22] and that sort of thing. And the cattle, as they feed on this silage, they nudge out of the feed troughs, and it accumulates on the ground and underneath the trough and breeds millions and millions of stable flies.

CP: That is where we do our egg laying is in there, not in the dung, not in the droppings.

AR: Well, usually a mixture of animal waste and the straw and silage, whatever they're feeding.

CP: I seem to recall there was a lot of attention given at one time to making sure all the washed-up seaweed was kept raked off the beach.

AR: In the early days of dog fly research in West Florida, some of the US Department of Agriculture entomologists went over there and studied this problem. I would say—

CP: A day or two?

AR: A little bit, not a whole lot.

CP: A day or two. They only ever studied a day or two.

AR: And not to criticize what they did and all, everything they did was helpful. And they did find some breeding in seaweed, turtle grass primarily, *thalassia*, that washed ashore around the bay, St. Andrew Bay and Choctawhatchee Bay and places like that. Well, this turned out to be a minor source after we got over there and began to look into the biology of the problem, as well as the control techniques. And that is why we did the flying distance capacity of these flies. We did those studies and found out that they could fly—

CP: Hundreds of miles, you said.

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22 Silage is fermented, high-moisture stored fodder which can be fed to cattle.

AR: A hundred miles or more. And—but we still occasionally would get some breeding in the seaweed. But in order for that to happen, a lot of other things have to happen just right. The tides and—as long as the seaweed is in the water at all, even at the edge its no problem, it doesn't breed anything, any flies at all. It's only when you get a storm that produces extra high tides and wind that pushes the seaweed away from the normal edge of the water, even above normal high tide, and it piles up there then, and then they will breed sometimes that we found, in places like that. But, most of the time, the flies we were having problems with were coming from the farming area.

CP: Yeah, well, that is fascinating. That's three firsts now.

AR: Pardon me?

CP: That is three firsts: malaria control in war zones, control of salt marsh mosquitos, control of dog flies. You were on the ground floor of every one of those firsts. Where did you go from there?

AR: I had lots of help.

CP: As an aside, my three-year-old little grandson, last Saturday, I got home and his daddy's flatbed trailer was loaded with a lot of heavy equipment that had been stored in my yard for awhile. I asked three-year-old, "My gracious, did you load this whole trailer?" He responded, "Daddy helped."

AR: Daddy helped. That's a good one.

CP: So, you had a little bit of help.

AR: Yes.

CP: Yeah, all right with these. Yeah, we don't stand alone in anything, and those who say they do, I worry about.

Pause in Recording

CP: The dog fly, the thing is we were discussing—can I move onto encephalitis a little bit?

AR: Why not?

CP: Because you got some firsts in encephalitis also, but I want us to get to—I want for the record for us to highlight your place as director of the Florida entomology program, but you went through a lot of encephalitis before then. How did you get involved with that? You were involved with some encephalitis in war zones, to begin with, and then you brought that experience to Florida with our St. Louis stuff.

AR: No, I don't recall being involved with encephalitis during the war.

CP: Okay, my mistake.

AR: I was involved in filariasis, as I said earlier, over in Okinawa and things of that kind. But my first encounter with encephalitis, as a participant in the control program, was in Tampa Bay area in 1961 to 62.

CP: And they had the big St. Louis outbreak in Florida.

AR: That, of course, has occurred a number of times since then. Outbreaks in other various parts of the state, in fact, I think last year or earlier this year we had—

CP: —had some eastern [Eastern equine encephalitis virus] earlier this year.

AR: Yeah.

CP: Oh, we had St. Louis on the Gulf Coast, southern Gulf Coast, Lee County.

AR: Well, that outbreak, I think the first indication that we might have of an epidemic of this disease in Tampa Bay area occurred in 1959, I believe.

CP: There were a few cases in ’59. That is correct.

AR: And then, in ’60, for some reason we didn’t seem to have any activity. I might be wrong about this, because I haven’t looked at the data on this in a long time, but ’61 and ’62 is my memory of the outbreak where we had two or 300—over 200, I think, cases.

CP: Yes, there was about a 25 percent mortality rate. You are correct in the dates ’61 and ’62. You were at Vero Beach at the time?

AR: I was at Vero Beach and Dr. Mulrennan, of course, went down. He was from Jacksonville, and when this outbreak occurred mostly in ’61, he went over to St. Petersburg area where it was centered, more or less. And he was looking for the classic vector of St. Louis encephalitis, which is the southern house mosquito, and he didn’t find it. What he found was a different *Culex* mosquito, *Culex nigripalpus*, very prevalent at that time. And he theorized, without having any proof of it at that moment, that this was probably the vector. And was later proven to be correct by virus isolations by CDC [Center for Disease Control] in Atlanta.

But the interesting thing, to me, from an epidemiologist standpoint on this particular problem, was that he called me and asked me to meet him over there. And I don’t remember exact dates, but it was during the height of the epidemic. And if you had planned to try to show people the epidemiology of a disease, you couldn’t have done a better job—

CP: —than that particular outbreak.

AP: He and I rode around in the city of St. Petersburg, which, you know, is largely populated by retired people and a lot of them from the north with little or no knowledge about mosquito problems and disease vectors and that sort of thing. And they love to feed birds, that is one of

their past times, and that's fine, there is nothing wrong with that, as long as the birds don't have viruses, you know? And we actually saw houses that had bird feeders in the front yard, in the back yard and then piles of grain on the grass and mourning doves just lined up like pigeons on the roof of the houses.

CP: Well, that free breakfast.

AR: It was so obvious to anybody that knows anything about vector diseases, insect vector diseases—

CP: —that those doves—

AR: Oh, it was all there. And you could just ride down the street and see it, yet we had no data to prove it.

CP: But you got a good hypothesis to work on.

AR: Yes, so as it turns out everything was exactly as we thought it was, but we didn't get the data that proved it but CDC in Atlanta did. They came down and worked on the program, you know.

CP: Yes, they sent their own entomologist, two or three entomologists, McCallister was the—I can't remember his first name—but I am remembering a McCallister, Dr. McCallister, who was an entomologist from CDC.

AR: That was so cut and dry, you know? And so, anyway, it was my responsibility, at least from a Florida standpoint, Florida State Board of Health standpoint, to make some recommendations about control. So, based on the incubation period of the virus in the mosquito, we decided that—which, I think, is about a week—we could treat every residential area every five days. We would be killing infected mosquitos before they could transmit the disease.

CP: Ah, good point. Good theory.

AR: So, we divided up Pinellas County into areas where we could do this, and the county did the actual spraying and fogging. And at Vero Beach, at this time, we had just completed research on dosage and effectiveness of Dibrom as a mosquito-cide. So, that's what we recommended that be used. That's the first place it was ever used on a large scale for mosquito control so—

CP: Oh, all right. And it worked.

AR: So, it worked. As far as we know it worked because the number of cases given time for—

CP: Natural course of events.

AR: Yes, started downhill. Not immediately, but almost immediately after we started this fogging program. And we got in trouble with the CDC because they were trying to collect mosquitos to isolate viruses and they fussed because they said we killed—

CP: Killing their mosquitoes.

AR: We killed their mosquitos.

CP: That is always the problem between the public health types and the purists.

AR: Yeah. So, anyway, it had a happy ending. They proved that, with their virus isolations, that Dr. Mulrennan was correct in his theory that *Culex nigripalpus* was the vector.

CP: And related to the mourning dove[23].

AR: And that we thought that the mourning dove was the principle host in nature for the virus and that proved to be true, also.

CP: Yes. That is y'all's experience, Mulrennan's experience. There is nothing to beat experience.

AR: That is right. So, we—

CP: In spite of the fact that you started as a young whippersnapper, you developed the experience over time.

AR: Yeah, you do that. At least you could remember the good things.

CP: But growing out of that, there was a major state board of health/public health service research effort housed there. An encephalitis research center was established as a direct result of that. What sort of roles did you play in that?
{{{1:13:53.3}}}
AR: I didn't play any role in that at all.

CP: I am remembering a guy by the name of John Taylor was the resident entomologist for that research effort.

AR: You mean with the public health service?

CP: Yeah, he was with Florida. He was with John Mulrennan's—(inaudible) awake before the research center was established. And John was established to Tampa as the research entomologist for that effort.

AR: I don't remember much about that. There was a Doyle Taylor that worked—

CP: Oh, it is Doyle Taylor, not John Taylor. I am sorry. I am sorry. Your memory is better than mine.

23The mourning dove (*Zenaida macroura*) is one of the most abundant and widespread of all North American birds. It is used as a game bird in the United States.

AR: Yeah, he worked for the Hillsborough County Mosquito Control District.

CP: He went over full-time, he and Dr. James Bond. Jim Bond was the director and entomologist. And we had an ornithologist and all sorts of people associated with that effort there.

AR: What was the lady? Find the lady that—

CP: Wellings. Flora Mae Wellings.

AR: Flora Mae Wellings. How is she?

CP: She's died. She was dead about three or four years ago. She had been most unwell. She had retired five or six years before that. But she did. She came and replaced Dr. Bond as the director of their encephalitis research center.
{{{1:15:19.5}}}
And the further history of that place was, when all the answers to encephalitis, quote, unquote, were done, the federal funding dried up, and through the good work of Dr. Sowder[24], legislative funds were gathered for the establishment of a Florida epidemiology research center. And Flora Mae expanded into all areas of viral disease as a result of that and made significant contributions to our knowledge of the microbiology of water, largely, and the virology of water is the direct result of that encephalitis efforts.

But you are beginning there, I am more interested in your further participation in all of that effort, even after you got the Dibrom over there and proved that your experimental theoretical stuff in Vero Beach worked on a small scale. You had an opportunity to test it on the big scale, and it did work as evidenced that the encephalitis disappeared ultimately. Were you continually involved with that? I'm aware that you have done some publications on a lot of that effort. You did some writings and you have some publications—

AR: Mostly in the monograph, as far as that particular problem was concerned. I guess it is this paper you cut right here. I don't know, is that from that monograph?

CP: Yes, it is. That's a photograph from the monograph. For our audience, we need to mention the state board of health used to put out a monograph on important subjects in following the St. Louis encephalitis outbreak and research in Pinellas County and environs. A monograph was published on St. Louis encephalitis and is available in most of the public libraries. But you were a significant author of the entomological part of that monograph. Do you recall offhand what your subject matter was? What were the highlights of that report, from your point of view? Do you remember?

AR: It has been so long.

24Dr. Wilson T. Sowder was a prominent figure in Florida's public health system for over 30 years. He started his public health career as a venereal disease control officer with the US Public Health Service in the 1940s. In Florida, he developed health departments in each of Florida's counties as a state health officer. Dr. Sowder was interviewed as part of the Florida Public Oral History Project on June 24, 1997.

CP: And I haven't read it in years.

AR: Yeah, I haven't either. I don't know for sure what all is in there, but I think I touched on the more important things.

CP: The Dibrom.

AR: Yeah, the epidemiology of the problem and the way we planned the controls, so to try to break the transmission cycle of the virus from the—

CP: Based on the known life history of two agents, the mosquito and the virus. And I recalled, being your student, that you allowed that all must begin with a clear knowledge of what you are dealing with. And I have seen, since my student days with you, those who tried to ignore the basic science piece. You know, "I will do this because of this theory. I will just give it a shot of penicillin." And in the bug world, knowing that life cycle is critical to control. You can't control —

AR: Same way with malaria.

CP: That's right. That's right. And I learned that lesson in your classroom, and you have demonstrated it now five times in our conversation here today that a knowledge of the lifecycle provided the means of control. Basic science. You know, our legislature says, "I ain't interested in where mosquitos lay their eggs; just tell me how to kill the suckers." But you are making a point that it's critical to know where he lays his eggs and when he lays his—

AR: When to kill him.

CP: When to kill him, yeah. Well, from encephalitis Vero Beach to Panama City dog flies, let me see, you went—you didn't go directly to the State Board of Health from, I mean, to the division of health from there, did you?

AR: I went from—Dr. Mulrennan retired in 1976. And they asked me to go over and serve at his capacity in his position.

CP: Director of the state entomology program.

AR: Right. And I stayed there until 1979 when I retired.

CP: Yeah, you know, that could be quite complimentary. We both talked about Mulrennan a lot, and here you are invited when he retired, you are invited to fill his shoes. Did you feel some awe or humility about that?

AR: Yes, I did.

CP: And a little bit of intimidation?

AR: A little bit. Quite a bit, really.

CP: Yeah, because Mulrennan was internationally famous.

AR: Yes, he was, and a very good friend of mine.

CP: And very complimentary that you would be invited to fill his shoes, Dr. Rogers.

AR: I appreciated it. I appreciated the compliment. I didn't want to leave my home, but I told them I would go for two or three years, which I did.

CP: Were you already retired yourself? No, you were living in Panama City.

AR: No, I was still director of the laboratory in Panama City.

CP: That's right, you lived in Panama City.

AR: Tom Gardener used to be with the health department there.

CP: Central Op Services. He was with the department of HRS.

AR: Yes. He came over to Panama City and—

CP: Put the word on you.

AR: —sort of encouraged me to go to Jacksonville.

CP: Very good, I am glad you did that. Yeah, with our '69 reorg, State Board of Health was abolished and the public health function became apart of HRS. And then the '76 reorg, selected functions like entomology were removed from the health family by the powers that be and administratively housed in an organization called Central Operations. Laboratories, entomology was notable that were put there, and Mr. Tom Gardener was the second director, I think the second director, of that.

AR: He spent quite a bit of time here at Winewood during those days.

CP: Yeah, you did. Didn't we all spend a lot of time in—now that you are back in Jacksonville office as director of entomology, speak to your function there?

AR: Well, I said earlier in this interview, after malaria, we will put it that way, the emphasis shifted to pest mosquitos and Dr. Mulrennan, again, came to the legislature. He not only got the appropriation to build the laboratory at Vero Beach, at that same time, I think, he got the appropriation to provide matching funds to the counties and mosquito control districts.

CP: Oh, yes.

AR: Another aspect of this that has maybe a sideline interest in public health was structured pest control. While I was at the University of Florida, this law was passed in 1947 on the structural pest control, household pest control, you might say; and I was on the original board of that.

The original board of directors of that tried to get this law implemented in Florida, but anyway, I say that to point out that this was a part of the office of entomology in Jacksonville and still is, but it's not with the health department anymore. It is with the Department of Agriculture now. So, that was one important responsibility, to examine and license the pest control people.

CP: Oh, like the Orkin[25] guys.

AR: Yeah, that is right. And the rest of it was primarily mosquito control by the counties and they had matching funds from the state. We had to handle that in our office in Jacksonville, keep the records and do the extension work and that sort of thing.

CP: Distribute the money.

AR: That was a primary thing. And, plus, of course, be on the lookout for disease vectors and that sort of thing.

CP: How did you do that? What kind of surveillance system did you mount or have to keep up with the disease vectors?

AR: Well, it is pretty hard to keep up with it. You know we have as many malaria vectors in Florida now, probably, as we ever had, but we don't have any malaria.

CP: Yeah, that's nice.

AR: Yeah, that's nice. It would be nice if we could say that about encephalitis, but I don't know about that, if we will ever reach that. But I didn't mean to say that we kept right up to date on how many vectors we had. But if there was a case of, let's say, encephalitis in any county, then we cooperated with that county making intensive surveys of mosquito populations, light traps, setting our chicken program, all that was sort of assisting the counties in carrying out these particular programs to monitor the possibilities of having an outbreak.

AP: I'm interrupting you to say that the recent concern in New York City about Western Nile virus and the notable entomologist was quoted on TV as saying, "All of this has happened for the lack of a chicken."

CP: I didn't hear that.

AP: Yes, that is what he said. "This whole outbreak has happened because of the lack of a chicken." Chicken sentinels[26].

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25 Orkin is an American company that provides residential and commercial pest control services.

AR: The lack of a chicken?

CP: The lack of a chicken. And his implication was, if you jokers had been following standard procedure, been using sentinel chickens for mosquito-borne viruses, you would have caught this before it got out. All of this happened because of the lack of a chicken.

AR: Right. I hadn't heard that one.

CP: Yeah, I thought that was so cute.

AR: That was an interesting outbreak, wasn't it?

CP: Oh, it was, it was.

AR: It sounds like the original epidemiology of St. Louis encephalitis.

CP: Yep, sure does. Basic epidemiology is the same. They don't know what the host is yet and they are still working hard—least, I don't know if they have reported it yet. I haven't heard. But I got you off, and I was trying to listen for what sort of special concerns you did in chicken sentinel flocks around the human case or a horse case you would do. And could I extend that to say that your close collaboration with epidemiology, the human disease folks, if they were to bump into a case of Rocky Mountain spotted fever[27], for example, would you use your tick knowledge to run out there and see what kind of ticks you could find?

AR: We would send an entomologist into the area, and collect ticks, and see what possible vectors that could be there.

CP: Ah, that would be good. And would the lab culture some of those for the virus?

AR: I don't recall ever having any virus isolation problem, but—

CP: I am constrained to tell you my first real acquaintance visit with Mulrennan. There was a case of Rocky Mountain spotted fever reported out of Deland. Deland, first case in Florida, never had Rocky Mountain spotted fever reported in Florida before. And this had preliminary laboratory results that it was. And me and Dr. Mulrennan were talking about it and he said, "We better go down there and check on the ticks."

And on the appointed day, which was just two days later, I was privileged to ride with Mulrennan to Deland. We went to the home of the case, and I did some interviewing about where you been

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26Sentinel chickens are the first line of detection for certain diseases. Sentinel chickens are used primarily for detection of the mosquito-borne West Nile virus.

27Rocky Mountain spotted fever is a tick-borne disease caused by the bacterium *Rickettsia rickettsii*. This organism is a cause of potentially fatal human illness in North and South America, and is transmitted to humans by the bite of infected tick species.

and what you been doing. And then me and Dr. Mulrennan went into the woods with a croaker sack[28], and we got us a croaker sack full of ticks.

AR: Yeah, dragging it across the vegetation.

CP: That was my only field activity with Dr. Mulrennan, in spite of my, what, 25 years association. But it was a great and glorious day.

AR: Yeah, he was that kind of a guy.

CP: He was. And while you were director of entomology you would be subject to do the same thing?

AR: Yes, right.

CP: Right. Do you recall a specific instance where it was fun and exciting?

AR: No.

CP: No Lyme disease in your time?

AR: No, no Lyme disease. There was an occasional case of tick paralysis, this sort of thing; which is obvious, I mean, somebody had a tick on his spine and got paralyzed.

CP: From a medical point of view, those are very rewarding.

AR: Yeah.

CP: To have a child brought to the emergency room or into your office because of progressive paralysis. Find the tick in the back of their hair and pull it off, and assure the mother the child is going to be well in the morning. You know, you usually get a neck hug the next morning.

AR: Yeah, right. Of course, as I said, we had to examine as far as the duties of the office of entomology, which a lot of it was administrative, you know, for budgets.

CP: That is one of the problems of doing good work as a researcher and then finding yourself as a chief operating officer.

AR: Chief paper shuffler.

CP: You're the chief paper shuffler.

AR: That's right. I didn't especially enjoy my three years as an administrator in Jacksonville, really for that reason. I would lot really have been out doing fieldwork.

28A sack made of a coarse material, typically burlap.

CP: In the field with your research activities.

AR: Yeah. I have to be honest about that.

CP: Yeah, I'd want you to be. And it's time over, but that's common. But we so often see that you are doing such a good job where you are; you are the logical choice for this next step up. And you get out of enjoyment one step above. You satisfied the Peter's principle[29], do you remember that? And it is so often the case. You are so good that you can't stay where you are, and then you get so bad where they put you.

But you managed well. And as I recall there you managed very well in spite of the fact that we didn't know you weren't enjoying it. You looked like to me you were enjoying it.

AR: Well, I shouldn't say I didn't enjoy it. I enjoyed the people I worked with. Well, I was an administrator in Panama City when I went over there, but it wasn't statewide, you know.

CP: No, and you still were responsible for the fieldwork.

AR: Oh, yeah.

CP: You still went to the beach.

AR: Oh, yeah.

CP: Yeah, you did. You still put on your khakis in the morning.
{{1:32:16.4}}
AR: Yeah.

CP: I doubt you rarely went to office with a tie and shirt on like you did in Jacksonville. You had a tie and shirt on everyday.

AR: Oh, yeah. Absolutely.

CP: Well, let me hark back to the late '30s and early '40s, when you were at the University of Florida. Our attention to the screwworm[30] as a state began in '38, '39, '37; and the release of the sterile flies[31] was in '40 or '41, were you involved in that? With the screwworm issues?

29The Peter principle is a concept in management theory formulated by Laurence J. Peter in which the selection of a candidate for a position is based on the candidate's performance in their current role, rather than on abilities relevant to the intended role. Thus, employees only stop being promoted once they can no longer perform effectively, and "managers rise to the level of their incompetence."

30The screwworm is a parasitic fly known for its screw-shaped larvae, which infest open wounds.

31The sterile insect technique is a method of biological control whereby overwhelming numbers of sterile insects are released into the wild. The released insects are normally male, as it is the female that causes the damage, usually by laying eggs in the crop, or, in the case of mosquitoes, taking blood from humans. The sterile males compete with the wild males for female insects. If a female mates with a sterile male, then it will have no offspring, thus reducing the next generation's population.

AR: No, I wasn't involved in it at all.

CP: Okay. How about the control of anthrax? Were you in on the tail end of any of that?

AR: No.

CP: Okay, because all of that is kind of around your time. The major thrust and final thrust on anthrax, though, was in the early '30s, was it not? That was the WPA [Work Projects Administration], not the WPAO. Yeah, it was. WPA project during the good deal [the New Deal], major effort for eradication of anthrax from stock. The dips for the—

AR: Well, dipping of cattle?

CP: Yes.

AR: That was—

CP: Texas tick fever.

AR: Yeah, that was right.

CP: So, I misspoke.

AR: That was well before my time.

CP: Well, that surprises me because I remember all of that. I swam in those—

AR: Well, I remember it too, but I wasn't—it was before I was an entomologist.

CP: Well, that was before I was as old as I am now. What have we left out, Dr. Rogers?

AR: I don't know of anything special.

CP: You have had a very colorful, productive, valuable career in medical entomology in Florida. You spent, for all practical purposes, your total professional career has been in Florida, except the little sojourn when Florida loaned you to the US Navy, that period, but you carried your Florida knowledge with you. And then, you came back to Florida after the Navy.

And it is just studded with a lot of firsts. It's studded with a lot of direct observation of first things being done, and I hope you take pride in that. I don't want your ego to get all out of place. It is a pleasure to be in the presence of a person who has observed so many firsts in matters of things medical and epidemiology and public health in Florida.

AR: Well, thank you.

CP: And on behalf of the College of Public Health and the University of South Florida, Dr. Rogers, we just thank you sincerely for taking the time to come by and share with us this very valuable piece of Florida's public health history. Thank you.

AR: Thank you. I have enjoyed it.

CP: And I am Skeeter Prather. You're a good guy.
End of Interview