

The University of Arizona College of Agriculture and
the Arizona Historical Society Oral History Programs

Narrator: George W. Ware

Interviewer: Leon Moore

Transcriber: Beth Thrall

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Today is Monday, April 18, 1994. I am Leon Moore representing the University of Arizona College of Agriculture. Today I am in the company of George Ware for the purpose of recording Dr. Ware's recollections of his career at the University of Arizona. We are in Dr. Ware's home at 5794 East Camino Celador, Tucson, Arizona.

Moore: Dr. Ware, am I correct in stating that it is your intention to give this tape and the typed manuscript resulting from this interview to the Arizona Historical Society?

Ware: That is correct.

Moore: Thank you very much. Now to begin the interview, George, I would like for you to discuss your life as a youngster for us just to get into things - discuss your parents, where you lived, schools you went to and anything of that nature that you'd like to give us regarding your life as a youngster.

Ware: I was raised in Hope, Arkansas, in Hempstead County. It just happens that Hope, Arkansas, also is the birthplace and early years residence of our current President, Bill Clinton. I'm not sure there's any honor attached to my having been raised there. My father was George W. Ware, Sr., my mother was Dorothy Clark Ware. I was born in 1927 in August and grew up on what was known as the Fruit and Truck Branch Experiment Station of the University of Arkansas. My father was

the Superintendent of that small 175 acre Experiment Station. I have no brothers and sisters so I grew up pretty much as an only child on the Experiment Station outside of Hope - we were about five miles out in the country. The roads were gravel and I took the school bus into town and my friends that went to school with me were on the bus every day. I remember my early years vividly, it was a rather peaceful life living there. My father tried to teach me the names of all the species of plants that he was familiar with and the culture of crops. So agriculture was not foreign to me. I understood what was going on. Even as a child up to the age of about fourteen, I actually picked cotton every summer - but it was only to gain some money. They could not employ me - that would be nepotism. That pretty well takes care of my childhood.

Moore: That's a real good start, George. When you finished that of course you went on to college education and I know that you went to at least a couple of different places. Could you tell us about where and when and the degrees you received and your major professors maybe and people that influenced your life along in there during your college years.

Ware: Because my father had gone into the military when I was sixteen, I was shuffled off to a military school in Virginia, the Augusta Military Academy. I finished my Junior high school year there and returned to Pine Bluff, Arkansas, where I finished my Senior year. So I went to high school one year in Pine Bluff, Arkansas. From there I went into the Navy for a year and this was at the end of the war so I've got all kinds of nice medals for serving in the United States when you're at the very end of the war. I was ushered out in early September of 1946 at which time I tried to get into the University of Arkansas. The University of Arkansas was absolutely filled with GI's as you probably well know. So one of my buddies there in Pine Bluff had already enrolled down in a little

school in the Southeastern corner of the State called Monticello A&M and he said, "I think they still have room for a few more students down there, why don't you try there?" So I hitched a ride down there and sure enough I got into Monticello A&M and started there. My first year was in Agriculture and it was at that point in Monticello that a Professor named McGinnis taught Freshman Chemistry and it just opened up the world to me. I found out that things weren't exactly as they appeared to the eye and that they were made up of chemicals. It was probably the most revealing course I've ever had. In the meantime, my father came out of the military and was with the Army of Occupation in Europe living in Berlin, so they suggested that I come over and spend a year with them, which I did, from 1947 until 1948. I came back to the University of Arkansas and finished there in 1951 with my Bachelor's degree in Agriculture. Two people then were very influential, I guess maybe three. The first was William J. Byrd. I don't know if William J. Byrd was there when you were there or not, Leon.

Moore: He was. Tell us a little bit about him.

Ware: William J. Byrd was a rather unique individual. He was German born and had a rich German accent, so it made everything very official - when he talked to you it was authentic. I remember that his reputation was to allow black widow spiders on occasion to bite him on the hand, the purpose being to record the effects - any elevation of temperature, blood pressure, pulse rate, overall nervous symptoms - he published several papers on this one activity alone. But I remember when he came into class in our basic Entomology course with a large battery jar - a jar about ten inches in diameter and about a foot high with sand in it and lo and behold there was a large tarantula sitting on the sand. He reached in very calmly, pulled the tarantula out and allowed it to

walk around on his arm and he said he'd give an A to anyone in the class who would do the same thing. None of us were smart enough to know that spider was absolutely scared of us and wouldn't do a thing. None of us out of a class of about 45, not one of us would even pretend to let that spider crawl on our hand. At the end of the course after we'd become familiar with these sorts of things, there was no one in the course that wouldn't do it so we all missed an A by not knowing the behavior and characteristics of the tarantula.

Moore: Do you think he really would've given you an A?

Ware: Well, I went on and this was probably in my Sophomore year when I became acquainted with Entomology. In my Junior year I was taught by a gentleman, Dwight Isely. We called him Mr. Isely or Professor Isely. He did not have a Ph.D., something that was a sore point with him and a lot of the other faculty members. It always irritated him, I think, that he did not carry the rank of Ph.D. so he overcompensated by some of his very great research work. But Dwight Isely was a precision individual, in his thinking, in every word that you used, it had to be exactly so. He was the first one to read my thesis, but before we got to the Masters program, still in the Bachelors degree, I remember papers that he graded and I just dreaded examinations because he asked for precision that I wasn't accustomed to. I was the casual, non-scientific type and I would say that he did a rather unusual job of turning me around and making me somewhat precise in the way I described things and understood the biology of insects. He had written two books which were really just mimeographed publications and he was well respected. At the same time in my Senior year, I had never met him before - he just showed up - he was Charles Lincoln, known to his friends as Charlie Lincoln. He had just come back from Cornell where he had finished his Ph.D.

and he was a most remarkable person. He could sit back and puff that corn cob pipe and philosophy and you'd think he was 100 years old from what he would tell you about various things. Well Charlie did not become my major advisor. He was influential, of course, very influential. My major professor through my Bachelor's degree was still Dwight Isely. I finished the Bachelor's degree in 1951 and from there my professional career began.

Moore: At that time did you go immediately into the military or did you go on to school some more?

Ware: In 1951 I went straight to Jackson County, Arkansas, and was employed there by the collective funding of the compress, the oil mill, and the bank. They paid my salary to work out of the office of the County Agent. I had an A-Model Ford and my job was to go around and scout farmers' cotton and tell them what they needed. We'd hold meetings, at night or meetings in the fields of some of the farmers and generally try to educate them on the biology of the boll weevil and the corn earworm or the cotton bollworm. Those were the two major pests. So all of the summer of 1951 I did that and it was rather exciting because everything I'd learned in the laboratory came true in the field and it really brought to life the reality of what experimental work by others can do if you pay attention to it and apply it in the field. I remember that A. J. Williams was the so-called scout supervisor for the State. We had about 20-25 scouts around the State and he would go and visit one or two a day and keep up with what they were doing in the way of their teaching, their training, their scouting work with the farmers. My headquarters was in the Jackson County Extension Agent's office.

Moore: Was that near the beginning of scouting activities in Arkansas?

Ware: I think it was the second or the third year of the scouting program that Arkansas had started and I guess the combination of Charlie Lincoln and then Dwight Eisely. I think it was Dwight's concept and it was Charlie that executed the program because it was Extension and Charlie Lincoln was the Extension Entomologist in Arkansas. That's how he came back from Cornell - as the Extension Entomologist. So occasionally Charlie would come through town and when he did that was like having the President come through - it was a big to-do. He was well respected among all the County Agents. A rather remarkable man, had a lot of personality, in fact it was more than just a personality - he was a character. Anyway, that whole summer I moved along and it looked like I was enjoying what I was doing so I decided to go back to the University and get a Master's degree. My GI Bill had run out so I borrowed \$800 from my parents to see if I couldn't make it through the Master's degree in one year. So I went back to Fayetteville, Arkansas, and really started humping - working hard and I was able to finish the Master's degree in one year. My major professor was Floyd Miner and the subject that I wrote on had to do with the sub-lethal effects of DDT on the Diamondback moth. So my real introduction into research was with insecticides. I finished my Master's degree and went back to Jackson County, Arkansas. In the meantime during the winter I had worked up a group of farmers who were willing to hire me privately to scout their fields. I had been commissioned in ROTC earlier in the Signal Corps during my Bachelor's degree, so I moved my commission over to the Medical Service Corps. In June of 1952 I received a notice to report for duty in San Antonio, Texas, for basic Officer's Training School in the Medical Service Corps. I had become engaged to a sweet young thing, Doris Adams, who lived there in Newport. We agreed to get married in early October and report on the 15th of October in San

Antonio. I finished my cotton scouting career there that year and I think I had 1,500 acres and was really pleased with the outcome. So that was the end of my "self-employed" career, so to speak.

Moore: That was in 1953?

Ware: 1952. So Doris and I were married, bought us a little Plymouth and we took off through Mississippi and down through Louisiana and worked our way back to San Antonio on a honeymoon. We spent the next six weeks in San Antonio going through officer's basic training crawling under machine gun fire, learning how to control ticks, learning to identify mosquitos of certain kinds, and generally learning the principles of Entomology as the Army dealt with problems in Entomology. At the end of that time, it was getting close to Christmas and we were assigned to Fort Meade, Maryland, so I was assigned to a Preventive Medicine Company as a 2nd Lieutenant working under a Major Kidwell, who had just come back from Korea. He had all the answers to the Korean problem and he said, "You'll never go to Korea, you won't have to worry too much about that." Sure enough, about five months later, I got orders to go to Korea. I went to Seoul, Korea and became the commanding officer of a small Preventive Medicine Detachment, the 37th Preventive Medicine Detachment, located up on the 38th Parallel at Panmunjom. The war had just terminated and I took over this unit and their responsibilities at that time. We were on what would have been the front lines and our job at that time was to dust and control body lice on North Korean prisoners. There were some 35,000 in these large prisons, I'd call them cages, barbed-wire fenced-in compounds. We slowly dusted and gave them new fatigues and sent them across the exchange point, put them on trucks and sent them off North. I remember that vividly because at that time the North Koreans learned every vernacular that the GI's had and as they raced off by

the truckload on the other side with their fresh fatigues and fatigue caps in the North Korean trucks paralleling the fence where we were working, (they'd just been dusted with 2% DDT dust), and they yelled at us all the obscenities they had learned and took off their fatigue caps and fatigue jackets and pants and they threw them over the side in contempt, and yelling and screaming those contempts as they drove off. So it was an exciting time. I spent eleven months in Korea, a full winter and it got pretty cold up there in that part of the world. We lived in tents and had kerosene stoves, and we ate GI food and had a great time, if you can have a great time there.

Moore: It almost sounds like a M.A.S.H. unit, George.

Ware: Actually it was. We were attached to a M.A.S.H. unit because the hospital was the headquarters for the 7th Division and we were attached to the 7th Division, Mobile Army Surgical Hospital. So the choppers kept coming in because there were wounded people from truck accidents, automobile accidents, they'd run over a land mine that they'd forgotten about, so we had all kinds of casualties. I remember that but I'll tell you, the M.A.S.H. was in no way like the M.A.S.H. that became the serial series for the movie and later television. In May I got the good news that I could go home. This was 1954 so I came home, met Doris in Fort Smith and we went back to Newport and I fortunately got there in time to pick up my same customers I'd had in the Scouting program. While I was there we lived in a small apartment. A young professor, Dr. Lloyd Warren, had just finished his Ph.D. at Kansas State University and was a faculty member there at Fayetteville, stopped by. One of his assignments was to check on the Scouts, so he had dinner with us one night and he said, "George, you ought to go back for your Ph.D." I said, "Oh, that's too much for me, I couldn't handle a Ph.D." He said, "Well, you never know until you try. Don't you have the

GI Bill?" "Yes, I have the GI Bill." "Well, why don't you do it. Let me set up a meeting for you up at Kansas State." So on a Friday night after I had scouted fields, Doris and I hopped in the car and we drove all the way to Kansas State non-stop. I think it was 1,000 miles - it seemed like it - it must've been 600 or 700 miles. Anyway, we drove straight through and got there on a Saturday morning and Dr. Roger Smith, the past Department Head who had stepped down, met us and he was the most personable individual I think I'd ever met. He invited us over to his home that night and they had slides of trips to India and insects and it was really a nice home seminar, a cozy atmosphere. It didn't take long for me to decide to give it a try. So Doris and I got back in the car and went back to Newport and proceeded to make plans to move to Manhattan, Kansas for the Ph.D. program.

There was something brewing which we didn't know about -- there was no housing there. When we tried to find a place to live at Fort Riley, Kansas, which was the main source of income for Manhattan, we could not find a single place to live - not a place was available. So we went back to Newport and there was a company in Newport that manufactured what we then called house trailers, we call them mobile homes today. We invested, I think, \$3,200 in a mobile home, hooked it on our car that hardly had the horse power to pull it, and dragged that thing all the way up to Manhattan, Kansas, got some concrete blocks, blocked it up, got a propane tank, evaporative cooler, and settled down for the Ph.D. program, little knowing that Doris was now pregnant. Here we were in a small 28' trailer and expecting our first child. We got into our Ph.D. program in September of 1954 and Clifford C. Roan became my major professor. Cliff was a toxicologist, which

was the area that I wanted to work in. We just did great things there - had a real good relationship and I dug into the Ph.D. program with a vengeance and finished, I guess, in some sort of record time because we went that nine months, took the next three months off in 1955 to go back to Arkansas, to earn some money and have Cindy, our first child, and do some cotton scouting and then come back to Kansas State. We did that and only had nine months of school, had another nine months which carried me into 1956, and the summer of 1956 I finished my Ph.D, writing my dissertation. I had my examination mid-August and my first job was at Ohio State. We sold the trailer, moved out - so I had finished the Ph.D. in 21 months, both languages, and I tell you, I was about as near exhausted as I could be. I think the motivation was to get out of that 28' trailer because it was so compressed - just no room to move. If anyone had motivation to finish, it was I. That ends the educational portion of my life. All of that, military, and schooling contributed greatly to my overall understanding of insects.

Moore: George, I sure want you to bring in the rest of your family here because I know there are two other children, but could you do that in relation to telling us a little about what you did there at Ohio State?

Ware: I went to Ohio State, strangely enough, as an Extension Entomologist and I was to work with Lyle Goleman. He was the Senior Extension Entomologist, I would have been the Junior. Lyle had been in the military, and had finished at Illinois. Ohio was a different kind of Entomology for me. Here I was trained as a toxicologist and going in as an Extension Entomologist, but all the Extension work that I had done in Arkansas was probably the reason they hired me because I did have a way

with people and with handling the people situations. I took the job but was not really contented as an Extension Entomologist. It was something that just didn't seem to fit. Well, about eight months into that tenure the faculty had initiated a search for a toxicologist on the faculty of the Department of Zoology and Entomology, so I talked to two or three of them and I said, "You know, that's where I was trained." They said, "Why don't you apply?" I did apply and got the job.

My appointment was 75% Experiment Station and 25% Instruction which is a common time distribution of appointments for a Research/Teaching position in a Land Grant University. My research base was up at Wooster, so I spent a lot of time there, did a lot of research in the field at Wooster and at that point, most of the research that I was doing was residues of different insecticides on crops. My laboratory, of all places, was in the headhouse of a greenhouse there at Ohio State because it was so crowded for lab space. We got out the putty gun and paper towels and stuffed the windows and finally had a fairly serviceable laboratory. I spent a total of ten years, from 1956 until 1966 at Ohio State. The career there was fairly challenging. I taught two courses: a basic toxicology course and then an advanced course. On top of that, I also had an analytical methods course. So my life was very heavily into chemistry and to staying on the front edge of analytical methods for micro-levels of pesticides in tissues and in plants. I had graduate students, several Ph.D. students, an abundance of Master's students and it went along very well. I made Full Professor in 1966 after nine years which was fairly standard.

In 1965 I met a person who dropped by to see me, Dr. Larry Carruth. He was the Department Head at the University of Arizona and for some reason he had learned about me and decided he wanted to interview me. So he came out and said, "Are you

interested in going to Arizona?" I said, "Where is Arizona?" Anyway, we talked about coming to Arizona and a little later on the Dean of Resident Instruction, Darrel S. Metcalfe, came to Ohio State University to really check me out. What they were looking for was a Department Head, so here shows Darrel and he really gives me the old "third degree." Shortly after that I had an invitation to come out and be interviewed and that was in 1965. In 1966 I made another trip out here because I had agreed to come and in 1966 I made a couple of trips to write research grant proposals.

Moore: George, you were just discussing the federal grants about the year 1966. Could you continue there, please?

Ware: I think my last trip out here to write grants was in May of 1966 and I was going to stay here about three days so it was a very important time element. Larry Carruth asked me where I wanted to stay. The first time he had put me up at the Pioneer Hotel downtown which was a pretty classy place, but it was too far from the University campus and I needed to be someplace that I could just walk from and go early and work late and not bother anybody. So he said, "Okay, we'll put you up at the Geronimo Hotel." Well, that was an appropriate name, I tell you, because that had been, I'm sure, a good hotel in its day and it was located on what would be Euclid and now University Boulevard. I remember that it was evaporative cooled, it smelled like a men's gymnasium and it had German cockroaches in every conceivable spot. I wouldn't eat a meal there because it was such a crummy place.

Moore: But it was close.

Ware: It was close and I remembered getting up early and walking down what would be University Drive now, east toward the Agriculture Building on several mornings and walking past these palm trees, I could hear these small Sonoran doves up in the palms where they nest. They have that very peaceful little "Coo" and that was a most memorable time, I guess, of the whole affair was just hearing those doves. Every time I hear them I think of that era of my life in making the transition to Arizona. Anyway, I went back to Columbus, Ohio, to finish my tenth year and start making preparations to move to Arizona. On July 4th I drove from Columbus by myself to Tucson over that holiday to start nestling down as a Professor at the University of Arizona. They wanted me to work in residues and toxicology at Arizona - that was the reason for my being hired but at the same time they were looking for a Department Head. I guess the "gentlemen's agreement" was that if I kept my nose clean and did my work, I would very likely become the Department Head. It was not an absolute given and I met for the first time Harold Myers who was the Dean and when I interviewed with him I was already an employee. I came into the office and he greeted me cordially and he said, "I remember you because I was the Director of the Experiment Station at Kansas State and your contract as a Research Assistant in 1956 was the first contract I signed for the Experiment Station. So I remember you." I liked Harold Myers, he was a gentleman and a very intelligent person and did his very best to keep the College on an even keel.

Moore: He was "Mr. Agriculture" through and through, wasn't he?

Ware: He certainly was. The person that I replaced in the Department of Entomology was James Witt, or Jim Witt. He had, for some unknown reason, indicated that he had his Ph.D. when in fact he didn't. This caused some concern with the Administration so they decided that it would be best

if Jim Witt left and in the process brought me in so there was a rather tenuous period in which Jim Witt and I were in the same Department. We got along fine, as it turned out. Finally got settled down and I inherited his research crew and our job mainly was to work on residues of DDT in milk and alfalfa, grains and soil, and work on drift from aerial application, because it seemed that there were two problems. One was DDT. It was everywhere in every medium, and the other one was that when they made applications of DDT, it seemed to drift everywhere. So if they could solve the drift problem, maybe they could control it by confining it to just the fields of cotton being treated. Neither one of those problems could be resolved and I guess I would say that the foremost problem that I encountered when I came to Arizona in 1966 was the omnipresence of DDT. It was in every ounce of milk we drank, it was in the soil, it was in the alfalfa, being fed to the cows and there was no end to the problem that this was causing. Milk had to be poured down the drain because it was far over tolerance.

Moore: George, could you tell why there was so much DDT out there. What was the cause of it?

Ware: That's a good question. DDT was introduced into agriculture in Arizona about 1948 or 1949 and initially the basic product only cost about 25 to 27 cents a pound. You could make an application for a couple of dollars an acre, so the growers were using DDT as insurance, not only to control insects but to prevent infestations from occurring. As a consequence, we calculated that in 1965 or 1966, either year, we were using as much as two million pounds of DDT in Arizona. That's a phenomenal amount when you think about it and that DDT of course was applied only to irrigated agriculture which was a very small part of the geography of Arizona so that meant that everything that was within those little communities of irrigated agriculture was being exposed. To get back

to my point, the major problem that our laboratory faced and that the Dean of the College of Agriculture faced, was the continually high levels of DDT in milk and in all the crops that were being eaten by animals. There seemed to be no way to get around this by examining of residues and reporting results. All you did was just report the obvious. So, in 1968, with long discussions with Leon Moore, you, and Theo Watson and other members of the faculty, we talked about this - what should we do? We've had nothing but problems with DDT. We really put our necks on the line when we agreed in 1968 that we would remove DDT from our recommendations. It would not appear as a recommended insecticide - we'd have substitutes. So the substitute that we went to was primarily methyl parathion for the major displacement of DDT. I can't think of anything that probably brought more attention to the Department, to Leon Moore, to George Ware, to Theo Watson, than the abandoning of DDT. Of course the cotton growers were just furious about it because we hadn't given them any warning. The chemical people were more than furious. They were angry because they suddenly found themselves with great reserves of the material on hand and the growers were refusing to use it because now they figured there's something really wrong, even though they were displeased with what we had done. I guess at that time, in 1968, was when we had almost polarized ourselves with both the cotton growers and the agricultural chemical industry. In late 1968 our laboratory presented to the Board of Pesticide Control literally reams of irrefutable data showing that there was no way that you could reduce the use of DDT and still have saleable products - that reduction was not the answer - a ban was really needed. So in the spring of 1969 the Board of Pesticide Control did a rather courageous thing. They put a moratorium on the use of DDT and Arizona then became the first State to have such an action. I

had nothing but praise for the Board because now they became polarized with the University against the Ag Chemical industry and the cotton growers. Oh, the shouting and commotion that went on after that! I remember testifying at the request of Dean Myers before the State Legislature in 1968 on why we did what we did and it got an awful lot of attention - television, radio, newspapers - and it's not the kind of attention that people like because it became a form of notoriety rather than popularity. So in 1969 DDT was put on moratorium and amazingly the levels in the milk and fodder went down dramatically. We continued to monitor into 1970 and in 1970 the Board decided to continue the moratorium, it was so successful. In 1971 the Board continued it and on January the first, 1972, the newest branch of the Federal government, the Environmental Protection Agency, put a ban on the use of DDT nationally.

Moore: So we really had a leadership position right here in Arizona in terms of doing that. George, didn't you find yourself in a position of having the facts and having to be a leader and having to override any desire there might be for popularity in this kind of a circumstance?

Ware: Yes. It was not what I'd call a comfortable position but it seemed like it was the only thing that as a Department Head I could do. I had two roles here, one was the leadership of the Department and the other was the knowledgeable person in the Department who had all the data from field collections of samples and the analytical information from them. So in that dual role I guess I probably banged my head against it but I will tell you, in retrospect, I would have handled it a little differently - I think I would have approached the growers and the chemical industry earlier with the information and told them what the options were. As it was, we didn't do that, we just threw it at them and said, "Fellas, this is the way it's going to be."

Moore: But isn't that a little bit like quarterbacking on Monday morning? I mean it's always easier to see these things from looking back than during the heat of the battle.

Ware: Ha! We can always say, "If I had . . ." Well, things got pretty tough there for a while and then in 1972 or 1973 with the DDT fading away from our environmental sampling, another material stood out like a sore thumb. Let me tell you what had happened. The common insecticide, the one that was used so frequently and so heavily, was a combination of DDT and toxaphene. DDT and the analytical method used makes it easy to see. It's just one peak with a couple of smaller peaks in gas chromatographic analysis. Toxaphene was made up of more than a hundred different components, so when you see it on a gas chromatograph it's just a rough bumpy road and none of it's really distinguishable -- like a baseline that's just loaded. DDT finally disappeared from our analytical samples and then we could see toxaphene. It was there all along but we weren't concerned about it. So now the dairy industry is saying that toxaphene's killing us, we're having to dump our milk because there's toxaphene in it.

Moore: This was about 1973 or 1974.

Ware: Yes. Because we had been away from DDT, now that there was none being dumped into the environment, it's beginning to vanish at least in the larger quantities. Well, DDT and toxaphene were replaced when we put a ban on DDT with a new combination of methyl parathion, an organo-phosphate insecticide, and toxaphene. And the toxaphene, I guess you might say was a good glue with methyl parathion when placed on the cotton plant. It stuck and it seemed to protect the methyl parathion a bit. So that was the combination and the methyl parathion degraded quickly. It was not environmentally persistent. In the Spring of 1974 we did the same thing. We said,

"We're removing toxaphene from our recommendations." Well, in the meantime since the DDT episode, the growers and the chemical people had sort of formed an alliance. In 1974 when we said we were removing toxaphene from the recommendations, this alliance came out like a lion and it was at that point, I guess, that you Leon, Theo Watson and I, known by that time as the "Arkansas Mafia," were put on alert and we believed with every cell in our hearts that we were going to face being chased out of Arizona. We discussed this with the Dean and he said, "Well, you just sit still, don't do anything." Well, I did something - I called my old buddy Perry Atkinson back at Texas A&M, and Perry who was Department Head there knew what was happening out here. Texas A&M was the biggest Entomology Department in the nation. So I called Perry and I said, "Perry, we're in trouble out here." He said, "That's what I understand." I said, "There are three of us that just might need a new location if Ag Chemical people manage to persuade Administration to push us out of the College." He said, "Tell you what. I don't have any jobs for you right now but I can assure you that there will be three positions here if they do kick you out. We'll find the money for you." So I told Perry that he was an angel and not in disguise, either. He was our blessed overseer. Well, with that kind of support, I felt a little more courageous because I knew that if we got kicked out here we could go to Texas A&M. That's a story that I don't think many people know. It's the best-kept secret in the country. Between Dean Myers, who defended us so strongly and Dick Frevert who headed up the Experiment Station at that time, Dick was sort of a weak-kneed administrator, but as long as he had the Dean behind him he was willing to be fairly strong.

Moore: And George Hull?

Ware: George Hull - Oh, he stood up for us all the way. I don't know all the ramifications of it but I know that the chemical industry went to the President of the University, Richard Harvill, and he stood by us and said that what we were doing was certainly within keeping of the mission of the University, the College of Agriculture and the Extension Service. He would not do anything except support us.

Moore: George, we're skirting around it just a little bit here, but along with the necessity to do away with DDT and toxaphene which we saw as absolutely necessary, we instituted what we called Integrated Pest Management or IPM. You might want to just bring that into the picture here a little bit.

Ware: Well, you can see where my worries were at the time. You, Leon, had been asked to work in the Safford area and try to solve their - call it a "calendar application" of insecticides to control the pink bollworm. Your solution to that was to develop a scouting program so that you looked at the fields only for the pest and monitored them, to establish an economic threshold. This was a given, because you, Theo, and I were "raised" so to speak in the Arkansas system of cotton scouting where you did exactly that. You didn't treat a field unless there was something there to kill, unless it would be economically feasible, because we knew that when you apply an insecticide you didn't kill just the pest - you killed virtually everything out there. You were beginning to develop this program in 1972 I believe in Safford.

Moore: No, it was in 1969.

Ware: That's right. All of this came along - it was such a shock to both the chemical industry and the cotton growers that here we had both the removal of some of their favorite, cheapest tools, and

the introduction of a system in which you didn't treat the fields on a regular basis. So we were sort of fighting both battles at the same time. The toxaphene and the Insect Pest Management program together were what really brought the agricultural chemical group and the cotton growers into their alliance to try to oust us because we were just too much for them.

Moore: You mentioned cotton growers but there was some support out there amongst the rank and file but not in the Arizona Cotton Growers Association, that's what you were referring to as the cotton growers?

Ware: That's right, the Cotton Growers' Association had never been supportive of the IPM program as far as I was concerned. I guess if we sat down and listed them, there were probably fifteen or maybe twenty cotton growers who, in my opinion, had their hats on right and understood the biological principles that we were dealing with because it was about that time that we were also beginning to introduce what was known as heat units. That was just the beginning of it. Roger Huber introduced heat units over in the Safford area and I think it was his first study. He brought together heat units with the monitoring system and treating the fields only when they reached an economic threshold of the pest became such a revolution to the growers of Arizona that it was almost impossible for many of them to accept it. I think I'd heard statements something like this, "I've always treated on a weekly basis whether I needed to or not and you're coming along and you're telling me to treat only when the field needs it? Why I can't sit here and do nothing! I've got to get out there and treat that field! That's just part of the cotton growing process."

Moore: What kind of a syndrome was that?

Ware: We classed that as the "do something" syndrome. I think it's important at this point to talk a little bit about the very close alliance that Watson, Moore and Ware had and the IPM program became so well known that the EPA asked us to conduct some training sessions with them. I don't remember where the first one was but I do remember the one in Denver.

Moore: Denver, San Francisco and Washington, D. C.

Ware: We had three and we really put together a good program so we were teaching the administrators and EPA about insect pest management, the obvious route that things were going to go. We were well received. We had put together a manual and in 1975 I had written my first book on "Pesticides, An Autotutorial Approach." It was a little manual in which you worked your way through and filled in the blanks. This was published by W. H. Freeman. It was obvious that what we had put together was the first effort at introducing insect pest management in book form because we had prepared a manual. So we agreed that we would prepare this and try to sell it to W. H. Freeman as a book and they went for it. So we worked on weekends and I think every Saturday morning we worked until about two o'clock, brought our coffee and our sandwiches and we worked on our manuscripts and then during the week as we had time we would do our individual parts. So in March of 1976 the manuscript was finished and we sent it off to W. H. Freeman. It was already finished in such a way that it was camera ready - we had it typed and completed. It was ready to be photocopied and was quickly printed and published. It was titled "Practical Insect Management" by Theo Watson, Leon Moore and George Ware, and I tell you, I just had a hell of a lot of fun doing that.

Moore: So did I.

Ware: That was one magnificent effort and I don't believe there were any three guys in the nation at that time that were more synchronized and working in the same direction than the three of us. It was a tremendous alliance, something that I can never forget.

Where are we - 1976. By 1976 IPM was pretty well started in the State and I think you had it in Yuma, Pinal County and Casa Grande, and then you had activities around Marana and Maricopa County. You had quite a crew out there that were involved in a project which was partially supported by the feds and it went along smoothly. That takes us 1976, 1977, 1978, 1979 - I'm trying to think of the events that occurred during those years. The Department began to grow, the heat unit philosophy was really taking hold and had been applied first to the pink bollworm and then later to the budworm, and then - when did the boll weevil hit us?

Moore: It was about 1980. 1978 was when we went back to stub cotton production and it took about two years for it to really get under way there so it was around 1980. That was another whole chapter of things that began at that point.

Ware: We could write a book about the stub cotton and the consequences of that.

Moore: George, this shows the ultra importance of your administration in terms of what was going on out in the State and I know how much I appreciated that, but there was a lot more to being Department Head than that and I wonder if you can recall some of the circumstances as to what the Department was when you came here and some of the things that we tried to institute from the standpoint of teaching and other aspects of the Department.

Ware: Well, at the time that I took over in 1967, the College had a Ph.D. program but it was run by a committee. I've forgotten the name of the committee but it was like a Plant Sciences committee so any degree that would be offered through Entomology as a Ph.D. would come through that curriculum and the oversight of that College committee. So every member of the Department started preparing a document that would go to the Graduate School, the idea being to initiate a Ph.D. program which would be the first Departmental Ph.D. program in College of Agriculture. And we did - we put together probably a 250-page document to demonstrate that we were capable of administering our own Ph.D. in Entomology. I think this was finally completed in either 1968 or 1969 that the Graduate School gave us the sanction to have our own Ph.D. program, so we did. We were the first such department in the College of Agriculture, none of the others had taken the time or made the effort to develop their own program.

The Ph.D. program was a somewhat remarkable event because Entomology was not a very big department in 1968 and we were depending upon some very skilled people. Fortunately we had some good names, some good degree programs from which our faculty came. We had Floyd Werner and Bill Nutting who were graduates of Harvard with their Ph.D.'s, we had Theo Watson who had finished at Berkeley and then you and I had finished our degrees at Kansas State, the least of the apostles, I guess. Nevertheless, the Ph.D. program was accepted and I thought that was a rather remarkable event, breaking away from the old traditional super-committee of the College.

A little earlier we had received a grant to work with people that had been exposed to pesticides and it had begun out of the Communicable Disease Center in Atlanta,

Georgia. A very sizeable grant came to us and we had a young physician on board who was the Epidemiologist but who was most disagreeable, and he ran the show by himself. We had a few chemists and the purpose was to look at people who were in the profession of dealing with and handling pesticides, so we were dealing with the occupational exposure group. Cliff Roan who was my major professor at Kansas State had been in Australia working there with the Shell Chemical Company, became disenchanted and called me to see if anything might be available out here. Well, sure enough we had a position opening as the Director of that human pesticide exposure group. Cliff Roan came and shortly after he came and headed that up, he hired a physician, Don Morgan, who was practicing up in San Manuel. He had a private practice but also had a Ph.D. and was a darn good statistician and was more interested in Epidemiology than anything else. So Cliff Roan and Morgan put together the rest of this program and it was about a third of a million dollar a year project which was not small peanuts at that time. This was in 1969. They became probably the foremost occupational exposure research group in the nation and they were part of our Department. So in addition to all the other commotion that was going on we had Cliff Roan out there nosing around and he got mixed up in the Globe incident. Billie Shoecraft owned a television station in Globe and became involved in the 2-4-D and the 2-4-5-T applications for the control of sagebrush up there by the feds. She later became the author of a book entitled, "Sue The Bastards." A very outspoken and unusual personality - had a lot of punch. Well, Cliff Roan came along just in time to face her and I guess we had some real interesting personalities out here. Stewart Udall came out and

shared a session at which Billie Shoecraft was in, Cliff Roan, and Don Morgan. I tell you it was a knock-down drag-out. Well, at the same time all of this was happening, then EPA got in the act and they started looking at protective clothing. Remember that episode?

Moore: Yes.

Ware: They came out here and said that Arizona's got to be the hottest place in the country, we want to know about what kind of protective clothing we can use to protect these farm laborers and people who are irrigators, the ones who are scouting cotton, etc., that have to enter fields right after they've been treated with insecticides. So we put on a dog and pony show for them and we dragged out the protective clothing that was then available. We had the rubberized suits like the ones firemen wear, and we had straw hats. We put on the black suits - I forget the outfits that we put together because there was essentially no protective clothing available. We took pictures of it and had the men put on the outfits there in the hearings that were held in Phoenix. Don Morgan was our physician in Epidemiology and he said that the hazards of having someone work in such an outfit were far greater than any exposure they would encounter by not wearing it. I think that protective clothing was probably set back a decade by that episode.

Moore: I recall that meeting, George, in which you dressed me up in one of those suits and then asked Dr. Morgan how long I would live outside and he said, "Probably about fifteen minutes."

Ware: I remember that. I still have some of those slides.

Moore: That was a very interesting group and certainly after good information to help with the pesticide problems but on the other hand they were realists and I think the Pima Road

situation got involved in that too, up around Scottsdale. Do you remember the incident where Dr. Roan asked a plane to fly on an application of water and then reported the complaints from the neighborhood.

Ware: Yes, they did that more than once in which an airplane loaded only with tap water would zoom down over a field and within hours you'd have the people calling up and saying, "They sprayed pesticide over there and I'm getting nauseated and my children are losing their hair and my chicken has one leg . . ."

Moore: ". . . and my ducks are dying."

Ware: We had a lot of laughs about that but there were some very serious moments. Pima Road is a North/South road that separates the McDowell Indian Reservation from Scottsdale and of course you have the very wealthy people living in the Scottsdale area and right across the road, a little 28 foot right-of-way, airplanes had been making applications of various pesticides.

At that time there was another episode with defoliant. There were two or three defoliant that either contained in the defoliant - a defoliant is material that's used to dry the leaves of cotton at the end of the season causing them to fall off so you can harvest the cotton with machinery - they were making applications of these defoliant and the defoliant by their chemical nature either had in them or broke down into thiolethers (mercaptans) which are very odoriferous. The ones that are most common smell like either skunk or garlic or onion. The ones that smell like skunk are really tough - they smell very bad and are even repulsive to some individuals, causing them to vomit. Well, that sort of thing then became a problem and we got into the drift - actually I guess we were experts

in the country as far as drift went. We had done tremendous amounts of work trying to put limitations on sprays from aircraft, where you could and couldn't apply. So we became involved with the Board of Pesticide Control. They had hearing after hearing and finally came up with buffer distances. You couldn't spray some of these defoliant within a quarter-mile of residential areas, you couldn't spray them upwind. If you applied them with ground equipment they could be done within 100 feet of residential areas, but everything that we could think of we proposed and the Board of Pesticide Control did impose many of them and the Aerial Applicators Board also was part of this. So we had the Pesticide Control Board and the Aerial Applicators Board all involved in trying to regulate and prevent these uprisings that had to do with the smelly characteristics of some of the materials being applied to our crops.

Where are we - there were so many exciting events you almost need a schedule to follow.

Moore: Right. George, let's go back and pick up just a little bit on the Department from the standpoint of its growth. Do you have any numbers that you can throw out regarding the people that were there and the students, the faculty and everything when you came and at the time when your tenure as Department Head ended. It must have been a considerable increase.

Ware: I really have not thought about that too much, but I would say that our Department was about 75% larger when I left it in 1983 than it was when I came there. The spectrum of faculty really grew - this was just at the beginning of the era that I guess we refer to as Biotechnology. When we were

looking at new types of control mechanisms that we hadn't even thought of a decade earlier - pheromones, the materials that insects produce for mating attraction, we used those in our research on the pink bollworm and later for other insects. We were looking at growth regulators, all these were being slowly brought in to the pest control picture, and I say pest control because our Department was truly oriented in a mission to help growers with their problems that concerned insects. I would say that's not the picture today with the Department of Entomology. It's gone completely off into what I would call the cellular and theoretical part of Entomology that has little to do with helping growers. This all began on a field basis, I would say in Safford, with two areas - one was using the pink bollworm pheromone, gossypure, to monitor pink bollworm adults as they emerged and were in the process of mating and were able to lay eggs. So this was an alarm system that we had developed knowing when to really start looking for damage. The other was the beginning of the heat units in which you could predict the emergence of generations of insects by their growth patterns dependent entirely on temperature. So that was the beginning of what I think was the introduction of new aspects of insect biology into their control looking at their weak links. We had a department of very dedicated entomologists and I remember once being told by the Director of the Experiment Station that Entomology was the most cohesive department in the College and I certainly believe that. Probably part of that cohesiveness, though, stems from the external pressures that we had.

Moore: We had to hunker down, didn't we?

Ware: We had to hang together, so to speak or we might hang separately.

Moore: Right. But I also think, George, didn't we have a pretty clear mission laid out before us. If we were going to be leaders in the protective position we were entrusted with, we felt that we had a pretty clear mission there of doing some of these things we had to do and so that also caused a cohesiveness, didn't it?

Ware: I think about 1978 - correct me if this seems to be wrong to you - but we finally concluded, as a faculty, that all of us would work toward Insect Pest Management.

Moore: I think it was a little before that.

Ware: It was a simple goal to have because everyone, regardless of their research targets, could set aside 25 - 50 - maybe even 75% of their direction so that it could be used in an IPM program. That remained the heart and soul of the mission of the Department of Entomology until about 1984. I left the Department, was asked if I would serve as the Associate Director of the Experiment Station in the spring of 1983. Pete Dewhirst was the Director. We had a new building program coming on and we had a new Dean, Bart Cardon. Bart came on with a flurry and a fanfare of great activity - we knew that things were going to happen and they surely did. I was asked to be the Associate of Pete Dewhirst and oversee the new building program that was going to be under way with our bonding that came along, we were going to sell some of our farms. We were going to build a new Experiment Station, and all these things came along, so in 1983 I left the Department as a Department Head. Larry Crowder who had been both a toxicologist and a physiologist in the Department was asked to be the Acting Department Head and Larry became a candidate in the search but he was not hired and as a consequence he left and became the Department Head at Oklahoma State which is a pretty good indication of his leadership characteristics and later he

became the Associate Director of the Experiment Station there where he is now. Following Larry's departure, they brought Bill Bowers from Cornell as the Department Head of Entomology and Bill was interested only in Bill. As a Department Head and as a leader, he was in my opinion, a miserable failure. He lasted about four or five years - had nothing to do with the growers, had nothing to do with the pest control industry or with the urban pest problems - devoted all of his time to his own research and then he resigned. Bill Nutting was made Department Head for about six months or a year, and then Roger Huber became Acting Department Head. They started another search for a Head and came up with a young lady who was a Professor in the department in Berkeley, Elizabeth Bernays. Elizabeth came here about 1988 as the Department Head and was certainly an improvement over what had happened with the previous Department Head. She found that it was a very difficult assignment and the demands as Department Head far outweighed the demands that she had on her research and she preferred to do research. So in 1993, she asked to be relieved of that position and resigned. The Department has really gone through a tremendous evolution - from one of being a pragmatic Department doing a lot of empirical research in the control of insects, a great deal of field research, to a Department now, and this is the way Entomology is almost nation-wide, in which there is very little field research going on, most of it is being done in the laboratory which doesn't, in most cases, lend itself to extrapolation to field utility.

Moore: So we really went from a well-organized, concise Department to a totally different kind of a Department run in different ways and we'll leave it to history to show what that is. I do know that we had a tremendous Department with a strong interest in fulfilling the role of the Land-Grant system while you were Department Head, George, and that's certainly

great. I wondered if you could - you've mentioned different Deans here in Administrations. Could you run through those just briefly and tell us a little bit about how they differed from Dean Myers.

Ware: Gladly. Harold Myers was a Plant Scientist and I guess you would call him an Agronomist in the earlier terminology. He finished at Illinois, became the Director of the Experiment Station at Kansas State and then moved out here about 1962, I believe. So he was the Dean when I first came here and he was the Dean until 1978. Anyway, Harold Myers was a man who had also met his challenges and over the years he had lost some of his boldness simply because he had been knocked down, not by the people that he was working for but more by the Administration of the University. He finished his tenure and was replaced for a brief period by Darrel Metcalfe, Director of Resident Instruction, or the Academic Dean. Darrel had a very "hands-on" type of management in which he met with the Department Heads frequently and wanted everything to be kept with no ripples in the management. He was even more timid than Harold Myers in his latter years. So we didn't do anything administratively as Deans from that period, About that time we had a new President, John Schaefer, and as a chemist he looked toward the exact sciences for leadership in the University. He had not much use for Agriculture. He was a good administrator but as I said, he was interested more in Astronomy, Chemistry and in Physics and that's where his attention was placed. Also, in the Space Sciences, the Optical Sciences, Engineering, all of those grew under John Schaefer. I don't know the details of it but I think he was probably asked to leave as President by the Board of Regents - that's my speculation. He fortunately had a very good opportunity to head up the New York firm which was a non-profit organization called Research,

Inc. He left Tucson and they looked for a new President. They found Henry Koffler. Henry came shortly after Bart Cardon was made Dean, didn't he?

Moore: I believe so.

Ware: I believe Bart had been in the office as Dean of the College of Agriculture for about a year when Henry Koffler came. Bart made it a point to really squire Henry Koffler around and get him under his wing because physically he could almost do that. Bart was about 6'2" and Henry was about 5'2", so if he put his arm around Henry Koffler, Henry's little bald head was right under the armpit. But Bart Cardon was a dynamic guy. I think he got part of his indoctrination by being one of the senior staff members of General George Patton in Europe. So Bart Cardon had a kind of military manner about him and he expected his lieutenants, his staff, to do exactly what he said. Needless to say there were many events which didn't exactly work out that way so Bart stayed I guess frustrated much of the time. He expected our Maricopa Experiment Station to pop up in just no time at all, but it didn't work that way. We had too much red tape to go through so he stayed in a continual state of frustration. I guess the College, partly due to some of our activities, Leon, had been separated from our user group out there by a lot of the activities that were going on and a seeming lack of interest and attention to the agricultural industry by the College, and when Bart came, he had been a part of the industry and he was well known out there. He had formed what they called the ABC, the Agricultural Business Council, and he was President of the first group. Anyway, he had retired from Arizona Feeds, was President of this non-profit Agricultural Business Council, and was asked by the Board of Regents to be the Dean of the College. When he came on, he really left his mark. I think of all the Deans that I worked for, I enjoyed my work with Bart

Cardon more than anyone, because I did also work more closely with him than I did with any of the other Deans. But that guy really had charisma - he could've easily been a Senator, he could've been a Governor, he could've been the President of the United States under the right circumstances. He just had the aura, the stature, the leadership capacity to do these things. There is one Dean that I haven't mentioned - that was Gerry Stairs.

Moore: He came in before Cardon.

Ware: Gerry Stairs came in in 1973 and left in 1978. He came from Wisconsin where he was Director of the College of Natural Resources. He was well accepted for a time and while he was here was when we formed our School of Renewable Natural Resources. The School of Home Economics was still there and Gerry had some big ideas - a lot of them good. He was going to develop an Energy Ranch in which all the energy consumed there was solar powered, very little man-made energy pumped into it. A lot of keen ideas but Gerry didn't mesh very well with the agricultural industry and he had an annoying habit of talking you to death. He could start talking and I've gone to sleep at some of his meetings, which wasn't too hard to do on several occasions, but Gerry would just talk you to death and he ended up with some other problems too. Eventually he was asked to step down as the Dean of the College and he went into the School of Renewable Natural Resources for a period of about seven or eight months while he looked for a new position. He left here and went to Duke University. The same problems he had here followed him there.

Moore: George, that's a pretty good resume and I was going to ask you who maybe your favorites were and I know that all of them had some good points. Could you discuss a little with us some of the developments that occurred while you were in the College Administration. I

know that there were several buildings and other developments - could you just give us maybe a summary of some of the major projects that were under way.

Ware: I went to the office of Associate Director of the Experiment Station in 1983, when they were beginning to secure the bonding, referred to as the Agriculture Endowment bonding. The idea was that we would sell some of our Experiment Stations, put the money into an endowment and then pay the interest from the endowment on bonds that were issued by the University in agreement with the Legislature. The first bonding issue was 24 million dollars. We sold what was the Citrus Experiment Station in Phoenix; we sold what was the Dodge Road Animal Farm here; we sold the East side of the Casa Grande Highway Farm. What it boiled down to is that we sold several of the Experimental farms around the State. The only ones we didn't really mess with were the Campus Agricultural Center which was known as the Campbell Avenue Farm and the Yuma Agricultural Centers, there were two farms out there - we left those alone. All the others were sold, the idea being to put the money into an endowment and the interest spinning off of that would pay the annual interest on the bonds that were sold to build new structures. We bought a large 2200 acre farm up near Maricopa, Arizona, in Northern Pinal County and that became our leading research center which we divided into two areas. We had the Research Farm, which was about 450 acres, and the remaining 1600 acres would be the Demonstration Farm. In reality, the Research Farm was used purely for research and we had the crew that took care of that, but the Demonstration Farm was more to produce crops that could be sold to support the Research Farm. When we did have something that was worthwhile that we could demonstrate on a small scale we would do it on the Demonstration Farm. We never had many great demonstrations. We had

irrigation experiments which would work, we've grown jojoba, buffalo gourds - several things in a demonstration fashion have worked very well. We had a big potato production experiment which turned out to be a fiasco - it was not a problem of ours, it was a problem of Frito-Lay. They wanted potatoes grown in this area and when we did, for some reason they weren't used. But we can produce some of the finest potatoes in the world in Arizona as has been demonstrated even on the Mesa Farm.

All this leads around to what I did. My primary mission was to oversee all the construction that was taking place on the Maricopa Agricultural Center. We started by building a very large shop building there in which all of the equipment could be maintained, lubricated and repaired - a fairly sizeable building of 5000 square feet. In one corner of that we put our first office headquarters for the Maricopa Agricultural Center. Across the road we built five homes for staff members who would be employed there at Maricopa Center. Then we proceeded to build the headquarters building and that was truly an accomplishment. We have probably the signal event of construction on a new Experiment Station in the nation, one that is equipped such that we can have a satellite down-loading, a satellite communications center, we have laboratory space there that can do virtually anything that you can do in any laboratory, we have a nice conference room, we have kitchens, we really

have the whole schmear. It's been an ideal location and I think it will probably be an international center in the next decade that will be a leader lasting for probably the next century. It's relationship knits in so closely with the Mid-East. Those are the countries that have low rainfall, but have good soil and will benefit from the technology that's generated there. But it was my responsibility to oversee construction of those buildings, have them dedicated - the office building at Maricopa became the Bartley P. Cardon Research Building. That is really the shining star of construction that I was involved with. Other things that we built were the new Meats Science Technology Building on the Campus Agricultural Center, the new research pens for cattle and smaller animals, and a new Extension headquarters on the East side of Campbell Avenue which was quite an accomplishment. We then moved Pima County Extension and all of the new Urban Garden Center headquarters all together at that one location.

Moore: What about the building on campus, George. There was one there.

Ware: One other addition on the Campus Agricultural Center was a large greenhouse facility which has altogether eight large greenhouses, all of them electronically controlled to give you almost plus or minus one degree fluctuation in temperature. They are the "state of the art". Then finally the big building, the one that Bart Cardon was wanting all along, was built on campus and it is the

Agricultural Building, nothing more than that - just the Ag Building. (In 1993 it was dedicated as the Marley Building). It's very large - seven stories above ground research facility with two floors into the ground, built between what is now known as Forbes and Shantz Buildings. It's built in the old parking lot, a very small foot print for a building of that size, but I personally selected that location because I felt it was imperative that we try to keep our researchers close together. It's difficult enough to keep them in communication when they're merely separated by one floor in the same building, but to have them in another location which was the choosing of the University Administration farther South near the Biological Sciences Building would have been a mistake. I went out one day and measured that off with Norm Buck. We took a tape measure and I drew a tentative foot print and it was from that point that the building was designed. It eventually cost about \$19,000,000. We ended up with more than half of the space with what they call shell space. It was just unfinished space, the laboratories were not there, the philosophy being that once you had the shell space you could eventually get money to complete the laboratories, but if you didn't have the shell space, that was the end. We really got a lot of bounce for our buck out of that building. The first time we went out to bid we were \$2,500,000 over budget and this was done with the knowledge and consent of our Director of Physical Resources, our Director of the Architectural group and myself and our consulting architects. All of us made that mistake and as a consequence they fired the Building Construction Manager. They didn't ask me to leave that responsibility but I turned it over to Pete Dewhirst at that stage and the fellow that headed up the architectural group on campus asked to be relieved of oversight so the main characters in that event in one way or another stepped aside. The building was finished and dedicated in 1993 and they

occupied it in the Spring of 1993 and now they are working on the construction of the laboratories in the rest of the building. It'll probably be another five years before the building is completely finished. I look at that building with a great deal of pride because overall it conformed to the design that I had in mind to begin with and even though I was not responsible for seeing it to completion, I did see it from its beginning.

Moore: It's early stages were very important and obviously, George, just like when you were Department Head, as an administrator within the College Administration a lot of things happened, a lot of good things that will benefit the University and the people for years and years to come. I wanted to get on to one other thing that you mentioned briefly in the interview and that is that you're an author of a number of books and I think personally that this is quite an accomplishment that you had in your career and I'm sure it's not over yet, but could you just bring us up to date on the books that you have been involved in authoring.

Ware: I think any author is proud to talk about what he's written. The first book was one that came out of a series of little talks that I gave to people who dealt with pesticides. I don't even remember what I called it, but something like "What you always wanted to know about pesticides but were afraid to ask." So that became the theme and I would give these talks in as much as an hour or even six or seven hours depending on what information was needed to be imparted. Coming back on a plane from California one time it occurred to me that if you can talk about it you should be able to write about it and put it in a book. So I did and the first book I wrote was entitled Pesticides: An Autotutorial Approach and it was a do-it-yourself pesticide book published by W. H. Freeman.

It sold very well, it was really a great seller. Later on I wrote another book which was called The Pesticide Book and that was the one that I had started out writing but it seemed as if I had been diverted in getting it published by getting out the smaller book. The Pesticide Book turned out to be a textbook and it is now in its 4th Edition and I changed publishers from W. H. Freeman to W. T. Thompson in Fresno, California and he's just done a remarkable job in marketing. It's now used as a textbook in probably, I'd say about 15 Land Grant schools. It's the only book, there is no competition, so I feel very proud of that. The last edition came out just this Spring, a 1994 copywrite. Another book that I first wrote in 1978 was a book I had started on ages and ages ago, finally became entitled Complete Guide to Pest Control With and Without Chemicals. It was written for the homeowner initially but it turned out again to be a textbook in junior colleges and it was used by the Peace Corps because there were methods of pest control in there that they couldn't find elsewhere. They had a choice of the chemical route or some other means of controlling them. I'm finishing the 3rd Edition of that right now. It will be released this Fall. Then I ended up writing a law book with an attorney, John Johnson. He called me up about four years ago and said he had a contract to write a book on pesticide litigation. So having written extensively on pesticides, he and I teamed up together -- he wrote the legal aspects of it and I wrote the chemistry and the pesticide aspects, so it's almost two books in one. That thing weighs about six pounds so we sell it by the pound! That was published by Clark, Boardman, Callaghan the largest law book publishers in the nation out of New York. We revise that annually. But one book that I want to talk about briefly is one that I'm really proud of. My Dad was an author as well. He wrote the book Producing Vegetable Crops. My father died in 1985. His last edition of that book

was in 1980 and he and the co-author of the book died within a month of each other in 1985. We had an agreement with the publisher that I would try to pick up the book and carry it forward at its next edition. So it came time about 1988 to find an author who would work with me in revising my father's book. We found a young man, John Swiader, at the University of Illinois who is a Plant Physiologist and he and I teamed together and revised the book and I confess, I'm truly proud of that. It came out in the Spring of 1993 and it's a marvelous book, much improved over what we had before. It's written at a level much more sophisticated than the original book. I'm sure if my father were alive he'd just be delighted to see what we had done to his product.

Moore: Is it used as a text?

Ware: It's used but it hasn't been a big seller -- unfortunately a couple of new textbooks similar to it came out in the interval that we were trying to get this one written so they got the drop on us marketwise. It is used but it's not been sold nearly as extensively as the other books that I have authored. I'm proud of those books. I guess I'll say that The Complete Guide to Pest Control has just been a whiz bang! I've sold an astonishing number of copies. It's padded my pocketbook very nicely. The Pesticide Book which is in its 4th Edition has taken off after four editions and it's selling even better than the other one so I'm quite pleased. I'm honored to be asked about it, and I'll brag about it any time.

Moore: I think it's a tremendous accomplishment and I might say a cap but really not. It's just a part of a very illustrious career, George, and one that I have been privileged to be a part of in some ways and it's been great to have that opportunity. To sort of put a cap on

everything here and there's so many accomplishments I'm sure it might be difficult, but how would you like to be remembered as a professional?

Ware: Well, I guess remembered as a fellow that had the willingness to grit his teeth and bore into some decision-making that had no personal benefits in any form or fashion. I think the three that we were referring to, DDT, IPM and the Toxophene decisions. I guess I'd like to be known as a person who had integrity and was willing to stand up for what were obviously the right directions to go.

Moore: I think that's certainly admirable and I commend you for a tremendous career, George, and thank you for participating in this interview with me today. It's been a pleasure and we'll end it at that if you have nothing else to say.

Ware: Needless to say, everybody enjoys talking about himself so I've enjoyed this far more than you have Leon, and thank you for your time, it's my pleasure.