CHEMICAL HERITAGE FOUNDATION

EDGAR S. WOOLARD, JR.

Transcript of an Interview
Conducted by

James G. Traynham

at

Wilmington, Delaware

on

10 June 1999

(With Subsequent Corrections and Additions)

CHEMICAL HERITAGE FOUNDATION
Oral History Program
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Edgar S. Woolard, Jr.

(Date) 10-13-99

Chemical Heritage Foundation
Oral History Program
315 Chestnut Street
Philadelphia, Pennsylvania 19106

EDGAR S. WOOLARD, JR.

1934 Born in Washington, North Carolina, on 15 April

Education

1956 B.S., industrial engineering, North Carolina State University

Professional Experience

1956-1957 Industrial engineering, Alcoa Corporation

E.I. DuPont de Nemours and Co., Inc.

1957-1959 Industrial Engineer
1959-1962 Group Supervisor, industrial engineering
1962-1964 Supervisor, manufacturing section
1964-1965 Planning Supervisor
1965-1966 Staff Assistant to Production Manager
1966-1969 Production Supervisor
1969-1970 Engineering Supervisor
1970-1971 Assistant Plant Manager
1971-1973 Plant Manager
1973-1975 Director, Product Marketing Division
1975-1976 Managing Director, Textile Marketing Division
1976-1977 Manager, Corporate Planning
1977-1978 General Director, Products and Planning Department
1978-1981 General Manager, Textile Fibers
1981-1983 Vice President
1983-1985 Executive Vice President
1985-1987 Vice Chairman
1987-1989 President and Chief Operating Officer
1989-1996 Chairman and Chief Executive Officer
1996-1998 Chairman

Honors

1995 International Palladium Medal, Society of Chemical Industry
1998 Chemical Industry Medal, Society of Chemical Industry

ABSTRACT

Edgar S. Woolard, Jr. begins the interview with a description of his family and childhood years in Washington, North Carolina. Woolard's parents encouraged him to excel in both academic and social environments. As a high-school student, Woolard held an interest in mathematics. After graduation, Woolard enrolled in North Carolina State University as a nuclear engineering major. Woolard enjoyed college life and was involved in several extra-curricular activities, including serving as house manager for his fraternity. In his junior year, he switched his major to industrial engineering, and received his B.S. in this field in 1956. Shortly after graduating from NC State, Woolard married his junior-high-school sweetheart and accepted a position at Alcoa in Maryville, Tennessee. Woolard left Alcoa after one year to serve a six-month term in the U.S. Army. Upon his return, he was offered a job at DuPont in industrial engineering. After two years, he was promoted into management as a supervisor, a position that Woolard relished. He quickly rose through the ranks at DuPont, gaining valuable learning experiences from each promotion. Woolard entered DuPont's Planning Division in 1976, where he oversaw many breakthroughs in DuPont polymers, especially Dacron® production. Throughout his career, Woolard helped shape DuPont into a more streamlined and environmentally-friendly company. In the late 1970s, DuPont responded to a spike in oil prices and high inflation by reducing senior management and combining departments. In 1983, under DuPont's new system, Woolard was given responsibility for three departments: Agricultural Chemicals Division, Medical Division, and Photo Products Division. He served in that capacity for three years before becoming Vice Chairman and Chief Operating Officer. Woolard became CEO in 1987 and worked to both streamline and evenly downsize DuPont for the good of the company. Although this period was difficult, his efforts proved successful for both DuPont and its employees. For his earnest reorganization of DuPont, Woolard received the Chemical Industry Medal in 1998. Woolard concluded the interview with a discussion of DuPont's major achievements during his career, retirement, and thoughts on his family.

INTERVIEWER

James G. Traynham is a Professor of Chemistry at Louisiana State University, Baton Rouge. He holds a Ph.D. in organic chemistry from Northwestern University. He joined Louisiana State University in 1963 and served as chemistry department chairperson from 1968 to 1973. He was chairman of the American Chemical Society's Division of the History of Chemistry in 1988 and is currently councilor of the Baton Rouge section of the American Chemical Society. He was a member of the American Chemical Society's Joint-Board Council on Chemistry and Public Affairs, as well as a member of the Society's Committees on Science, Chemical Education, and Organic Chemistry Nomenclature. He has written over ninety publications, including a book on organic nomenclature and a book on the history of organic chemistry.

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LOCATION: **Wilmington, Delaware**

DATE: **10 June 1999**

TRAYNHAM: Mr. Woolard, I know from some things I've read that you were born in Washington, North Carolina, on April 15, 1934.

WOOLARD: Correct.

TRAYNHAM: Can you tell me something about your childhood and your parents?

WOOLARD: Well, sure. I had a wonderful childhood, unlike a lot of people nowadays. I had a childhood that was very supportive and very reinforcing. I was born in a little town called Washington, North Carolina, with a population of about eight thousand. Even today it's still about eight thousand. So while there's industry now in the eastern part of North Carolina, there was really no industry when I grew up, and still there's very little in my hometown. It was a rural area. Tobacco was king. Most everyone who lived there was a farmer, grew tobacco or corn, some soybeans, and cotton. A delightful little town. We knew everybody. Everybody knew us. My parents were neither poor nor rich. They lived paycheck to paycheck. My mother worked in a drugstore as an accountant, keeping the books—bookkeeper, she would call it. My father owned a poolroom, but it was really more of a quick-lunch place than a poolroom because people from all walks of life loved to come. It was named "Edgar's" and people from all over town came to have lunch. So I worked with him the whole time I was in high school and summers during college. He was very well known and very popular. He was a gregarious guy—one reason his business was so successful. My mother was very, very smart. She was the valedictorian of her class in 1927. I have one sister. She and I were both very interested in athletics. She played on all the women's basketball teams and other sports. I was fortunate enough to play on the high school football, basketball, and baseball teams. So it was a very happy environment. Washington is on the Pamlico River, so we grew up on the water. We had a little boat; and swimming, water skiing, and just naturally having a good time as kids.

My mother, being very bright, always taught me, helped me, supported me, and encouraged me on the academic side. My dad, being gregarious and not that interested in academics, always helped me on the side of getting to know people, understand people, being around people. So it was a great environment to learn a lot of things. It was a very secure, safe, and friendly environment. In those days you didn't lock your doors. You walked everywhere

and I never had any fear or concern of anything happening day or night. It would be hard to beat the life I grew up with.

TRAYNHAM: Your father had the same name as you. And what was your mother's name?

WOOLARD: My mother was named Mamie. Mamie Boone. They always had the joke that they were descended from Daniel. [laughter] I have no idea whether it was true or not, but we had a good time with it. Yes, they believed it. But we never spent any time trying to figure it out. Large families. My mother had four sisters and three brothers, and my dad had four sisters and no brothers. So I had lots of aunts and uncles. We got together a lot for picnics and other things on both sides of the family. So once again, I grew up in an environment where there was big family support. I remember well when I had appendicitis when I was about twelve years old. I was in the hospital and the next morning when the doctor came in to check on me, he said, "I don't know how many more Boones and Woolards there are to come in here and see you, but the place has been full for twenty-four hours." So it was just that kind of a family environment where when someone's in the hospital or in any kind of trouble, everybody joined in. I just kind of thought that's the way life was.

TRAYNHAM: What were your principal academic interests when you were in high school?

WOOLARD: Well, I always loved math. I was very good at math. It was very easy for me, you know, which is really just an asset the Lord gave me. Nothing particularly attributable to me, personally. But I could always do math very fast and very easily—I think it's from my mother's genes. As I say, my dad wasn't really interested in that. I remember even back in the first grade where the teacher was teaching addition and multiplication, I just had the ability to do it real fast, and I always raised my hand. After five or six times, she would say, "Okay, Edgar, you don't answer, now. [laughter] Let the rest of the class have a chance." So math was really always my great interest. The second one was history. I haven't really followed up with the history, but I loved reading about highly successful people, what motivated them, how they achieved what they did, and their positive accomplishments. I even liked reading and learning about those who put their talents into destructive routes. I liked physics a lot, but curiously, I wasn't really good at chemistry. I had a little chemistry set. In school, I liked it very much, but I wasn't really talented at doing experiments. It was really math, physics, and history that were the things that drove me to kind of shape where I wanted to go.

TRAYNHAM: When you graduated from high school, did you go immediately to college?

WOOLARD: Well, yes, I did. When I was in high school, you know, as I've indicated, growing up in North Carolina, my family lived nicely. We had a car, we had plenty of food, and

we were just happy as we could be, but we didn't have any real money. So it never occurred to me there was any consideration to go anywhere but a state-supported school in North Carolina. At that time—while there are many in North Carolina now—the University of North Carolina at Chapel Hill and North Carolina State in Raleigh were really the two places that one seriously considered as the premiere places to go. I mean, there was Duke [University], but it was out of the question for us even to consider Duke. So the only question in my mind was which one of those I would go to. Both my math teacher, who I remember very, very well as one of the people who shaped my future, her name was Mertie Cooper, and my physics teacher, Billy Wagner, from, oh, I don't know, tenth grade on, said, "You've got to go be an engineer. [laughter] You'll be a great engineer." I was impressionable, and it seemed to make a lot of sense. So I pretty well knew that I was going to North Carolina State to be an engineer. Again, my mother and father, while very supportive of whatever I wanted to do, really didn't have any feel for what kind of education I should pursue. We didn't have any placement offices or anything in the school, so I really depended on teachers, and those two were the most influential, mainly because I was very, very good at math, and I was very good at physics. I could grasp concepts very well. It bothered me a little because I had so many friends that were very good at repairing cars and stuff like that, at which I was pretty inept. But they assured me that engineering was more about understanding the concepts and how to solve problems than being a good mechanic or a good carpenter. So they gave me a great deal of confidence, and it was clear to me from early on that I was going to North Carolina State, which I did as soon as I graduated from high school in 1952. I applied and was accepted at NC State. I had very good grades in high school and very good references. So, really, getting in was never a problem. The tuition in those days was remarkably low, even on an inflation-adjusted basis. The State really almost paid for the whole thing. So it was fairly easy for me to go and to earn most of my living expenses in various jobs that I held to take care of the room and board. So, once again, I had a very great experience at North Carolina State. Our high school in Washington did not have some of the prerequisites. I remember solid geometry was not offered in high school so I had to go that summer and take solid geometry and another course to meet the requirements to get in.

I started off at NC State in nuclear engineering, which was embryonic in those days—1952—when I started. North Carolina State had the first nuclear reactor of any university in the United States, which I though was very impressive. This was a new science and one that had great appeal to me. I started in nuclear engineering, not really knowing what I wanted to do and knowing, in spite of all the advice I'd been given, that I really wasn't very good in a mechanical sense. I was much better at thinking and solving problems than physically doing things with my hands. So I really liked it very much and did very well. I had a lot of interests in college. I had a terrific experience. In my second year, I joined a fraternity. I was pretty shy up until those days, not excessively, but I didn't meet people easily. I was very comfortable and gregarious with people I knew, but didn't meet new people easily. So joining the fraternity was excellent for me in two ways: one was it did help me greatly, socially, as you're constantly meeting new people, and secondly, I ran the dining hall and then later was the house manager, so I made enough money right in the fraternity just operating the place to pay for my room and board—I got my room and board free from the fraternity. So again, that got me involved with paying bills and interviewing people for jobs—you know, just two or three people we had working there in the dining hall and all. It got me involved with interacting with fraternity brothers,

some whom weren't too keen on paying their bills and I had to kind of find ways to make sure they did that. [laughter] It got me involved, occasionally, with school officials when my fraternity would be a little too rambunctious on a Saturday night. It got me involved in understanding, for the first time in my life, that any organization—and I guess maybe we had fifty brothers—has many pluses, but has some real bureaucratic things you have to overcome. There are always people who totally disagree on any subject, whether it's how to repaint the house, what food to serve, how loud you can play music and how late at night. So I got involved in all of those issues and began to see how people can become polarized over trivial issues if they are allowed to continue to exist and aren't dealt with. And even really good friends become quite upset with each other to the extent that they wouldn't speak for periods of time. So it was a great opportunity for me to begin to learn how to interact with people, and how to try to break down barriers and rebuild a consensus of some sort.

As a result of two years as the house manager and the dining hall manager, I was elected president my senior year. So I really got involved with all those things and continued running the house and the dining hall. So college was great for me, socially, for all those reasons, and it made me much more capable and able to meet people and to deal with issues, and to really see the kind of things I was going to face in the business world.

TRAYNHAM: At that time, you were confident you would move into business?

WOOLARD: Well, that's the second part of the story I want to tell you. [laughter] So, the first three years I was in nuclear engineering. In the middle of my junior year—NC State at that time had a requirement that I thought was excellent. They no longer have it, I understand. But the rule was, between your junior and senior year, you had to go somewhere and work at least eight weeks in the field of endeavor that you were going to pursue. So about the middle of my junior year, I started talking to the deans about what should I do that summer, and they were talking about Westinghouse and other people who were in that field, as I recall. I said, "Okay." I did some interviewing with them. I said, "What would I be doing?" And they said, "Well, you know, the main thing we're doing right now is working in the area of metallurgy, where we're working on the kinds of metals that can withstand the heats, the pressures, and alloys. You'll be assistant to someone who's doing that." And I said, "Wait a minute, now. You know, I've learned a lot about people. I like dealing with people. I like seeing results. You mean, both in the summer and then later on in the job, I'm liable to be working in a laboratory fiddling around with different alloys?" They said, "Well, you know, that's kind of where the technology is today. There's not much in the way of production and operations." Well, that made me reconsider the whole thing because I knew that wasn't what I wanted to do with my life after having spent these last two or three years becoming more outgoing and really liking interaction with people. Some people are very afraid of conflict and choose to avoid it. I don't want to say I like conflict, but it never bothered me trying to get two or three people together and say, "Hey, let's act like grown-ups here and figure out how to solve whatever the issue is." It became clear to me that not too many people were comfortable doing that. Most people like to ignore it and hope it goes away, and of course, all it does is get worse.

So then, talking further to deans, I said, "You know, I may be wrong, but this isn't really what I want to do. I want to be somewhere where I can interact with people." Again, always in the back of my mind, maybe excessively so, I had never been any good at mechanical things. To this day, I couldn't replace a sparkplug in a car if—well, if my life depended on it, I probably could figure it out. [laughter] I'm no good at that. We tell the story around my house that when my two girls were little, they would come to me and say, "My toy is broken. The duck won't squeak anymore. Can you fix it?" I would say, "No. We'll go get you another one." And about an hour later, they'd be running around pulling that damn little duck, squeaking and acting perfectly, and I'd say, "How did you do that?" They'd say, "Well, mommy fixed it!" [laughter] That was kind of the way our life has been. She can fix anything, and I'm just not very good at that.

So anyway, I concluded that wasn't for me, and so I looked at mechanical, I looked at chemical, I looked at electrical, and I decided to go into industrial engineering. As I talked to everyone, it seemed to be an area that was focused on dealing with people and solving problems in a way that I really understand because we called it Operations Research in those days. It's almost what the people call Supply Chain Management nowadays. But I had a real skill for that. I could look at a problem and almost instantaneously see the direction it ought to go. So I switched the middle of my junior year, I guess, to industrial engineering. That worked out great for a couple of reasons, because I had taken so many technical courses in nuclear engineering that I had finished all my thermodynamics, fluid flow dynamics, and all of those that were a requirement to graduate in industrial engineering. So in my senior year I took industrial engineering courses and some liberal arts kind of courses, which not too many engineers get a chance to do.

So I really felt fortunate because I'd had the experience in the fraternity house of interacting and dealing with people. I had had an outstanding technical background, and once again it was very easy for me. I mean, all my colleagues couldn't understand how I could make As on thermodynamics when I couldn't change the oil in a car. But I just could. I could see the problem, I could see the answer, and they were fabulous at everything else, but they couldn't understand thermo. [laughter] So I had the technical background, I had the social interaction, I had my senior year where I could really focus on academics that were of some significant interest to me but were really very easy. In fact, my grades probably deteriorated. I pretty much had all As until my senior year, and I got some Bs because there were a lot of subjective courses, where you had to write essays and things. I made much better grades if it was just something that—you know, there was only one right answer and you had to figure it out mathematically. I could <u>always</u> do that. But nevertheless, I ended up with a 3.6 GPA and came out of college feeling that I had been extremely fortunate in the way the whole thing had unfolded. My high-school folks had sent me—you know, recommended and pushed me in the direction of engineering. I tried what was then the new phase of engineering, learned a lot from it, but concluded that wasn't what I wanted to do; switched to industrial engineering, industrial management. I had a year to really focus on what that meant without any pressure at all from grades or courses that required a lot of study. And they talked to me about staying on and

getting a master's and a doctor's degree because people recognized I had a pretty good intellect, but I was not the least bit interested. I was itching to get to work.

My parents had been wonderful. They'd helped me with tuition. I paid my own room and board for the most part. I now had more confidence in my ability to get along with people and to meet people. My wife, now, we just had our 43rd wedding anniversary yesterday—we'd been dating since the seventh grade, we were in the school together. She'd gone to what was called Women's College back in those days in Greensboro, North Carolina. It's now the University of North Carolina, Greensboro, and I'd gone to NC State. We were ready to get married and go out and have some fun, and I was eagerly looking forward to going to work. So I never gave it any serious consideration. People asked me all the time, in my career at DuPont, young folks who are interviewing, should they stay for a master's or a doctorate, and it's a very tough question. You can only answer it—each one has to look at where they are in their thought processes in their life and what they want to do. For me, it was so easy. I wanted to go to work. I wanted to get out in the world. I wanted to earn a paycheck. To me, going to work looked like fun. Other people are not ready for that and they want to gain more knowledge or gain more skills or ability to interact. Do you really want to work in a lab or do you want to be in a people environment? So it's a tough decision for some young folks, but for me it was very easy. So I graduated North Carolina State. I had been in ROTC [Reserve Officers Training Corps], so I had a commitment to the Army. I graduated on Saturday, Peggy and I got married the next Saturday, and the following Saturday we drove to Maryville, Tennessee, to go to work for Alcoa. So within two weeks after graduating, I was happily at work in industrial engineering.

TRAYNHAM: You did find a position out of the laboratory, then, or not in production?

WOOLARD: [laughter] Yes. I interviewed in—it was a pretty good year—1957 was a pretty good year. Not a <u>great</u> year for jobs. You know how in engineering it's either feast or famine. Everybody's hiring everybody or you can't get a job. And we were just about to go into a big recession. People weren't too aware of it but they were hiring less, and I interviewed at AT&T, Exxon [Corporation], DuPont, Alcoa, and I don't know, three or four more. I didn't want to interview a lot. I really wanted to stay in the South, figuring I'd grown up there. We loved the South, everything about it—the weather, the fishing, the water, and being near our folks. We both had big families. Peggy had two sisters and two brothers. In fact, for years, decades, every time we'd come home on vacation, our family and friends were saying, "Well, now, are you ready to move back home and settle down now?" I mean, they never believed we were not coming back to Washington, North Carolina, to live. [laughter] So we didn't want to go straying too far from home. I really liked this plant in Alcoa, Tennessee/Maryville, Tennessee—they're sister towns. They were building up an industrial engineering organization because it was a fairly modern plant but very inefficient. They had a national union there, which was good for me to get exposed to, and they had really inefficient methods. They had modern equipment, but they had agreed to a lot of industrial practices that were okay maybe prior to that, but as they put in modern equipment, they hadn't gained much from it because the regulations and agreements they had with the union were such that—well, if it used to take a

machine an hour to do a job and now it could do it in thirty minutes, they had handcuffed themselves so if the crew got through in thirty minutes, they'd sit and wait thirty minutes. They were trying to change that dramatically. So they hired seven or eight of us about that time. We did a lot of layout, a lot of time and motion study, a lot of basically working with the people—not the unions—to get them to understand that everybody would be better off if we used all this new equipment efficiently, showing the people how to do it in a way that really was not onerous to them. I must say, while we were very successful in identifying a lot of improvements, it was clear to me that the management didn't have the courage to insist that they be installed. I liked the plant a lot and the people a lot—I'll give you an example.

After about six months, we began to really put in some of these new ideas. Some of the more rabid members of the union—well, let me allege this because I can't prove it—but as soon as you put something in, you would find the equipment failing. And it was pretty obvious to me it was sabotage. It became clear to me that this company had lots of difficulties, and at that point in time they didn't have management at the plant, or above, that was really going to deal with the issues. A great learning experience for me. People would leave machines running. They'd leave ten minutes before the shift was over and leave the machine running so if the tail of an aluminum coil ran out, the coil would just flap all around and damage equipment. I observed nobody getting fired or no one really being severely disciplined. So I was a little bit disillusioned at that point about American industry, or particularly the heavy industry, which we have seen subsequently—whether it's aluminum or steel or automobile companies—having difficulty to compete.

But in any case, as I say, I liked it a lot. After one year I had to leave Alcoa. I learned a tremendous amount. I went into the Army for two years, ostensibly, and planned to go back to Alcoa. Well, when I went in the Army, the Korean War had just ended—I went to Aberdeen Proving Grounds—and we were in one of those periods where the Pentagon was short of money. They asked for volunteers who would leave after six months instead of two years. [laughter] They didn't have too much difficulty getting volunteers, including yours truly. Now, there was a penalty. I had to agree to be in the Reserves for seven-and-a-half years as opposed to two years of full service and nothing in the Reserves. But to me that was a very good deal because I could get back to my career and I didn't mind the Reserves anyway because it meant a little extra money. And in those days, as an engineer with a young family, I didn't have any money. So I made that decision and after about three of the six months, Peggy and I went home to Washington, North Carolina, for—I guess we had some days off. We went down for a long weekend and while there, my friends all told me that DuPont had just started up a new plant just 30 miles away from my hometown, right outside of Kinston, North Carolina. And they wondered why I didn't go over there and try to get a job if I wasn't going to come back home.

Well, the next morning I rode over with no introduction or anything, and just asked if they were hiring. It was really interesting because they said there was nobody there to interview me that day, but come back the next day. So I drove back the next day and interviewed with the number-two person in the industrial engineering department. I found what I just thought was an extraordinarily encouraging environment at that plant. First, the plant was new. It was producing Dacron® polyester. It was the first polyester plant in the world. Everyone there was

young and enthusiastic about the potential for polyester in all kind of apparel, sails for sailboats, and on and on, and expansion plans and ideas for the future. They weren't doing real well at the moment because it took a while to get people to accept Dacron® in shirts. People were used to cotton. It took a while to get the whole idea of wash/wear ingrained in the public, which again was a great learning experience for me to see how that takes a while to take hold.

But in any case, that day they offered me a job in industrial engineering, to help really get the plant efficient. They were pleased that I had a year's experience with Alcoa. So I went back to get my last three months in the Army. After about another month, I got a note from the people at DuPont that said, "We really need to know if you're coming here or not. You gave us the impression you might, but you haven't accepted yet." So, I could tell from their tone that I'd better accept or plan on going back to Alcoa. So the attraction of living near home with a brand-new plant in an industry that truly was embryonic as opposed to the aluminum industry, which not only was pretty set in their ways, but had the national union and had lots of difficulties to overcome—which wouldn't have bothered me if I thought the management had really been committed to do it, but the management kept backing off when challenged. So here was a brand-new plant with tremendous upside potential, which turned out to be true, for sure. Polyester has been the fastest growing part of the chemical industry for the last forty years. It was a modern plant, there was really a need for new ideas, they knew there were going to be future plants. I did accept the DuPont job.

So I worked at Alcoa for a year, and then in the Army for six months, and in December of 1957, I went to work in Kinston, North Carolina, as an industrial engineer with the absolute expectation that that's where I'd work the rest of my life. I was perfectly happy with the idea that I'd be living and working 30 miles from my hometown. I'd be seeing my family. I'd be with a great company because DuPont has always had a wonderful reputation, in an exciting new field of endeavor, working with people, which is something I was interested in. Actually, we had a little place on the river in Washington [North Carolina], and I commuted the 30 miles every day for the first couple of years. Once again, I felt like I'd been extraordinarily lucky, as I had in high school, as I had in college. I liked the idea of working a long time for a company. I still believe that's the way to do it. But I must say, because of the one year I spent with Alcoa and the six months in the Army—when I showed up working for DuPont, I had experiences that made me look much more mature and sophisticated than the other new folks who came in DuPont at that time who'd just come out of college. I had made mistakes at Alcoa. I'd seen other people make mistakes at Alcoa. I'd learned how to avoid them. I'd learned how to work with the operating people. I'd interacted with the mechanics and the operators. It was just really so fascinating to me that the operators who ran the machines would <u>always</u> agree with me that we should make these changes, but the union would tell them not to do it and so they wouldn't do it. So it was clear to me that if you can explain to people <u>why</u> you need to make change, how it will benefit the company, how most of the time it'll benefit them in the long run, and how most of the time even if it doesn't benefit them in the short run, it's not onerous, then people are receptive. So that was a great learning experience for me. All these things were very helpful when I showed up at DuPont in December of 1957.

TRAYNHAM: You were also fortunate, it seems, that DuPont was willing to wait those additional three months for you to show up.

WOOLARD: Yes, that's true. You know, when you're young and, certainly not cocky, but knowing you had a job at Alcoa, which I liked—I liked the people. I had made a lot of friends there. Peggy and I liked them. So I wasn't focused on, "Hey, come on, Ed. You'd better get on with what you want to do!" I was just kind of nonchalant about it. I guess I knew deep down all along I would accept the DuPont offer, but it's kind of a nice feeling to know you've got two options there and you can talk about it and think about it. But I was impressed with the way DuPont handled it. I mean, they were used to dealing with young folks like myself who think they're going to live forever and everything is going to be okay. So they wrote me a stern but pleasant letter. You know, "We really need to know. We want you, but we need to know if you're on board or not." A very good learning experience on how to handle something. I've used that, you know, many times myself. Without being threatening to people, you can give very positive feedback. "We need you on this. You're just the kind of person we want. We're counting on you. But you've got to step up." So, you're right. I was very fortunate. There were so many differences that I saw immediately about DuPont and about Alcoa, and most of them were—yes, the plant was modern and all that, but the people, their concerns for individuals. DuPont's concern for the individual was so readily apparent. Small things.

I was scheduled to come to work January 1, 1958. It was a holiday, so it would be January 2. The head of the Human Relations at the plant—not some flunky down the line, but the head of the Human Relations, named John Page—wrote me a very nice letter and said, "Ed, we're delighted you're coming, but it is Christmas and you're just moving back home." Because I wasn't getting out of the Army until like the 20th of December, he said, "You ought to think about this, because if you come the week before Christmas, you'll obviously get the Christmas holiday paid; you'll get the New Year's holiday; you'll get a week's vacation in 1958 that you won't get if you come in January." And there were several other perks. He said, "You know, every five years the vacation allowance goes up, so every five years you'll have another year of service for the rest of your career." You know, that was a thoughtful thing to do. It wasn't necessary, but it makes a big impression on a young person that the guy who reports to the Plant Manager, who's on the staff, is twenty years older than me, cared enough about me to write me a letter and say, "But if you want to come on the 2nd, that's just fine. We'd just like for you to know." The other thing that happened after I accepted the job, they wrote me a letter about a month before I got to work and said there'd been some changes in the salary structure. They were giving me a twenty-dollar-a-month raise or a thirty-dollar-a-month raise. [laughter] Neither one of those things was necessary. Oh, and by the way, the head of industrial engineering wrote me two or three times during that three months to tell me what was going on and what areas they wanted me to be thinking about. So it was very clear to me from the first day I arrived on the job where my new boss—who I hadn't met because he wasn't there when I interviewed—sat down with me, really spent most of the first two days telling me do's and don'ts and ideas, explaining to me how polyester worked and the chemistry behind it. When I went to Alcoa, they said, "Here's your desk. Here's your pad. Go out and start doing this." This was just a much better human-relations touch.

TRAYNHAM: When did you begin to migrate toward more management positions, or be interested in doing so?

WOOLARD: During the interviews we'd talked about that. I had told them that, while I liked industrial engineering and felt I was pretty good at it and could be helpful, and that's what they wanted and needed in both of those situations, I told them all along I wanted to be involved in management. So I guess it was between two and three years in industrial engineering. After two years I got promoted in industrial engineering and became a group manager. So I did that for about a year. I had about seven or eight industrial engineers reporting to me. I'd gotten to know pretty well the plant manager, the head of Human Resources, and, of course, my boss. I continued to talk about my interest in people and in management. So while I was managing a small group, they agreed it would be useful for me to get hands-on management. Now that plant, like most polymer plants, runs around the clock, which means it runs on shifts. The plant never shuts down. These large polymerization units are very, very expensive to shut down and start up. So except for a scheduled shut down for each of the units every couple of years, they produced polyester continuously. At that time we had six polymerization units at the plant. So they ran all the time. So to become involved in the operations, you had to work on shifts. There were three shifts rotating. You worked a week on the 8:00 am to 4:00 pm shift, a week on the 4:00 pm to 12:00 am shift, and a week on the graveyard shift, midnight to 8:00 in the morning. So they asked me, would I be interested in doing that, and I indicated I would. By the way, DuPont had then and still has an excellent development program when you could go different routes to prepare you for senior management. So they really didn't want me to go out there just to run the shift, because for the most part, the people who were the management of the shifts were people who'd been upgraded from either operator roles or mechanic roles and really knew what was going on. But anyway, I accepted a shift assignment. I was a first-line supervisor for about a year, supervising the polymerization operation, continuous polymerization, and the spinning operation where the fiber is actually formed, oh, with a crew of about thirty people working on rotating shifts. This was probably the best experience I had.

[END OF TAPE, SIDE 1]

WOOLARD: I had a great experience there for about a year on the shift operation, when we went through the usual kind of difficulties that any fairly young plant does with things shutting down. You'd have to make big decisions at 3:00 a.m. One morning I remember one of the continuous-polymerization operators came up to me—his name was Ashley [Dickerson]—and said, "Oh, God, I forgot to put the catalyst in the holding tank for that latest batch of polymer make-up that we're injecting into the CP." And sure enough, I could look at the charts and see that the viscosity was dropping fast [laughter], and so, you know, what do you do? As I recall, I made the decision to dump it in on the line. That wasn't what the engineers recommended, but it turned out that it worked out great. We only made off-standard product for about two hours.

We really didn't have the kind of control that you would like to have—we dumped this into the glycol and then injected the glycol into the polymer—but we would have made far much more off-standard product, but you know, that's not the point. The point is, it's just constantly things like that that you have to make decisions on because people are people. He forgot to put it in, and to his credit, he came and told me right away. I don't know what had happened to him that night because he was a very, very good operator. But just dozens of experiences where you have to decide, mechanically, do you shut down a pump, or do you try to keep running until morning when the new crew's going to be in? Do you call a crew in? What do you do when people don't show up because they're sick? You have to get people in. How do you train people on all the new changes that are constantly being made?

Again, a great learning experience for me because I learned that while everybody liked each other in the manufacturing operation, there was great cynicism toward the day people. The shift people thought that the people who worked on days didn't really understand the issues that shift people have to deal with. They would write them little notes in the logbook saying, "Do these five things tonight." While the five things might not have been onerous, people didn't understand why we had to do them; people thought it was a waste of time; people thought it was a waste of money; people thought it was just somebody on days behaving in a bureaucratic fashion. So I think one of my big strengths is that I took note of all these things I saw—they cause these kinds of issues, disagreements, and cynicism—so that later on, when I became a plant manager and I was interested in making a change, I would do several things. First, I would typically ask some of the shift people to come in and talk with me instead of just having our staff get together and give their thoughts on how changes would be received and how would be the best way to do it. Secondly, I would try to always give a very clear explanation of why we wanted to and needed to do it. And then third, I would typically come in like 5:00 one morning and just talk to the people on shifts to see how it was going and let them know I appreciated what they were doing.

So in this one year I learned how things go on in the operations, whether it's days or nights. I learned once again, as I did in the fraternity and as I did at Alcoa, that there's a natural polarization between people if the communications aren't good. You need to communicate much more effectively. I learned people will do anything in the world for you if they believe in you, if they believe you care about them, and if they believe you will at least listen to their point of view. I cannot tell you how many times in my career, at all levels that I later attained, when I'd be talking to people at plants, they would say to me, "We've got some great ideas if the management would just listen to us." So it is a human failing, almost, that when people get to managerial jobs, they tend to either be too busy to listen to the people that are actually doing the job, or be a little arrogant, or for some reason just think that the people on the line just want to complain. There are many examples of where, when I was superintendent in a plant before I became plant manager, I would say, "I was out there talking to Susan today and she would say so-and-so." "Oh, she's just a whiner. You don't want to waste your time listening to her." I said, "Well now, wait a minute. She had some pretty good ideas. Maybe she is a whiner. I'm not saying she's not. But even a whiner occasionally comes up with a good idea, so why don't we listen to what she says and maybe one out of five of her complaints is legitimate and we can

learn something, do something better." But I have to say, while DuPont has great people, they tend to fall in that trap—if a person complains frequently, they turn the person off.

So after about a year of doing that, I got promoted to shift supervisor. At that time, we had two levels of management on the plants; now we just have one. The shift supervisor had several areas where you had these first-line supervisors, so you were a little more broadly involved across the plant. Now I began to learn about another area of natural interaction of people, and that was Section A of the plant, Section B of the plant, and Section C of the plant. First we compete about which are the best, which was a positive and natural thing. But if there was a problem, there would be a tendency to say, "Well, Section A didn't get it to us in time. Therefore, Section B couldn't do it right, and therefore Section C got behind." [laughter] So again, trying in that job to explain to people, "Look, it's our shift who's doing this job. We all win together or we all lose together. It's not Section A or Section B or Section C." I made some pretty good progress in that. "Our shift, our objective is to be the best shift on the plant, to do things well, to have great safety over our people, to have great productivity, and great quality." I explained to people that if Section A had a problem, then it was all of our problems, and we had to really quickly figure it out and help Section A learn quickly. So another great learning experience for me.

Well, from there, I went back into Planning. Not really industrial engineering, but at that time, Dacron® was growing so fast that we had a couple of new plants on the drawing board. With my experience in industrial engineering and then in operations, they selected me to be head of the Planning Division for all of Dacron®. So first I stayed in Kinston and did that, but then moved to Wilmington, Delaware, to coordinate the expansion of the plant in Wilmington, North Carolina, then in Nashville, Tennessee, and then later on in Charleston, South Carolina. So I left management really for a couple of years to do that, but they agreed and I agreed that what I really wanted to do was get back in the line operation. We got those plans laid out and humming along, and then I was transferred to another plant in Nashville, Tennessee, the Dacron® expansion, as the superintendent of the Dacron® business there.

So I was in industrial engineering about three years. Then I went to shifts for a couple of years, and I came back in an industrial-engineering-type assignment, but really focused on the expansion of the whole Dacron® division for a couple of years. Then I was back into operations, where I had responsibility, now, for probably seven hundred to eight hundred people, maybe a thousand. It was, really, the first big-time, full assignment I had with total responsibility for everything in the plant, the maintenance, the operation, the development of new processes, the short-term process research, the operations, the safety of the people, the development of the people—and just a great job.

TRAYNHAM: You were pleased with that change in responsibility, it seems.

WOOLARD: I very much was. As I've said a couple of times, I mean, I loved the planning job. I had known that since my senior year in college. It was just real easy for me. My mind

worked in such a way that I could see how to lay things out in an orderly fashion and so the company recognized that, as well. So in my early industrial engineering experiences, I had been able to help the plant. There were two advantages there: one, I was able to do that well. And second, everybody else was so busy just operating the plant, they really didn't have time to sit back and figure out how to improve the orderliness or the systems flow, or the integration of every aspect of the plant. So I had the time to do that because that was my assignment. But then, working with the people on shifts—I mean, I really loved that. I had operators on the shift call me ten years later. Just every three or four months, someone would call just to talk and tell me what was going on. So I really developed some friendships with these folks. My wife used to say, "Ah, you know, it's one of your friends on the phone," calling late one night. They'd go out and have a couple of beers and they'd call and talk about work. This is after I'd left Kinston. They'd ask me to come back and see them.

So, I knew that was for me because I was learning these things. It says you have to really have a concern for people because they can tell. People can spot a phony a mile away. If you come into an operation job and you talk about, you know, "I really care about you and your families, and I want to learn your birthdays," and people see that as kind of a game. But if in the course of interacting with them, you begin to explore what their interests are, what their concerns are, and you offer them some help and some ideas—they can tell if you're genuine, if you're sincere. So I knew that what I wanted to do was be in a position where I could gain their respect. I loved, as I had from the high school days playing ball, seeing results. I was never the best athlete on the team, but I was frequently kind of looked to for leadership because I could bring the teams together to achieve things. So I recognized that kind of as a leadership skill. So I loved, then, in operations—whatever it was, whether it was just the shift or whether it was the Dacron® plant, or later a plant of its own—to have the objective of just being the very best we could be.

TRAYNHAM: During this time that you had the extended, fruitful learning period in management, leadership, it was all associated with the Dacron® production.

WOOLARD: That's correct.

TRAYNHAM: Were there chemical innovations that altered the Dacron® production during that time, or was it more or less just getting better doing the same thing?

WOOLARD: Well, I guess most of it was process improvements rather than the latter kind you described, but there were some very significant breakthroughs that I got to observe. So let me digress into a couple of areas. When I came back from shifts and was in this planning job—first at Kinston before they moved me to Delaware—during that year, year-and-a-half, I was assigned, in addition to the planning job, to work with the research division of Dacron®. Each of the divisions has research laboratories. Fortunately for me, the Dacron® research laboratory

was located at Kinston, so all of the research in Dacron® was done right there at the Kinston plant. I had two assignments. One of them was the long-range planning of the operations, and the second one was working with the research scientists and the research leadership at the Dacron® research lab because we were still in very much the embryonic period of growth for polyester. They had a tremendous number of projects going on, and the management of the division said, "We need someone to help screen these things," because another thing I'd learned was the scientists will work on something they're very interested in, which may have no commercial affectivity at all. Again, a great opportunity for me because I got involved with every significant scientist working on every significant chemical-engineering innovation involved with Dacron® for the next decade. Helping them figure out: a) the probability of achieving scientific success; b) the probability that we can do that in a cost-effective way, because some of these things we knew we could do, but if they doubled the cost of the polymer, the cost of the final product, it was not likely to have any commercial application; and c) working with our customers on if, in fact, we achieve this and we achieve it at this cost, what would be the potential size of the market?

So I got the opportunity to be exposed to all that. I got to really understand how the scientists worked and how they thought about things. That was highly beneficial when later on I got into senior management jobs and I had to make decisions about moving forward with research projects when I truly didn't understand the chemistry, but I had to make a judgment about the probability of now moving with one-hundred-million-dollar projects instead of half-a-million-dollar projects.

Well, the innovations at that time were enormously prolific. There were breakthroughs that were primarily focused on expanding the end uses. When I went to work there, polyester, basically, was a homopolymer. We just made the basic polyester. But then our people started coming up with all kinds of co-polymers where you would add a chemical additive, which would give you a product that was stronger, or, in one case, a product that was weaker, had weaker tensile strength. So that's what you were looking for there, since Dacron® had a propensity to do what we call pilling—you get little knots on your shirt. For knits, if you had on a golf shirt and you got these little rolled-up balls, you know, it wasn't very attractive [laughter] and it wasn't good for the market. So our scientists came up with a product that was less strong, so that what we called the pills, the little balls, would form but they'd break right off. We had breakthroughs in co-polymers that made polyester easier to dye, so it was much more attractive for things like men's suits. When I went to work there, polyester was pretty much used, for the most part, in Dacron®-cotton shirts and trousers. So all this rash of innovation of co-polymers was a great learning experience for me to see how scientists understood that you can take any kind of polymer, put an additive in it, and totally change all the physical characteristics. So you make it stronger, you make it weaker, you make it more dye-able.

Then our scientists came up with an idea that just turned out to be enormously profitable for us. We would take the waste and put it in something called fiberfill, which you made pillows out of. So some of our scientists and marketing people said, "The thing we ought to do is not just use the waste." But we began to make a line of products that were tailored to make pillows, comforters, and sleeping bags more comfortable for the consumer. So a whole new line

of polymers—all these were variants to polymers—but a whole new line of polymers and spinning conditions, which gave you different recovery properties. So a whole new marketing arena opened up that actually, only DuPont, forty years later, still capitalizes on. We have an entire line of products tailor-made for these kind of filling products.

Well, that was great, except now we still had the waste. We were making more money and building a better market. So then we came up with the idea, the scientists did, of how to recapture the waste in a unit that re-melted the product and broke it down. So again, I got exposure to all that. Now that's not quite as sophisticated as the kind of the things we were talking about with the co-polymers and all. But for me, a young industrial engineer, seeing how much people could change things was dramatic. Then the next major area—more in the area of improving what we had—our scientists began to work upstream with the raw materials because they began to realize that the performance in the spinning operations and the finishing operations were enormously impacted by the uniformity of the quality of the polymers produced in polymerization. We were able to demonstrate over time—significantly impacted by the quality of the raw materials—the dimethyl terephthalate and the glycol, and the consistency and the uniformity of the viscosity in the distribution in the polymer itself. So I would say this was probably the best period for innovation of polymer modification. All the way from modifying it to producing a varied range of products, modifying it to recapture and save the waste, and modifying it to provide consistent feedstocks to produce consistent polymers to greatly improve the operation downstream.

TRAYNHAM: You mentioned, particularly, the fabric and filler utilization of Dacron® or polyester fiber. Did DuPont move into the production of polyester for tire cords and so on?

WOOLARD: Yes. This was one of the innovations that they came up with about that time with very high-viscosity products, which were good for tire cord. While DuPont was a great leader in most of the polyester field, this is an area the DuPont management did not move fast enough and aggressively enough in, I think, for the following reasons—although at that time, remember, I was a very low-level member of the company. But the word on the street that most of us believed was that DuPont had an enormous commitment to nylon tires. Nylon tires are great tires. It was another important lesson for me to learn that, as I understand it, at the time the big disadvantage of nylon tires was they had a problem called "flat spotting." When you left your car to sit overnight, the tire would deform slightly. It would immediately recover as soon as you started driving it, but the first 100 yards or a mile or so, you would kind of feel a little thump in your tire. I believe it's true that the management of the Textile Fibers department, which was by far the most profitable for twenty or twenty-five years, made a big mistake. I believe they were too long trying to defend nylon tires as opposed to this new concept of going to polyester tires. So, yes, we were on the leading edge of inventing, had excellent performance, excellent operations, but were slow to expand, which greatly infuriated my friends in the scientific world because they believed, without a doubt, that the consumer passenger cars were going to eventually go to polyester and that the automobile companies would begin to put them on the new cars as opposed to nylon. But there was a lot of propaganda going on about how

nylon tires really were the best tires and safest, and that the auto companies shouldn't abandon nylon, et cetera. So one of our competitors was very clever and they expanded very rapidly, and became larger than DuPont, and to my knowledge, it was the only end use in which our competition became larger than us. They became successful with the tire companies and the auto companies by saying, "We've got the new candy bar." I mean, they totally stole DuPont's script. We always had the new candy bar! So people always wanted to buy more from DuPont, textile fibers, whether it was nylon or Orlon® or Dacron® or Lycra®, because they just knew that next month or next year DuPont would come out with the next version, which was bigger and better. Well, we had so many strengths and nylon was our dominant product making most of the money so that there was a great hesitancy to push this new product. As I say, much to the dismay of our scientists and some of our business people who, dealing with the marketplace, just knew that Dacron® was less expensive, and didn't have the flat-spotting problem.

Now, there were many related high-tenacity polyesters where DuPont remained and still remains the leader—in all kind of belts, rubberized belts with polyester reinforcing inside, and fire hoses, in anything like ropes and cables where you need great strength. DuPont immediately moved into those, and sewing threads for industrial products, cables, where you need real strength. Prior to Kevlar®, which came along later, Dacron® was preferred and DuPont was preferred. But in tire cord itself, DuPont was too slow. We stayed in the business for a long time. We made decent money, but we learned a very valuable lesson: once you let a competitor turn the tables on you, it is very difficult to overcome their leadership. Well, Celanese [Americas Corporation] did that in the tire-cord business. They had the distribution chain. The tire companies and the auto companies said, "Okay, you're the one who's letting Celanese take the leadership in tire cord, in consumer tires, passenger tires." We were never able to make that invention that thrust us ahead of Celanese who had, essentially, the same kind of products we did, but constantly innovating them using our approaches to marketing, constantly making them a little bit better, every six months, every twelve months. They had most of the market share, and were willing to sell the product always slightly below our selling price so they would maintain their position. A very clever marketing strategy. Our management at the time made the decision not to continue to expand. As the market expanded we became less and less a factor, until we actually withdrew from the business, oh, about ten years ago, and just really focused on all of these specialty markets where high tenacity is important.

It was a lucrative market for a long time, but our management was right in one assessment, I think, and that is: when you're in a business that's basically a commodity business, dealing with the tire companies and the automobile companies, and there's not room for a real breakthrough, it becomes a marginally profitable business over time. That's what happened to the tire-cord business. So I personally would say it was a pretty big mistake by our management. It turned out not to be enormously important over time because it never happened again in polyester, and it didn't turn out to be enormously profitable. We focused on these specialty products where the volume was less but the selling price was higher, the profitability was higher.

But I do recall that we had three production units on high tenacity polyester, and my recollection is that we eventually shut one of them down permanently because there wasn't enough market for more than two in these specialty areas. But another great learning, you know, which I've preached to our people for the last ten years: let's obsolete ourselves. Whatever our product is that we're the best in, let's figure out what the next product is and not wait for our competition to do it, and let's be prepared to obsolete ourselves. A good friend of mine, Bob [Robert] Forney—he worked for DuPont like myself for forty years—Ph.D.—used to have this little joke. One of our biggest and best products is titanium dioxide, TiO_2. We're the leader in the world, and Bob used to always say, "I want us to be looking for the TiO_3." If you're not a chemist, you won't get that joke! [laughter] But that's what we had to begin to preach after that. That was a lesson. It was a real split in the department, I was always told, of those people who wanted to push Dacron®, and those people who didn't. But we invented it. And we made the breakthrough in the polymerization to allow it to happen.

The other thing we learned out of all that is that these breakthroughs in the 1950s and 1960s were wonderful because DuPont always had a long lead time—three, four, five years. We could afford to put in a lot of research investment. We could afford to put in heavy investment in a production unit or a new plant. We had patents. We could make a lot of money. We'd get a head start. But starting about the mid-1960s, people learned how to emulate DuPont's breakthroughs and bring a "me-too" product to the market very fast. So I used to describe it: if they could make a product within a year or two like our polymer innovation, with something that was 90 percent as good, and sell it at 80 percent of the price, they had an entry into the market. They were becoming very capable because now, universities around the world were turning out a large number of outstanding scientists. DuPont hired most of them in the 1940s and 1950s. We could get anybody we wanted. But now, you know, the German chemical companies, the French, Dow [Chemical Company], Celanese, and Monsanto [Company] were hiring outstanding people. If they could get in there with a "me-too" product, then they began improving it, focusing on niches, like Celanese did in the high-tenacity tire business. Before we knew it, they'd be making a product equal to or maybe slightly better in some aspect—not broadly, but in some aspect—whether it be a tricot knit for ladies' underwear or whatever, they would find a target and go in and just work and work. The Japanese turned out to be really good at that. The Japanese chemical industry and fiber industry was never large enough. It didn't have enough money to compete with us, but we would find them constantly coming out with some new product that had some benefit that we'd have to work <u>fast</u> with our scientists and our engineers to match because they would be able to enter the market. What we found was we had to match it fast, or we would give them a beachhead that would be hard to overcome.

So this may a good time to say, in all my management assignments, I always had the feeling—and 90 percent of the time it was confirmed—that if we would tell our DuPont scientists, or our chemical engineers, our engineers, "We have to have this kind of product within the next twelve months or twenty-four months at this price," they would deliver. It was a great compliment, and still is, to our people that if the management would give them clear, direct goals—while they were always working in breakthroughs in the polymerization area, which had been enormous in the area of engineering polymers as well as in fibers, while they

were always working on the basic science and the breakthrough—if we'd get a team and say, "We've got to have this," almost invariably they would deliver.

TRAYNHAM: It's a remarkable record.

WOOLARD: Remarkable, and a great comfort to people in general management, like I always was, to say, "We're being attacked in this area. This isn't right for DuPont to be in second place," and to give people kind of the challenge, "Let's get ourselves back up there." Also remarkable in the sense that our customers believed that. Most of the time they had so much confidence in us that they would come to us and say, "Hey, this is what a competitor is showing us. We'll stick with you if you can match it or do better." That was one motivation of our customer, but the second motivation, to be very candid because many of them told me this, "You know, we're scared to death to leave you guys because you will come out with the next TiO_3 and we want to be there." [laughter] I mean, whatever it is. "So we'll suffer with you here for the next twelve months or so, although in this one field you may not be quite as competitive as you should be. But we just know that you're going to come out with something really great, whether it's a new fiber or a breakthrough in a polymer area, that's going to allow us to move into some market we're not in, or allow us to produce it twice as fast as we're now doing on our current machines. We've just got to be there with you. We're married to you for life."

TRAYNHAM: That attitude on the part of the customers and the realization or fulfillment of those expectations must have been great for morale within the DuPont organization.

WOOLARD: It absolutely was, and you know, that's another thing. I never liked someone coming in and saying, "Hey, look at what our competitor has done." I always hated it, but on the other hand, it was beneficial because I could go to our marketing people and say, "You guys have been asleep at the switch. What are you doing? You know, you didn't tell us we needed this." I could go to our scientists and say, "What's the matter? These folks better than you?" So it really allowed me the opportunity to say, "You know, are we going to be number one, or are we going to become kind of second-fiddle here?" You could kind of challenge people in a positive motivating way to say, "Hey, this isn't right. We're supposed to be the best at this, and I don't know what's going on but you folks aren't doing your job." They loved to come back to me six months later and say, "See? We told you we were going to do it." [laughter]

One of the great stories—I have so many of them—but I put one of my really good friends in charge of the carpet business in Europe where we weren't doing real well in nylon carpet. We had a business review there and he told me, "Within a year's time, we're going to have the best product. We're going to introduce these new products. We're going to have the best quality, and we're going to regain all our market share and gain some." I said, "Siggy [Wittauer], I love you, you've never let me down, but there is no way you're going to do that." This is when I was head of Fibers. Well, about six months later I was promoted and transferred

to the Executive Committee, and didn't have responsibility for Fibers. About six months after that he calls me and he says, "Are you too big a shot or can I come talk to you?" [laughter] I said, "No, of course you can come talk to me." I assumed he had some problem he wanted some help with. So he came over, we sat down and he started pulling out his charts. He said, "Now, I want to show you this presentation that I gave you a year ago, and I want to show you what I promised, and I wrote down here what you said. I want you to see that we exceeded every single one of these goals I promised you. We introduced these new products. We improved the quality. Here's what the customers are saying." I said, "Mea culpa. Siggy, I should have known better than to bet against you." But it was that kind of atmosphere that I enjoyed having with our people throughout my entire career. I was just astonished when he wanted to come over and wanted to show me he had done it.

Well, it's the same way with our scientists. When anybody leapt ahead of us just a little bit, they wanted to make breakthroughs. But all the time they were working on significant innovations to anticipate where the markets were going. One of the things that I think I was able to do, in both my assignments as head of Fibers and then later on in broader ways, was greatly increase the interaction with customers and the scientists. We used to have people in end-use marketing and tech service who would talk to customers and come back and talk to the scientists. I had a strong belief and made a strong commitment that we wouldn't do that. We'd bring the customers in or we'd take the scientists out there and, yes, there could be a marketing person who kind of led the delegation. They were always afraid to have our scientists talk to the customers. They didn't know what they would say, and vice versa, and what they'd commit and what they would say they could do. But I found the benefits far outweighed the risk of having the direct contact. Now it's something we just do routinely, but it took a lot of effort.

[END OF TAPE, SIDE 2]

TRAYNHAM: Let me ask you to comment on changes in the management agenda during your career.

WOOLARD: Let me just get a little clarity here. Are you talking about as I see it, or changes in management of the company, or in my experience or what?

TRAYNHAM: Well, your experience and your feel for what has changed within the company during your management career.

WOOLARD: All right. Well, the company has been through enormous changes during my career. First, to kind of restate in a clearer way, the management style of the company when I joined in 1957, up until 1973—that's what, sixteen years—was pretty much our people made great inventions, our research folks. We patented them. We built big plants. We had the

leadership for four or five years. This was in every line of work we were in: Dacron®, Lycra®, Orlon®, expansions in nylon, Teflon®. At that time, the company was run by an executive committee, and they, in all honesty, didn't really understand all that was going on in the company. They were more like a group of investment bankers. The company had about twelve very independent departments: Textile Fibers was, by far, the largest and most important. And the company was enormously successful. You remember after World War II, in 1946, so many of our competitors overseas were basically decimated, and DuPont was in the golden era of hiring the best scientists who came up with many, many new products. It was just kind of taken for granted that every year or two, DuPont scientists were going to come through with a polymer breakthrough—either in fibers or in engineering plastics, engineering polymers, or in paints for automobiles—that would move us a step ahead of everybody. And it worked like a charm for twenty years.

The first really big body blow to the company was in 1973, when OPEC [Organization of Petroleum Exporting Countries] became powerful. This happened at the same time that DuPont's competition was becoming very capable, and at a time when, while there was still room for innovation and breakthroughs in polymers and chemicals, they happened less frequently. The innovation was less significant. They would fill a gap instead of a whole new area like polyester, nylon, Orlon®, or Teflon®. So in 1973, the price of oil shot up nine-fold. There was a shortage of oil. There was a shortage of every kind of raw material that DuPont depends on. We were still petrochemical-based, and to a great extent still had a fair amount of commodity products. With the competition becoming better, all of a sudden, for about a three- to five-year period, DuPont's earning declined. We had never before had to even borrow money, and now we were beginning to face some cash problems. Inflation, you remember, under Jimmy [President James Earl] Carter just shot up immensely, so all inventories and everything cost a lot of money. The senior management of DuPont went through an enormously soul-searching time.

Now, again, my timing was impeccable—either good or bad. In 1973 I got a very unusual transfer, and I went into marketing. At that time, it was almost inconceivable to take a plant manager who'd spent fifteen years in operations and put me in charge of the products group for all of fibers: Dacron®, Orlon®, acetate, nylon, Lycra®. So I was there in 1973 when there was this tremendous shortage of products, and all of our customers were begging us for products and were willing to pay any price. I was involved with searching around the world trying to find raw materials to help run our plants. We were making money like crazy in 1973. In 1974, when the recession hit, everybody had built this huge inventory because of the shortage, and then when products became available, there were huge excesses in the marketplace. I'll never forget it: in September of 1974, after a year-and-a-half of trying to find products and help customers, our orders fell dramatically, like 40 percent in one month. This downtrend continued for a couple of years. Our costs were way up because the price of oil had gone up. Competition was doing everything they could and the senior management of the company was in shock, because this wasn't only happening in Textile Fibers; it was happening in every part of the company. Inflation was high, costs were high, prices were down, and orders were down. While it was happening everywhere, Fibers had been the mother lode. I mean, we provided 60 to 70 percent of the earnings for a long, long time. The executive committee had

left all the departments alone. They really didn't understand the customers, the dynamics, or the cost structure.

I was selected to go into corporate plans to study for the company—and this must have been early 1975—what the hell was going on. Was this just a short-term disruption in Fibers? Was it a new way of life? So I spent about a year doing a study of the whole Fibers department, and concluded what was obvious to most of us who'd been around: that the golden era was over, and that we could no longer afford to build these huge plants. The last one we built was Kevlar®—several hundred million dollars, very expensive cost-per-pound, and it hit the market about this time of a highly-disruptive period. It took a long time to develop the markets because the industrial markets were where you had to prove to people that this product and its great strength was going to hold up over time and was not going to deteriorate. It was all kinds of transportation markets, airplanes, NASA [National Aeronautics and Space Administration] markets, automobile markets, and markets to replace hose and belts. So it was clear it was going to be a long time to get a pay-off from that business. But then, all our other businesses were under fire at the same time, so that was the last really big, "Well, we'll follow the old strategy. We've got a breakthrough; we've got a new product; it has tremendous characteristics; we'll build a plant; we'll develop the markets." DuPont's great at end-use marketing. "We'll have a long lead time and everybody will live happily ever after."

So, I reported to the Textile Fibers management first, which they didn't particularly want to hear, then to the executive committee, and then to the board of the company, that we entered a new era as far as those of us on this task force could see. That model wasn't going to work anymore. We had to lower our costs, we had to take out a lot of the redundancy we had built up over the years like IBM [International Business Machines], AT&T, General Motors, and [Eastman] Kodak. We were all of the same ilk. We had loads of people who just communicated and wrote reports and checked quality, and we had to begin to reduce the cost. We had to be much more aggressive in making small, incremental improvements. When we had a big breakthrough we had to be much more demanding and systematic about learning how to do it with less up-front expenses. We'd been through some disappointments like Corfam, so the management knew what we were talking about. So we had to invent then, really, a new model. That process took about ten years because a lot of the senior management, like senior management in other companies, as I've talked about—IBM and General Motors—just couldn't make the immediate shift. But we started. We began to work more closely with our customers and with our suppliers. There is a certain arrogance that grows in any company when you've been highly successful for twenty to thirty years with a certain model. We saw it in Kodak, who just couldn't believe that Fuji [Photo Film, USA] was eating their lunch. We saw it in all of the big automobile companies when the Japanese came in (Toyota and Nissan) with higher quality and better prices. We had it in DuPont. Fortunately, not nearly as bad, and fortunately, not nearly as widespread.

So this began to change. Then, unfortunately, just as the markets got better and we started making good money in 1979, we had another big OPEC oil crisis, which just really reinforced that we had to make major change. So the executive committee became much more involved with the business, the heads of the departments became much more involved in every

decision. DuPont management brought Dave [David] Barnes back to head Fibers. He had grown up in Fibers, but had left and gone to work in a number of the chemical operations. His return was traumatic because Dave was a great leader, very demanding, insisted on details, and insisted on having very rigorous examination of everything we did as opposed to just, "Well, let's build this plant. We've got this product. We know it'll work." And everybody saying, "Okay, go ahead and build it. We'll give you two hundred million dollars." No more.

Dave ran the Textile Fibers for about three years, and I succeeded him, having learned a great deal from him. I had also learned a lot from being on the task force in 1975 where I saw the company and the changes that had to be made. I became head of Fibers, then, in 1981. Following Dave's footsteps, we began to greatly reduce the number of people, reduce the number of projects, focus more on the customers, and depend less on big breakthroughs from scientists. We insisted on more improvements in variants, and focused more on the processes and operations of our plants. Instead of building another plant, we'd say, "Well, we're going to get another plant-worth of production out of what we've got." So we put engineers, scientists, and chemical engineers working on all that. It was less fun, there's no doubt about that. But it was imperative with big payoffs. Again, when people began to deliver those kinds of results, they felt very proud of responding to a real threat to the company.

So we began a little bit in the mid-1970s. In 1979, with the second threat, we got even more serious. The big change really began when Dave came in and I tried to follow in his footsteps in 1981-1982 when I was in charge of the department. We went into another recession about this time (1981), brought about by the 1979 oil spike and the high inflation of the Jimmy Carter era. So our results were not really good in the two years I was there. They began to improve greatly in 1982, but it gave us a great opportunity to make enormous change. Where every plant used to have its own research laboratory at that point in time, we said we were going to have one for each of the major products. So nylon had five plants and five research labs; we combined them into one. Where we had scheduling groups for every division, computerization and systems were getting better, so we could streamline it into one. We greatly reduced all kinds of senior management. Where we had like seven levels of management in every one of our plants, we went to four. We had a plant manager, assistant manager, superintendent, a chief this, a chief that, and two on shifts. We went to four. And lo and behold, we found, as people were predicting we would, we got better results. We got better results with fewer people because communications were faster, decisions were better. There were fewer people sitting around in meeting rooms debating things. While this was great, we had actually just scratched the surface, which I then spent the next ten years working on across the company, because in 1983 I was promoted to the executive committee. We had nine people on the executive committee at the time. Dave Barnes and I were the two who'd been most involved with operations during this changing period. So we were pushing really hard for the company just to go further and faster in this area of simplifying, streamlining, having rigorous examination of everything, quit having these endless reviews and discussions. When I went to the executive committee, I was the first member of the executive committee—and this sounds really weird—to have direct responsibility for operations. Until 1983, the executive committee met as a group and they had what was called "liaison" responsibility for various departments and functions, but they had <u>no</u> authority to make any decision. The departments were independent. They could do

anything they wanted to. The liaison would give them advice and counsel, and they had to come to the executive committee for big financial authorizations like a hundred million dollars. But in terms of operation, executive members had no authority.

So when I joined on the executive committee as a junior member, the management decided, CEO Ed [Edward G.] Jefferson, that he would give me line responsibility for three departments. These feudal-lord systems [laughter], had run things totally independently. So I had responsibility for agricultural chemicals, the medical division, and the photo products division. It was different because now they had to talk to me and get approval to do things. They didn't particularly like it, but you know, I'd learned to work with people in all kinds of environments, and we got along just fine. It was clear this was the wave of the future. You couldn't have a group of business leaders responsible for the company who didn't know what was going on, didn't interact with customers, didn't interact with research people, and just kind of sat up on the ninth floor of the DuPont building and read reports. And everybody knew it.

TRAYNHAM: Were you the only one that had that kind of line responsibility?

WOOLARD: Yes. I was the only one at that time. That was true for three years. Then we began to give others that responsibility, because in 1986, after I'd been there three years in that role, and the others continued in their liaison role, Dick [Richard E.] Heckert became the CEO, and I became the Vice Chairman and Chief Operating Officer. We immediately went to that system for everybody then. First we reduced the executive committee. So as people retired, we didn't replace them. We reduced to six. They each had direct responsibility, so as we sat around the table now, we had in that room people who were responsible for every part of the company. By then we had acquired Conoco [Inc.], and it had a line organization. We could look and ask, "Okay, Bob, why is your business doing what it is? Your departments. What are you going to do about it?" Bob couldn't say, "Well I'm going to go out and talk to people and see what they think." "No, no, you come back and tell us what you're going to do." So a whole new mindset was introduced. This was big. You know, it sounds simple, but for thirty years each of these departments had run well on their own, making their own decisions, only telling the senior management and the board what they wanted them to know, and only asking for authorizations from the bank to spend company money in investments. In research, or in any other operating expenses, purchases, they could spend any amount they wanted to.

So this was one enormous change where the leaders of the company had responsibility for the performance of the company and no fooling. Now you had to dig into your departments and find out what they were doing, how much they were spending on research; did you agree with it? Were you happy with it? Now there were big debates among you and the head of the department, which were, you know, always resolved amicably, but no longer just the way the department had wanted it.

So all the major management changes in the company came in phases. Phase 1 was the awareness in the late 1970s, culminating in the 1979 crisis, inflation, high petrochemical costs,

which induced the executive committee in 1981 to acquire Conoco. That was done so we'd never have another shortage of petroleum raw materials, petrochemicals, and because people believed the price of oil had gone from a couple of bucks to nine, the first step, and then nine to thirty-some the next step, and people thought it was going to a hundred because OPEC was really strong in control. By the way, the head of our economics department assured me it would never happen. That OPEC wouldn't stay together and the price of oil was going to go down, not up. [laughter] But management, broadly, including ours, believed it was going up, and that was part of the decision to acquire Conoco. So the 1979 to 1981 period was kind of an awareness. We were in trouble, we had to change, we had to get more involved. I was still not in senior management at that time, nor on the executive committee. But that was kind of Phase 1.

Phase 2 was beginning to have the senior management responsible for the results of individual pieces of the company, which, I say, fortunately, I was the first person to be given the chance to prove that that would work. Then Phase 3 began in earnest in the 1986 to 1989 time frame, when we began to focus on totally making changes of all kinds, and it was continuous then. Continuous for five, six, or seven years, always looking to what the next step would be, because we were doing okay, but we knew we weren't as competitive as we had to be. So what followed was, in 1989 when I became CEO, I eliminated the executive committee altogether, and went to something that was much more like what other companies do: an office of the Chairman. We just depended on people to run their business through the line, and didn't have all these quarterly reports, reviews, and people coming up and just constantly getting senior management tied up all the time in reviewing things. Just saying, "Now, for sure, you've got line responsibility, and you just go do it. We're not going to sit and talk about it unless you need help."

So, that was important. Then the next thing we did was eliminate departments. Then we focused on businesses. Where Textile Fibers in the past was a department, self-contained with functions and departmental research, we eliminated the superstructure, and just said, "Okay, now we've got these business divisions." By the way, these divisions don't report to the same person. So the specialty fibers division reports to Person X in senior management and the commodity parts division reports to Person Y. We really wanted to get out of the mentality of, "We are a department in Fibers, and don't mess with us." Where we had had a business leader, an assistant department head, a department head, and an executive committee, we eliminated all those three steps, and we had a business leader, and a person who reported to me. So the business leader had one person between me, the Chairman and CEO, and himself, where there used to be four. So the decision-making now could be very clear. The Executive Vice President and the business leader could talk to me on the telephone, or talk in the office, we'd make a decision, and we moved. Whatever it was, a new product, a new invention. A lot of it was just keeping me informed. So we greatly streamlined the operation, and that was part of this final phase.

But then, we again realized our costs were just way too high. That became clear because our customers kept telling us, "We love doing business with DuPont. You have great quality. You have great people. You have great inventions, innovations. But I can buy it 10 percent cheaper from somebody else. I can't afford it in this day's competitive world." That all came to

a head my second year as CEO. After we'd done all this streamlining internally, we made the decision that we had to get ahead of the curve and really do this major downsizing event. At that time, we had reduced, over about six or seven years, about twenty thousand people in the company, which was good, but it really wasn't nearly good enough. We still had a hundred and forty thousand. We had kind of taken what people now call the "low-hanging fruit," the clearly obvious redundancies, as I've discussed. That was all good. But we had to make a dramatic change. So then we went through the downsizing phase for real, and did the mapping exercises of everything we did in every business and decided what we could afford. In 1991 we had a major downsizing, which involved about fifteen thousand people at one time, and over the next three years we went from one hundred and forty thousand to one hundred thousand people, which was really traumatic and dramatic.

TRAYNHAM: It was pretty evenly distributed over all the areas?

WOOLARD: Very evenly distributed. Everybody was involved, and we started with senior management again, although we had already reduced senior management a lot. The reductions in senior management—I would say, the top five hundred people in the company—we took a higher percentage of reductions there than we did in any other part of the company. But it was in every piece of the company. No fooling, because everybody knew we had to do it. I guess the most traumatic was here in Delaware, where we had like twenty-six thousand people, and maybe five or six thousand of them worked in plants making something. The rest of us were just office people: marketing, research, technical service, management, communicators, operations people, and information technology. We cut that to less than ten thousand. DuPont in Delaware had been huge—people claimed DuPont owned the state. We never did, but it made a nice story. We were very strong. But I mean, it was really very difficult for the local businesses here that depended on us for everything. We outsourced so many things, and we made so many things in printing, publishing, and brochures, and even people who supplied plants and flowers for the offices. We just cut out all that kind of stuff and put in artificial plants. They look nice and you don't have to have people come in to water them. [laughter] So it reduced costs dramatically, but there were an awful lot of people who depended on DuPont in Delaware that the business just didn't need anymore. Our people were great. I mean, they identified so many things that didn't add value to the customer. That's what we asked. "What is it we're spending money on that the customer will pay for?" They knew there were like a million things that were nice for egos and nice to make us feel good, but it just wasn't adding any value to the customer.

So that was kind of the low point for me, personally, in my career, because we went from 1991 to 1994 really doing those hard things. I never went to a cocktail party that I didn't see some member of senior management that I had told, "You know, you're a terrific person but we don't need your job anymore." We cut our information technology costs by almost 50 percent, just by combining. We had information centers all around the world, and we combined the one in Asia and the one in Delaware, and consolidated several in Delaware. We had a great leader, leading that effort, and she [Cinda Hallman] just showed us how to do it by streamlining

and telling people, "No, you can't have your own individual way of doing it. There's going to be a corporate way of doing it." We found we just spent tremendous amounts of money because everybody liked having their own reports, their own forms, and their own ways. We had zillions of duplicated computer technology, and we went to two or three, and shut down centers. So information technology is just one that was very clear, but it's the same way in human resources, it was the same way in research. We had a culture that people liked doing things their own way, and I'd seen that in IBM as well, when I was on the board there.

So people just had to quit having all that. Again, as I say, people were great. I mean, they came up with these ideas. While I set the target, everybody would find another way. Remember I said in the 1970s, we thought we had significantly reduced our costs, but we just scratched the surface? Well, from 1991 to 1994 we reduced our costs by three billion dollars. We spent three billion dollars less and produced more product, and this was out of a cost of thirteen billion dollars. About half of that was people, and about half of it was purchases, travel, and all the things that go with running big operations, shutting down offices. I remember our paint people telling us they had like twenty distribution centers. These are people who ran the automotive paints where we had distributions. They cut it to six, reduced all those costs, and found out they could provide better service because the information technology was catching up and the transportation was improving, and people were anxious to provide services to DuPont that we'd always done ourselves. We did our trucking, we did all kind of services for ourselves that other people could do less expensively, and faster. That was their field. They were focused on it. But it was traumatic to outsource it and reduce the people. In some cases, we made joint ventures with others where DuPont people would go into the joint venture, so people kept their jobs but they weren't working for DuPont anymore.

In 1994, we earned three billion dollars, and as I said, we reduced our costs by three billion. After tax that's equal to two billion. So two billion of the three billion we earned as a company in 1994 was because of these actions we took. Had we not taken them, the company would have been in serious trouble. There would have been threats of takeover offers or one thing or another. We certainly would have lost business and been less competitive, but it was a traumatic look-back to see that the success we had in earning in 1994 was two-thirds attributable to the actions we had taken to improve our costs and our operating performance. This was not some kind of cost reduced by inflation-adjusted numbers. We spent three-billion-less dollars three years later than when we started, including eating all the inflation that had come along.

So the question was, did we do that in such a way that we destroyed the culture of the company, the innovativeness, the competitiveness? And we found out, even though people were very hurt, embarrassed, and disappointed that we had had to do that, we were able to tell them, "Hey, look, we did it before we had a gun at our head. You know, it wasn't like General Motors, Ford [Motor Company], and Chrysler [Corporation] who were under the threat from the Japanese automakers. It was unlike IBM, who almost lost control of the company. It was unlike Kodak, American Express, and AT&T. We saw it ahead of time. We rallied our troops. We explained what we had to do, and our folks did it." We had a belief that we had to treat the people that were leaving as humanely as possible, with as much respect and affection as possible, so that the people who stayed—they called themselves the "survivors"—the survivors

felt good about themselves and about the company. They felt the company had handled it as well as they could, but they had to do it. We helped the people find jobs. We treated them well, financially. Certainly, the vast majority of them hated to leave DuPont because DuPont's a great company and a warm, friendly company to work for.

But it was always amazing to me then, two or three years later—and I can't say what percentage of the people felt this way—but a high percentage felt very good because they'd left DuPont. A lot of them were doing jobs that they knew didn't have any sustainability. They weren't needed any longer. They were involved in some kind of liaison or communications or there were three levels of management and you only needed one. So we helped them find new jobs and they went into careers or they went out on their own and they had financial resources. In many cases, they had financial freedom because the first thing we did was reduce the retirement age and add five years to people's seniority so a person could retire at fifty-three, fifty-four, or fifty-five with full retirement pay and health benefits the rest of their life. They could sit back and reflect and say, "You know, I really wasn't happy in that job, and now I can either do something in the community, or I can go back to school, or I can start my own company." So many people found it a liberating experience after they got through their trauma. I was really pleased that the local newspaper, which was very negative to us at the time, interviewed a lot of our people. They were hard-pressed to come up with people who would say negative things about the way it was handled, the way they were treated. The key to all that was, as I said, the survivors, or the people who stayed, felt a great sense of pride.

So when I summarized in 1995, everybody wanted to know, "Is it over? When is it going to be over?" "It's never going to be over as long as there's a competitor out there trying to take your job and our business. It's never going to be over, but 90 percent of it is over. You all have done a fabulous job. We are competitive. We made three billion last year, two of which because of what you did, and without it we would be in deep sushi. Now we can grow and now we can spend more money on research and follow these projects. We can start hiring, again, college graduates, and the future is bright. We have leadership positions in every business except one or two in our company, and we have plans to deal with those one way or the other." They saw that we, now, had great relationships with our customers and our customers wanted to buy more from us. They were very proud of the fact that in business after business, we were the strongest. Part of this whole thing was getting out of businesses like making Remington shotguns, which we never had any business being in anyway, in my opinion. We had some electronic-connector businesses that did not demand or benefit from our great expertise in chemical engineering, chemistry, biology, and research in general. We had four or five businesses like that that we either sold or spun off. Again, the people didn't want to go, but they got in a different environment, combined with another company in some cases, and they were more competitive.

So I felt very proud that in 1995, while continuous improvement was not just a fad, but something we had to do, we didn't have at that point any big weaknesses to deal with. We were highly competitive in every business. We were growing. We had done extremely well overseas. We had built new plants in Asia and Europe. We were well positioned for the global economy. We had leveled with our people and taught them the reality of competing. We had a

tremendous pipeline of new products in engineering polymers, specialty chemicals businesses, and variants in most of our fibers businesses, the spun-bonded business had tremendous opportunities ahead and new products coming. Nylon had been rejuvenated. We knew that polyester still had difficult times ahead because the Asians had built so much capacity. That condition is still going on today, so while we believe we're the strongest and the best in polyester, it really doesn't matter because nobody's making any money in polyester. You know, we have the capability and the resources to stick with it until our technical strengths and our market share pays off for us, which I'm convinced it will. We had made enormous breakthroughs in agricultural chemical research, and had led a whole new era of crop-protection chemical herbicides that allowed us to put, literally, grams of the new herbicides on an acre of crops instead of pounds. It was so powerful. They were non-harmful to people, birds, or fish, and it's been enormously profitable for us. We were beginning to get breakthroughs in the life sciences and biotechnology, which gave us great promise. So we could see that life sciences were going to become a more and more important part. We had been real weak in pharmaceuticals. We made a decision in the early 1990s to form a joint venture with Merck [and Company], which was enormously successful. We bought back their half here last year, and our people, DuPont people, invented a cardiovascular hypertension drug, which is a whole new state-of-the-art product that is one of the fastest-growing drugs in cardiovascular treatment for hypertension. So we had great promise there. We see life sciences growing and we have this whole bedrock of polymers and chemicals where, truly, we're the best in the world and we retained our scientists.

[END OF TAPE, SIDE 3]

WOOLARD: So in 1995, we had been through this enormously difficult period of downsizing, eliminating some businesses, strengthening the businesses we had, and we could see the future in the following way. This thrust into life sciences, where we now had plans to buy back and did buy back our half of the DuPont/Merck joint venture, which had been terrifically successful. DuPont had been able to attract—when we said we were going into the pharmaceutical business in the 1980s—outstanding scientists based on DuPont's reputation and tradition, people believing we would be successful. It took longer than we had hoped, but we do have outstanding scientists and a great pipeline there. We'd had these breakthroughs in agriculture, and we'd been working on the biological contents there, and we had some real breakthroughs in high-content oil. We'd learned how to manipulate genes so we could produce twice as much corn oil and corn crops as a natural existing product. So we could see a real future in life sciences, but the thing that I felt great about was that we had not given up at all, and had strengthened our basic chemical businesses: polymers, fibers, chemicals, TiO_2, for example. We had strengthened ourselves around the world. So we had two fundamental, great foundations for the future.

As we looked around, our competitors had followed different tracks, which I never understood and never liked. ICI [Americas Inc.] split into pieces, Monsanto split into pieces. Celanese disappeared, and then along came Hoechst [Marion Roussel] and split into pieces, as

did Rhône-Poulenc, the French company, and Ciba-Geigy. Dow started into pharmaceuticals and then got out. They're still important in Ag [agricultural chemistry], but I looked around and said, "I don't see many companies that think they can be great in chemistry, polymers, and life sciences." Bayer [Corporation] and BASF still are kind of following that track. It seemed to me we'd gone through a tremendously tumultuous period and came out being, in my humble opinion, the leader, and a company who believes in the integration of chemistry and biology so that we're well positioned to grow all of our fibers businesses where we're the clear leader in the world; our polymers businesses where we're the leader in specialty polymers. We got out of many of the so-called "commodity" polymers. In our chemical products, in fluorochemicals and in titanium dioxide, we're the leaders in the world. We're building this really strong life-sciences side, which, while we're not a giant in pharmaceuticals and probably won't be, it's my vision and hope that we will be a leader in the whole of biological sciences, in health sciences, pharmaceuticals, in agricultural products, and in food products. We have the size and the ability to stay with any up-and-down in those markets. The cash flow is coming from very successful polymers and chemical businesses, most of which we'll use to expand those. For example, just last year where we were always the leader, or we felt we were the leader, in automobile refinishes and automobile finishes in general, both original equipment and refinish, we were able to acquire from Hoechst their Hoechst paints business, which is one of the leaders in Europe.

So, while we were focusing on growing in sophisticated things like life sciences, we've taken every opportunity where it made sense to make acquisitions when people are abandoning the chemical industry to acquire strong businesses and now we are very strong in automotive finishes, refinish, and original equipment in both Europe and the U.S., and in the technology, because Hoechst had some technologies we didn't have. So that was going to be our game plan: to use the cash flow to make acquisitions in our basic businesses to strengthen them, and we did in polyester and we were going to in TiO_2 but the FTC [Federal Trade Commission] wouldn't allow us to acquire ICI's business there. Then Hoechst and the paint business, we used the cash flow there in modernizing our facilities, while building the life sciences.

Now, to do all that, the financial demands got too great. We have known for a long period of time that Conoco, the oil company we acquired in 1981, was an excellent company, well managed, providing us great cash flow and balanced earnings during a period of chemical downturns. Every time we had a chemical downturn, the oil company performed well so that we could keep raising dividends and have good earnings growth. We decided it was time—the Board decided, and we'd been expecting this for some number of years, that our appetite for life sciences would be such that we would need to dispose of the oil company, which we began last year in 1998, finished here in 1999. We will have seen an acquisition that we made for about seven billion dollars in 1981—and then we sold off coal and chemicals, and so we have about four billion in it—we will realize about twenty billion dollars that we can use to pursue our aggressive appetite in the life sciences. We've also announced this year that we are acquiring Pioneer [Hi-Bred International, Inc.], which we consider <u>the</u> leading company in the whole food area, in the agricultural area in the biological sciences.

So the game plan plays out—once we got through this terrible period in 1991 to 1994—of strengthening our chemical businesses, which we're going to stay with for a long, long time and hopefully remain the world leader in. Sell the energy business, which served us well, and now they can go off on their own and expand Conoco. Then, redirect the money into life sciences with the acquisition of Pioneer and a smaller company called Protein Technology, which is the leading technology in soybean research. We see a great future and fit with that into our agricultural business, which has become one of the two or three best in the world on its own. Now combined with Protein Technology, combined with Pioneer, and combined with the human health side of our pharmaceutical business, which is very strong and very profitable, we see that becoming an ever-increasing part of the future. Then, unlike any other company, I believe—we hope—that we will learn so much from biology and biotechnology that it's our objective to be the leader in using biotechnology and biology for material sciences. We are working on biological routes to 3GT [polytrimethyleneteraphthalate], which we hope to commercialize in the next few years. While it may be five or ten years away, we see a steady stream of biologically-derived products that can replace petrochemical-based products, our polymers and our fibers.

So DuPont, I believe, is well positioned. There will be continued need for streamlining, modernizing, and simplifying what we have. But we don't have any weak businesses at the moment. I'm delighted to say we have gone through a transition here from myself to my very good friend, Jack [John A.] Krol, who ran the company for three years, and like myself, wanted to retire in his early sixties. Now we have a CEO, Chad [Charles O.] Holliday, who's fifty years old, who can do the heavy lifting for a long time, and has a great game plan, good cash flow, and a very strong position in all our businesses.

So it's a very interesting change from the mid-1980s, where we had this model of just great scientific breakthroughs, big plants, strong patents, to—as one of my predecessors liked to say, "We've been trying to teach this company how to win without holding four aces!" I believe, now, the company knows how to do that through marketing, through end-use research, dealing with customers, making strategic acquisitions when other people feel they either want to separate out of a business or just aren't managing it well, and a highly motivated group of people who have been through a tough time but see themselves as strong winners with a company that's still highly regarded as one of the outstanding scientific companies of the world. Typically, around the world, when they do surveys, we usually come out one of the top five, or at least top ten, companies with a reputation for science. I'm always intrigued by that. They interview about six thousand engineers every year in Japan for technology, people they respect for their technology, and DuPont typically comes in third or fourth, up there with Sony [Corporation of America], IBM, Intel [Corporation]. We're usually in the third or fourth place. So we have a great reputation, good financial results, and I think a great game plan for the future.

TRAYNHAM: Well, with that kind of record through what one might call, in terms of DuPont's history, "the turbulent 1990s" with lots of personnel actions, your leadership was

recognized with several awards, including the Society of Chemical Industry [SCI] award last year. Would you like to comment on your reaction to that particular medal?

WOOLARD: Well, yes, I would. I was thrilled. I was thrilled to receive that medal because as you kind of just stated, I viewed it as a commendation for the people at DuPont who had been through this turbulent time, much less a medal specifically for Edgar Woolard. That was to a great extent the thrust of my comments the night of the award. Certainly, it requires leadership to make the kind of changes that we made and come out on the winning side. But I've never been much of a believer that one person achieves that much by themselves. First we had a tremendous strong leadership team—the top ten or twelve people right beneath me—who were constantly pressuring me to "let's do this," or "let's do that," or "let's do it faster," and serving up ideas of how to do it, and supporting me. Even though I had to make most of the announcements and make most of the final decisions.

But no one would believe the kind of aggressive enthusiasm that our people embraced during that time because they have great pride in themselves and in the company. Once they clearly understood what we were doing, and why we had to do it, the courage that individuals showed in making changes—and sometimes it was a sacrifice for themselves personally. I mean, people would come to me and say, "My whole division isn't necessary anymore." Or "The business I'm running really doesn't benefit from being part of DuPont and you ought to sell us or spin it off." I mean, people who said to me, "What you're doing is so right that if I lose my job, I'm supporting you for doing it." So the medal was very important to me from that standpoint.

The second standpoint that I want to just touch on briefly is that during these turbulent 1990s, all this change, I think our company provided more leadership in the environmental arena than any company in the world. We made the decision in 1989, and I went out and made a number of speeches, which are all being made available to you, saying, "It's time for corporate America and really, globally, the corporate world, to provide the leadership in improving the environment." In the 1980s the environmentalists had made a lot of noise, they got a lot of recognition, and they made some very good points about us, and particularly the chemical industry, where the chemical industry basically had the concept that "We're not hurting anybody. Leave us alone. We know how to run our plants, and we don't need to tell the world what we're doing and how." I think we recognized before most anyone else that that was unsustainable. The chemical industry had to open up and we had to say, "We'll let you come in our plants and see what we're doing. We'll show you what products we make. We'll show you what the risks are and what the benefits are. We'll clean up our act."

In 1989, one week after I became chairman, I gave the first of these speeches and I decided to do it in London because I wanted to have a global setting, where I committed DuPont to about eight major breakthroughs. Not that we were doing things poorly, but we were more focused on following the law and the regulations. I said that wasn't going to work anymore, and I was going to be the Chief Environmental Officer, as well as the Chief Executive Officer of DuPont. I committed us to reducing emissions by 60 percent within four years, reducing

carcinogens—cancer causing emissions—by 90 percent, setting aside land for wildlife habitat, taking all heavy metals out of our polymers, and several other very important initiatives to greatly reduce any deep wells we used putting stuff in the ground, although we thought it was safe. It was a really fascinating time in that regard because we were doing all these other things, and a lot of people, even chemists and scientists in our company, said it was impossible. I had a great retort: "Well, I've committed us to do it because I've got more confidence in you than you've got in yourself. Now just go do it." It was great for me that they did. In the last eight or nine years, we have increased production by 40 percent and we have reduced all kinds of waste and emissions by 65 percent. We're making 65 percent less waste than we were, and that's with 40 percent more production. We met all the goals we set for ourselves and the astonishing thing is, the vast majority of the improvements turned out to be economical, as I hoped and suspected they would be. Once again, my confidence in the scientists in DuPont, and the engineers, showed when we said, "We're not fooling; we've got to reduce these emissions." They found ways to change the process, redesign the models, and reduce the emissions for much less investment and much less cost. In some cases, we actually improved the cost, and of course, you know, you get the benefits of not making the waste, which is just money thrown away to start with—raw materials.

So now we spend less money on environmental concerns than we did then; we spend less investment; and we spend less cost, although we're producing more. A couple of our engineers just authored a book on how we did it. They came by and gave me a copy and very proudly said to me, privately, that they knew this all along, but the fact that I committed us to do it forced the business people to come to them and ask their advice and help and direction, allowed them to fulfill their vision of doing the right thing. I'll say kind of here in closing that there's been nothing in forty years of experience with DuPont that brought more pride, cohesion, and enthusiasm to our employees than what we've achieved in the environment. They didn't like going to meetings and having people say, "Why do you work for a company that pollutes?" They didn't like their children coming home and saying, "Why is DuPont considered a polluter?" While I do believe, as we always did, that we were not doing anything that was harmful, we're <u>so</u> much better today and the atmosphere is so much better. After about four years of progress, the person that I assigned to run it, Paul [V.] Tebo, who did just an outstanding job, came to me and said, "The business leaders of DuPont want to commit to a goal of zero waste and zero emissions." I got a lump in my throat and my heart because, I said, "You know, I'm reluctant to do that." They said, "We want to do it. We believe it's possible, just as we're committed to having no injuries in our plans, and we do from time to time have an injury, but we believe we can operate everything in our plants with no injury because we're the safest company in the world. We have very, very few injuries, and all the benefits that have accrued from safety, we want to take the next step. You got us 60 percent of the way there. We want to commit to going to zero. We're not going to put a timetable on it, but we know we'll keep working at it and every year we'll get closer to it. Some of our plants will get there, and as long as we have it as a goal, we'll find a way to get better and better."

And they did. I said, "I want to hear from everybody." They went out and got a letter and sixty-five of them signed, "We're committed to doing this," before I would announce that was our goal. I, personally, won several awards for committing the company to zero waste and

zero emissions, but I've said repeatedly for the record, it really wasn't my idea, and it scared the hell out of me. [laughter] But the people wanted to do it and they will. They'll make enormous progress.

So I saw this medal as kind of the culmination of the great turnaround—another great turnaround—because our company is the oldest on the New York Stock Exchange. It will be two hundred years old in 2002—just three years away now. It's shown great adaptability, great flexibility, the ability to attract and motivate terrific people. But we went through a decade where we had to totally rejuvenate our people, reduce a significant amount, get out of some businesses, strengthen some businesses, do it at the same time. Our safety performance last year was the best in history, although we've always been great; our environmental performance was the best in history. So to achieve those kinds of environmental improvements at the same time that we're strengthening our company, reducing cost, improving our quality dramatically, making all our businesses world-class, and preparing to move aggressively into life sciences, that makes a person feel a great sense of pride. So I accepted the SCI medal on behalf of all of our people. I was proud to have been the leader during that period.

TRAYNHAM: I'm watching the time, and just for a few sentences of comment, would you like to tell me something about your family? I see we have family pictures in your office here.

WOOLARD: Yes, I have an enormously supportive family. I have two daughters. Both are married, and I have a granddaughter, five years old. My wife has just been a great part of the family and the DuPont family. She is very gregarious, a wonderful hostess of everything as I was coming along. I had the great privilege in the last ten years, of traveling for DuPont and meeting with presidents and kings, and she's as comfortable interacting with the king of Spain as she is with the hat-check girl in the hotel. She just has a great way about her. I always tell the story: when I receive medals, she's always been such a great supporter because she knew whether to kick me in the butt when I was getting too cocky, or pat me on the back when times were tough. So I was very lucky to grow up in the period I did, go to work for DuPont, but, also to have a wife who, in those days, was happy to raise a family, to be a part of my business life at every level right on to the day I retired. I must say that she kind of motivated me to retire at age sixty-one because I thought about continuing, but she said, "Hey, it's time for us to do more with the family," and she influenced me that was the right thing to do.

We have two wonderful daughters who've just been a great source of happiness and have never really done anything but been their own folks. One lives here in Delaware not far from us, the one with the granddaughter. My other daughter lives in New Orleans. She lived here all her life, but she got married about a year-and-a-half ago, and they moved to New Orleans and are just as happy as two young teenagers. So we have a tremendously supportive family and I've had great fun with our five-year-old granddaughter. When I retired, people kept asking me what I was going to do, and I was quoted in the *Wall Street Journal* as saying, "Well, I expect to spend a lot more time playing with Caroline." She was only two at the time. But yesterday, we went swimming together in the pool and had dinner together last night with my

daughter, wife, and granddaughter. So I spend a lot of time doing that. Church is a big part of our life and we all go to church together. I now enjoy taking her places. We're going to London next week and my daughter, granddaughter, and son-in-law are going with Peggy and me. So she's fortunate, as well, because she gets to see a lot of different parts of the world and have different experiences.

But I said early on in my life that there were three things I was going to focus on and I wasn't going to put them in any priority. I was going to try to have a balanced life, which included my family, my job, and my church. For that reason, I never played golf, or tennis, or fished, or hunted, or played poker with the boys, you know, except on rare occasions. I never spent much time doing any of those, although I have done all of them from time to time. But weekends were pretty much for the family. I have tried to balance my life along those three things, and when they got out of balance, I could count on my family to say, "Hey, wait a minute! Remember what the deal is here!" [laughter] And I tried to respond to that.

So it would really be difficult, I think, to have the kind of jobs I've had and do the things I did without great support from my family. I also like to tell the anecdote about the speech that I've talked about, in London in 1989. My oldest daughter read a lot of my speeches and gave me comments. So I asked her to read this one before I did it. Her reaction was, "Dad, this is by far the best and most important speech you've ever given. I have just one question." I said, "What's that, Annette?" She said, "Do you believe what you're saying?" Well, that was an enormous wake-up call for me. If my daughter—we'd shared so many things and totally believed each other—questioned whether I believed that I was going to make this kind of personal commitment to the environment and commit DuPont to it, that if she was asking me to confirm that I really believed it, then what would other people believe, both inside the company and the skeptics outside the company?

So I've had a lot of great feedback from my wife and my daughters on everything I do. Every time I give a speech, my wife always—you know, for the most part—tells me the good part. One night in Chicago, I gave a talk to a group of our marketing people and I sat down and she said, "Boy, you stunk tonight!" [laughter] So always good feedback, sometimes more frank than I liked, but I knew I could count on her to help me in whatever endeavor we did, and we kind of did it together. She's probably the world's number-one tennis fan, and she's done a great job. She's on the board and the chairman of the museum of the International Tennis Hall of Fame in Newport. She's totally renovated that—we've always kind of tried to carve out a couple of things like that—and the Delaware Art Museum, where she has great skills and great interest, so that I could be supportive of her. So it's been kind of a mutual thing, but obviously I've benefited more than they have. Also, my wife got to travel a great deal and see parts of the world, and she has a mosaic in our game room of her playing tennis in maybe thirty countries with different people, friends and strangers that she met, who don't stay strangers long, who she communicates with. So we try to make it a really fun thing for the family, and for the most part it's been, except she'll tell you that the 1991 to 1994 period was pretty miserable for the family, as well, as we were reducing people and facing really tough times. But for the most part, I think all of them would say it's been great fun and we tried to make it a family affair where we could.

TRAYNHAM: Right at the outset of this interview, you remarked that as a high-school student you had always enjoyed reading accounts of successful people. I want to thank you, on behalf of Chemical Heritage Foundation, for adding a story that maybe some other high-school student will read and be inspired. [laughter] Thank you very much.

WOOLARD: Well, if just one person did that, it would be worth it.

TRAYNHAM: Thank you.

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