

CHEMICAL HERITAGE FOUNDATION

CLAIRE K. SCHULTZ

Transcript of an Interview  
Conducted by

Robert V. Williams

at

Line Lexington, Pennsylvania

on

9 July 1997

(With Subsequent Corrections and Additions)

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CLAIRE K. SCHULTZ

1924 Born in Etters, Pennsylvania on November 17

Education

1944 B.S., chemistry and biology, minor in mathematics, Juniata College  
1952 M.S., library science, Drexel University

Professional Experience

1946-1948 Wistar Institute of Anatomy and Biology  
Research Associate

1949-1957 Merck Sharp & Dohme Research Laboratories  
Librarian

1958-1961 Sperry Rand Univac Corporation  
Senior Systems Analyst

1961-1970 Institute for the Advancement of Medical Communication  
Research Scientist

1961-1970 Drexel University  
Associate Professor of Information Science

1970-1972 Freelance Consultant

1973-1982 Medical College of Pennsylvania  
Professor of Information Science and Director of Libraries

Honors

1980 Award of Merit, American Society for Information Science

## ABSTRACT

Claire K. Schultz begins the interview by discussing her childhood in south central Pennsylvania. Raised primarily by her father and grandmother, Schultz dreamed of becoming a doctor from a young age. Inspired by her grandmother's belief in her abilities, Schultz graduated from Juniata College in three years, and went on to medical school after a year of work in the Philadelphia State Hospital. Forced to leave medical school by the birth of her first child, Schultz went on to a job as a research assistant at the Wistar Institute of Anatomy and Biology, and then to Merck Sharp & Dohme [MSD], where she held her first position in a library. Schultz's interest in information retrieval began at Merck Sharp & Dohme Research Laboratory, where she met Calvin Mooers. After talking to Mooers about his ideas regarding information retrieval, Schultz joined forces with Robert Ford, of MSD's Pharmacology Lab, and began a campaign to get an IBM 101 system at Merck Sharp & Dohme. Schultz wrote her master's thesis at Drexel University in Library Science on the MSD library system. While working at MSD, Schultz met John Mauchly, Eugene Garfield, and Peter Luhn. As one of the pioneer documentalists, Schultz worked at Sperry Rand Univac Corporation, and later at the Institute for the Advancement of Medical Communication, and taught various courses on information science at Drexel University and at the Medical College of Pennsylvania. Schultz closes her interview with anecdotes about her post-retirement hobbies, and her work as a computer consultant in a local elementary school.

## INTERVIEWER

Robert V. Williams is a professor of library and information science at the University of South Carolina. He holds a Ph.D. in library and information studies from the University of Wisconsin, Madison; an MS in library and information science from Florida State University; and an MA in history from New York University. Before joining the University of South Carolina in 1978, he was an archivist and information services manager for the Ford Foundation, and the Georgia Department of Archives and History. Williams has also been an information consultant for various organizations including Appalachian Council of Governments of Greenville, South Carolina and Pontifical Catholic University Madre y Maestra, Dominican Republic. He came to the Chemical Heritage Foundation as the Eugene Garfield Fellow in the History of Scientific Information in 1997. He is a member of the South Carolina Historical Records Advisory Board, the American Library Association (ALA), and the American Society for Information Science (ASIS), where he served as chair of ASIS History and Foundations of Information Science Special Interest Group in 1994-1995. Williams is also a member of the Special Libraries Association (SLA) and Chair of the SLA Membership Committee. Williams has numerous publications on the historical role of information science.

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INTERVIEWER: Robert V. Williams  
LOCATION: Line Lexington, Pennsylvania  
DATE: 9 July 1997

WILLIAMS: Mrs. Schultz, let's start at the beginning. I have that you were born November 17, 1924 in Etters, PA.

SCHULTZ: That's right.

WILLIAMS: I don't have any information about your family background. Tell me about growing up, who your folks were, that kind of thing.

SCHULTZ: Etters, PA is in York County—in Pennsylvania Dutch country. My grandmother, on my father's side, was from a Pennsylvania Dutch family named Bamberger. She was a lovely woman who bore fifteen children and reared two older children from her husband's former marriage. She was very understanding, hard working, and kind. My grandfather—my maiden name was Kelly—was an Irishman whose parents came to the United States during the potato famine. My grandparents were poor, but they had a farm that was large enough to grow their food. There were not enough clothes for all of the children to go to school on the same day, so they took turns going to school. Those at home helped with the chores. Almost none of the children got a full elementary school education, but they, like my grandfather, were quite intelligent. They learned to help one another—for life. It was a close-knit family.

My mother's maiden name was Ross; her parents were a mix of German and French. She was one of five children; her mother died during childbirth when mother was four years old. Her father reared the children the best he could, in a little town called Goldsboro, just a few miles from the Kelly farm. Grandpa Ross painted houses, was a handyman, and later cooked for a boys' camp, located on an island in the Susquehanna River—now called Three-Mile Island. Mother apparently suffered from lack of an affectionate upbringing; she began to have emotional problems early in life.

WILLIAMS: They were from Ireland?

SCHULTZ: My grandfather Kelly's family. Grandpa was a very handsome and witty man, who unfortunately was also an alcoholic. He sold sewing machines when I first became aware of what he did. He was good at it because of his gift of gab; but most of his income went for alcohol. Grandma took his illness in stride and depended on the older children to keep things going at home.

Another note about my mother: she finished elementary school and later went to business school. She got a job as a court stenographer, and also won the speed-typing contest

for the State of Pennsylvania, at about age seventeen. She was fast when she recorded court testimony, so was on her way to a career. Then she met my father, just as he was returning from fighting in World War I. They were married, and she moved to the Kelly farm, where I was born—nine and one-half months later. Mother always blamed me for “ruining” her career. She did not want me—our relationship got off to a bad start.

WILLIAMS: How old was she when you were born?

SCHULTZ: She turned nineteen three days after I was born. Grandma Kelly took care of me while Mother and Daddy lived on the farm—for about two years. Then Daddy built a gas station and auto repair garage with a house attached on the main road between Harrisburg and York. He thought he would sell cars in his spare time (he was a fireman on the Pennsylvania Railroad) and give mother responsibility for the gas station, so she could go back to having a “job.” Mother liked that, and soon had him build a refreshment stand, as well, so she could stay busy all day and not even think about housework. Grandma Kelly, who lived about ten miles away, continued to keep me at her house a lot of the time. She and I had a wonderful relationship.

Our lives got disrupted when Mother decided, when I was eight years old, that she needed a change. She said she had serious back and neck pain and was becoming paralyzed, so she need to go to the famous Mayo Clinic to be treated. She made such a fuss that Daddy let her have her way. She used her train pass and went to Minnesota, but the doctors at the Mayo Clinic said they could find nothing wrong with her and sent her home. Then she wanted to go to Johns Hopkins Hospital. Daddy took her to Baltimore, but Johns Hopkins did not find anything wrong with her, either. By that time, she claimed to be completely paralyzed from her neck down, so Daddy had her transferred to a York hospital, where she stayed until I was eleven, and all of Daddy’s money was used up. Then, no hospital would take her. She had to come home. Daddy was away on freight trains, often for three days at a time. All of us children were in school now (at first my brother had to go to a baby-sitter), so mother was home alone most days. She decided that lying in bed with no one to wait on her was unacceptable. It was time for a miracle. She got up and walked!

WILLIAMS: After she was in the hospital for three years? And she was not walking during that time?

SCHULTZ: According to her. Of course, anyone who knows anything about physiology knows that her muscles would have atrophied if she had not used them, and she could not have walked suddenly. But, she had it her way. It was a miracle. However, she said she was still going to have to take it easy, and I was to continue taking care of the younger children, doing the housework, caring for the livestock, and pumping gas. She needed to stay in a rocking chair and read or do crossword puzzles.

WILLIAMS: How did your father feel about all this? Weren’t you too young, and too busy going to school to take on so much responsibility?

SCHULTZ: I guess Daddy was like Grandma Kelly. He just accepted his spouse's peculiarities as his lot in life. He was a kind man who wanted to keep his family together—he really loved his kids. Sure, I was too young, especially at age eight when she went away. I tended the chickens and pigs, fixed our breakfast and lunch, and walked two miles to the schoolhouse with the other kids, having banked the coal stove so the house would be warm when we came home. Back home in the afternoon, I tended the livestock again, got in buckets of coal and buckets of water from the creek, pumped gas for anyone who happened to stop at the pumps, made supper, and did the housework, making sure we did our school homework before going to bed.

WILLIAMS: What was your father's education?

SCHULTZ: Daddy finished just fourth grade. Being one of the older children, he then took responsibility for much of the farming and other things with which Grandma needed help. His brothers and sisters called him "good old Joe" —his name was Joseph—and then added, "he's got a heart of gold" or "he'd give you the shirt off of his back." He got his job on the railroad by lying about his age; he was only fourteen. He financed one of his younger brothers through dental school and helped other brothers start their businesses. He helped his sisters, his neighbors, anyone he knew who had a problem. When Mother was depressed, she would cry about his sharing his assets with anyone who needed something, saying he thought more of them than of her.

Daddy did not like it that I had to work so hard. He helped me as much as possible. I remember that he always wanted to be home when I did laundry because clothes wringers in those days were dangerous for a kid to use—it was easy to get your hands crushed. We learned to cooperate about everything, and had an especially good relationship. Mother resented that, too. She would fuss at me and say, "Oh, you think you can wrap your father around your little finger."

Two years after mother came home from the hospital, when I was thirteen, Daddy bought us a thirty-three acre farm on the other side of Harrisburg, in Linglestown, PA.

WILLIAMS: Why did you all move from the York area to Harrisburg? That's quite a move.

SCHULTZ: Yes, in a way it was. After my brother was born, our house did not have enough bedrooms, and Wayde was getting too old to sleep in the same room with his sisters. Mother felt demeaned by having to live behind the garage. Daddy liked farms and wanted to own one. There were a lot of reasons.

After we moved to Linglestown, I went on taking care of livestock—milking and putting the cow out to pasture before I got ready for school, and catching the school bus at 7:00 a.m. I did the milking after school, too, so was not able to play any sports, or belong to any clubs that met after school. Mother would not even let me attend a football game on Saturday afternoons, saying that games were frivolous, and I was needed at home. According to her religious beliefs, it was a "sin" to learn to dance or play cards, wear make-up, or go to movies, so you can guess how popular I was in high school. That, plus my crummy clothes, made from feed sacks and washed with home-made lye soap that faded them, made me pretty unattractive to girls as well as boys. I was also the youngest person in my class. I would have been a complete outcast if

my grades had not been high. Some kids wanted to be allowed to copy my homework, so were friendly toward me.

The summer I was fifteen, my ten-year-old brother told me he would do my farm chores if I wanted to accept an offer I had from a local lawyer's family to come be governess for their six-year-old daughter. The school principal had recommended me. I wanted to try it because I wanted so much to get away from Mother, and I wanted to earn money toward starting to college.

WILLIAMS: You mentioned once that you wanted to be a doctor?

SCHULTZ: Oh, yes. Grandma was counting on it. She had told me when I was two or three years old that girls could do anything boys could do. From that time on I had always said I would be a doctor. Daddy and I were not in agreement about my wanting to go to college because he was of the opinion that girls got married, raised a family, and did not need advanced education. That is why I thought I would have to earn my way through college.

My summer with the lawyer's family [the Millers] took an unexpected turn. I got on well with their little girl, but found looking after her kind of boring—except that there was a lot of entertaining of prominent guests going on, and I was allowed to help a little with that. For one thing, I got the bedrooms ready for whoever was sleeping over. Some of the guests left me big tips. Once, when the governor of Pennsylvania was going to be among the dinner guests, the chef who was hired for the occasion got falling-down-drunk before the meal was served. What to do? I had done a lot of cooking, so I took over in the kitchen. Mrs. Miller said she would oversee the serving of the food if I would carry the platters outside to the tables that had been set up for the purpose. Things went well, and she was pleased. Soon after that she asked me to be the family cook, and gave me a big raise. That made me anxious to go back to the Miller's the next summer, which I did.

WILLIAMS: That's quite an upbringing! How did you come to graduate from high school and later college, at such a young age? I take it you did well in school?

SCHULTZ: My elementary education was in a one-room schoolhouse that served all eight grades. I was five years old when I started, because my birthday fell before the end of the calendar year. School was very easy for me, so I spent a lot of my time during the first several years sitting on a bench between two rather slow boys, teaching them to read and spell. Each of the eight grades took turns convening on a bench in the front of the room when it was time for reading lessons, arithmetic, or whatever.

When I was in sixth grade my teacher asked if I would like to go to York and participate in the eighth-grade spelling bee. I was shy about it, but she encouraged me. I came in second against the eighth-graders with whom I competed—the word “syzygy” got me. My teacher was so pleased that she said I could skip seventh grade and be in eighth the next year. So, I finished eighth grade at age twelve. High school took the usual four years. I started college when I was still sixteen, completed college in three years by staying on campus throughout the summers, and graduated when I was nineteen.

WILLIAMS: Did your relationship with your mother improve over the years?

SCHULTZ: Mother stopped spending so much time crying, and interested herself in gardening. I did not spend much time at home after I went to the Millers' house at age fifteen. Mother was glad I was going to college. My absence made her less critical of me, but we were never chummy. Mother could not express affection for her children—only criticize them.

WILLIAMS: Is she still living?

SCHULTZ: Yes, she is ninety-one now. Daddy died in 1953 from heart problems. Mother got a job as a bookkeeper for a sales firm, and worked at it for about twenty years. When she was eighty-seven she had a serious stroke and lost her memory. She is in a nursing home near where my brother lives, in Carlisle, PA—he is a trustee of the nursing home and visits Mother regularly. She is being cared for very well, and seems quite content—she finally gets waited upon devotedly, and has achieved the status in life that she always wanted. She is being treated like a “lady.”

WILLIAMS: Now, let's go on to college. You started in the fall of 1941, at the age of sixteen?

SCHULTZ: Yes, after spending the summer working in the lawyer's home. I probably should mention that when I got to high school, as a country bumpkin I had no idea what it would be like. Someone, I guess the principal, came to our homeroom the first day and asked who wanted to take academic courses, rather than “shop” or “home-ec.” I did not really understand what he was asking, but I put up my hand. It was a lucky happening, it lent direction to my life.

The other thing that made a huge difference was the interest my Latin teacher took in me, starting in ninth grade. She, Miss Wertz, had graduated from Juniata College. She appreciated my interest in learning Latin, and talked with me about what I wanted to do after high school. She learned about my home situation, and made a point, three years later, of arranging for a Juniata recruiter to come to our school to test a group of us. As a result, I won a full-tuition scholarship! She also spoke with administrators of the college and arranged that the president's secretary would be a volunteer “mom” to me—she'd let me come to her room after office hours and chat with her while we listened to classical music, to which she introduced me, or while we played a board game together. Like me, she got migraine headaches, so she said her room was always available as a “hideout” when a migraine kept me from doing other things. Miss Wertz was also able to arrange for me to be head waitress in the college dining room, earning free room and board the first year, on top of having my tuition paid.

So, you see, I had angels looking after me. I was convinced that I was meant to be a doctor. I signed up for chemistry, one of only two girls to do that, and for introductory anatomy. I took the maximum number of courses allowed.

WILLIAMS: All of your expenses were paid at Juniata for four years?

SCHULTZ: No, just my tuition. The first year I lived in the dorm and ate in the dining room, at no expense to me, but I intended to stay and take courses in the summers, too. That meant earning my living expenses over the summers. That first year I had helped out at parties at professors' homes and had taken care of professors' kids, to earn pocket money. Word of that got around. As a result, I was asked to interview at the home of my German professor, where a new baby was expected over the summer.

After the interview I had a new job! For the rest of my time at Juniata—three summers and two winters—I lived with that family [the Zassenhaus family]. They now had three small children, all of whom learned to speak German first. The grandparents, who spoke only German, came to dinner some days. So far, I had taken two semesters of classroom German from Dr. Z, so it was really hard to keep up with the conversation, until I had more practice.

Mrs. Z was a great mom. She took most of the responsibility for childcare, but I kept the house tidy and helped with dinner when I was not busy in the chemistry or biology labs during the late afternoons. I loved the kids and spent all of the time I could playing with them and learning to speak kid German as I went. I ate meals at the family table.

I got up at four o'clock each morning to do housework and laundry for several hours before the rest of the family got awake. That's how I earned my room and board for the rest of my time at Juniata.

WILLIAMS: Why did you take summer courses?

SCHULTZ: I did not want to go home, and I wanted to finish college as soon as possible, so I could go on to medical school. I was able to complete more than the necessary number of courses for both a chemistry and biology major, in three years. I graduated as a pre-med major August 1944. A special summer curriculum was possible because the male students were being drafted to fight in World War II. The unusually flexible course schedule gave some of them a chance to graduate before they left Juniata.

WILLIAMS: Oh, I see. So you graduated with a pre-med major, were now fluent in German, and had been financially responsible for yourself for three years—all this at age nineteen. How did you plan to pay for medical school?

SCHULTZ: There was another good development. Daddy was now very proud of my ability to accomplish the pre-med bit, so he offered to pay my med school tuition.

WILLIAMS: You were still on good terms with him? Did you see your father while you were at Juniata?

SCHULTZ: Oh, yes. Because he was a railroader, I had a free train pass to go home for visits whenever I wanted. I went home about once a month, for a weekend, so we were never out of touch. Mother still found lots of fault with me, but Daddy and I were as we always had been—with him bragging to friends and the family about what a good girl I was.

WILLIAMS: What came next?

SCHULTZ: College went by so fast it is sort of a blur in my mind. Socially, I was still a misfit because I had no time to play—ever. There was a boy from home who had a crush on me, and he came to visit on a Saturday once in a while. He was in the Navy by the time I graduated. On one visit he bought me a diamond ring and asked me to wear it as a sign that I would wait for him to return from the Service. I wore it for a while and was glad to have it, to signal that I was not a complete social nerd. Before that, a boy at college had asked me to marry him, too, but he was irresponsible, so I never took him seriously. Whether and where I could get into medical school was, in my mind, a lot more important than marriage.

I decided to apply at Women's Medical College in Philadelphia, expecting that a women's school would be more likely to take me than a men's school, and Philadelphia was the nearest big city—not counting Pittsburgh. I had never been to Philadelphia, but some of Daddy's married sisters lived there, and Daddy's trains took him there some of the time, so I thought it might be a nice place to live.

WILLIAMS: When I read that you went to the Medical College of Pennsylvania, I thought that meant the University of Pennsylvania.

SCHULTZ: Many people confuse those names. Back then it was called Women's Medical College, so the schools were easier to distinguish.

Anyhow, I applied at Women's and got asked to come for an interview. The interview did not turn out well. The dean [Marion Faye] took one look at my paperwork and told me I was too young for medical school—no one my age had ever been admitted there. She suggested that I take a job, and when I matured, I should apply again. I felt devastated. It was too late to apply anywhere else that year.

Back at Juniata, when one of my professors heard the story, he told me he was a Quaker, and knew of a Quaker program in Philadelphia that I might want to consider. The program he had in mind was at Philadelphia State Hospital, also called "Byberry" because it was located on Byberry Road. The Quakers had started the program because, during the War, it was hard to find competent workers to take care of mental patients. For civilians who did not join the Service, jobs were plentiful for both women and men, and those jobs paid much more than Byberry paid. The Quaker program was to demonstrate how mental patients could and should be treated. The mentally ill were mistreated in hospitals throughout the United States at that time.

When I told Daddy about Byberry, he vetoed the idea, saying that I would probably spend my time emptying bed pans. But I investigated further. There were about thirty men and thirty women in the Friends Service Committee [Quaker] program, nearly all of them young college graduates. They were called attendants at Byberry. The women lived in a dormitory, the men in cottages. Meals were served without cost to those in the Quaker program in an employees' dining room. Women attendants got paid sixty dollars per month. The men got only twenty dollars per month because they were conscientious objectors, called "yellow bellies" by Byberry employees. They could not be paid more than a pittance for their "alternative service." The idea of working with a lot of young people, for a cause, appealed to

me. I signed up, and went to Byberry as soon as I finished my Juniata course work, early in the summer of 1944, returning to Juniata briefly at the end of August for graduation.

WILLIAMS: Did Byberry turn out well?

SCHULTZ: Yes. The best thing about it was that I met my husband [Wallace L. Schultz] there and we fell deeply in love. He was taking graduate courses at the University of Pennsylvania, working on his master's degree in English Literature. I registered for graduate work at Penn too, thinking that taking graduate chemistry and biology courses would look good on my next medical school application, and besides, I could ride back and forth to Penn on the same public transportation with Wally. It was more than an hour's ride each way, and was some of the best time we had to spend together—he worked night shift and I worked 2:00 p.m.-11:00 p.m., so the dining room was about the only other place where we saw each other, except on Sundays.

Actually, I enjoyed many aspects of being at Byberry, in spite of conditions. Our group of young women were splendid people—the best I have ever met. We all worked toward the goal of improving the lives of mental patients—comparing notes every day on how to solve particular problems. I was on the hydrotherapy ward alone after the day shift went off duty at 4:00 p.m.—alone with some thirty of the most violent women in the institution, some of whom were husky young teenagers. The reason they were on that ward was not for treatment, but to be kept in hot baths until they had no energy left, or to be bound up in wet sheets to keep them immobile.

Our Quaker group was dedicated, among other things, to integrating the care of black and white patients, and we succeeded to some extent. We were dedicated to non-violent treatment—we did not wear nightsticks, as did non-Quaker attendants. We tried to substitute proper care for habitual dosing with strong medications, given solely to knock out patients. I used the ward's hot and cold showers, on behalf of patients, just before bedtime. Hot showers calmed down the overactive, cold showers helped to lessen depression in others. Because my patients had a bowl of dinner thrown at them by worker patients at about 4:00 p.m., the patients were hungry by bedtime. I knew where the worker patients stored the large quantities of food they stole for themselves, so near to bedtime I went and got enough food to give my patients a sandwich and a glass of milk, to help them get settled without medication.

My night supervisor had a strong prejudice against “yellow bellies”, and extended her feelings to the women in the Quaker group. One evening she happened to make her inspection rounds just as I left my basement floor, by elevator, to go to the second floor where the food was stored. When I returned with food ten minutes later, she was waiting at the base of the elevator. She told me I was fired for leaving my patients unattended. She did not want any excuses. I could finish the shift, but I was not to come back tomorrow.

When she could not find anyone to replace me, she asked me to come back—calling me a stubborn Irishman and saying that from now on I could run the ward just as I had been doing. She now thought that I had been doing a good job.

I was proud that I had cut night-time medications more than 50 percent. Because I did not abuse patients, some patients had become much more cooperative and compliant when I was around. In the early afternoons, when I was not alone on the ward, I took some of the patients for a walk around the campus—the only exposure to fresh air and sunshine they got. Our hydrotherapy cellar was very dimly lit. Some evenings I could get patients to start singing

songs together, or look at magazines that I brought in. My doing that cut down on the amount of screaming, throwing things, and other misbehavior. It was very satisfying to have them act “civilized.”

I went back and worked a few more months after my run-in with the night supervisor, but after we were married in June 1945, my husband did not want me to be there anymore. I had been attacked a number of times during patients’ rages or when escape schemes were in progress, and I intercepted them. I had been there a full year, and now wanted to get ready for medical school. Yes! I had been accepted Women’s!

WILLIAMS: Medical school at last! But, first tell me—was your husband a Quaker?

SCHULTZ: No, but he was very seriously a peacenik. He’s unusually intelligent and compassionate. He never raises his voice to anyone—a Quaker by personality. After we took proper “instruction”, we were married by Quaker ceremony at the Byberry Friends Meeting located near the hospital. Almost everyone in our unit came to our noon-time wedding and the luncheon that the wives of the Meeting helped to serve on the lawn of the stately old Byberry meeting house.

About starting med school: Wally was still stationed at Byberry. So I moved into a nice old house in Germantown [a Philadelphia borough]—about a two-mile walk from my school—to be a companion to an elderly spinster [Miss Sherman]. She was still well, but she was afraid she might have a night-time heart attack and need help. My room was gratis, but I had to feed myself, using small gifts of money from my husband’s mother. I spent thirty cents per day for food. Milk was only fifteen cents a quart in those days. I bought soda crackers, cabbage or carrots with the other fifteen cents. Miss Sherman’s cook slipped me left-overs whenever she could. Daddy paid my tuition, as promised, but I did not want to ask for more than that.

WILLIAMS: So things were still not easy?

SCHULTZ: No, especially not the commuting on foot in cold, snowy weather, with only cardboard to cover the holes in the bottoms of my shoes. A few of my classmates lived nearby. We could get together to study in the evenings. Wally was welcome to come to visit me, even overnight, if both of us wanted to sleep in my one twin bed! [laughter]

Medical school was not fun. We were busy all day, cutting up our cadavers, and working in various labs when we were not having lectures. With one exception, our professors were women. Some of them had wanted to be physicians, but had not been accepted at any medical school, so they were pretty bitter—had the attitude that we had to really work to deserve the “gift” of a place in medical school. It was pretty general practice for them to give all of us poor grades throughout a semester, and then grade on the curve in the end—thus keeping us sweating between report cards.

WILLIAMS: How did the dean feel about your being married?

SCHULTZ: I did not say anything about being married. No one asked. As luck would have it, I got pregnant in October, not long after school started, and that was a problem. The birth would be after the end of the school year, so I decided to just carry on and see how things worked out.

Several months later I was chosen as a “guinea pig” for a fluoroscopic examination, to demonstrate the process of fluoroscopy. After a few minutes or so devoted to my head and upper torso, the professor shouted, “Miss Kelly, come out of there immediately.” I leaped out of the box and he said, “I thought I saw a head.” I said, “Yes, I am pregnant; I did not know I was doing anything harmful.” He asked if the dean knew I was pregnant, I replied that she had never asked. He said we would keep it our secret, but that I should be more careful of what I did from now on. After that incident, he always addressed me as “Miss Kelly, Mrs. Schultz.”

Of course, my classmates, from then on, knew that I was pregnant, but others did not. I wore a lab coat at school, and my muscles were still tight—I had always been athletic. When I was seven months pregnant, the women who headed the physiology lab chose several of us at random to give blood for a precipitation test, for instructional purposes. My blood did not behave normally, so one of the lab supervisors came to me and asked, “My dear, are you feeling well?” I told her I was, and soon she came back and said something was wrong with my test. Had I seen a doctor recently? I told her, “No, I’m in good health, but maybe you do not know that I am pregnant.” Just after that, the head of the department came and ordered me to go to the dean’s office—immediately.

WILLIAMS: They were shocked by your being pregnant, but did not want to talk with you about it?

SCHULTZ: Right. So, I went to the dean’s office and she was all aflutter. She said, “What is this I hear?” And I said, “I’m pregnant. I did not feel that I needed to report it because I come to school every day, my tuition is paid, and my grades are all right. I figured I could finish the year because the baby is not due until July.” She said, “No freshman has ever had the audacity to become pregnant! Do you know that women all over the world are waiting to get into this medical school? And here you are, taking this spot, without being sincere about wanting a career!” I said, “I am sincere. I want very much to be a doctor. I’ve paid my tuition, and I want to stay until the end of the year.” She replied that I couldn’t do that, and I said, “I don’t think there’s any way you can stop me.” She got furious, and dismissed me on that note. She was afraid—I mean, back then women were not litigious, but she expected that I was going to fight to stay. I did stay and took the final exams for the freshman year.

She took advantage of the fact that our grades were more or less a secret from us until we saw them on our report cards. She was professor of my biochemistry course, so just after that incident she came to me in the lab and said she wanted to examine my notebook—the book in which I recorded the results of my experiments.

She found no fault with my results, but said the book looked sloppy and I was to copy the entire book—neatly! That order ignored the fact that lab results are never to be changed. The act of copying them risked introduction of errors, but I complied. In the end, the report card I got, after I was in Florida, had a red “D” as my grade for her course. The card said the “D” meant that I had not failed the course, but was subject to re-examination. When I telephoned my response, I said I did not know why I had gotten the “D”, but I wanted to make an appointment for the re-exam. She replied that I did know why I got the “D”, and I was never to set foot on the campus again!

WILLIAMS: Why were you in Florida?

SCHULTZ: Oh! Wally's mother lived there, and she wanted to take care of me and the baby when he was born. Her husband, who had been City Manager of Winter Park for twenty years, died in March 1945—the year we got married—and she was all alone in a big house on the lake. The War had just ended and Wally, on discharge, was given a railroad ticket back to Florida. He gave the ticket to me and then he hitchhiked home. We were nearly penniless, but we planned to get jobs in Philadelphia before fall. My free, because I was a medical student, obstetrician in Philadelphia had arranged for me to have courtesy obstetrical care in Florida, too. Wally's wealthy uncle volunteered to pay the hospital bill.

WILLIAMS: So things were very pleasant that summer?

SCHULTZ: As far as personal comfort was concerned. But I felt as though my whole life until then had been a lie. Grandma Kelly had died, but I could not come to terms with being unable to fulfill my promise to her and myself that I was going to be a doctor. With a baby to care for, there was little chance that I could ever finish medical school, now. I did not really want to do anything else. One day I walked into the lake near the house, with the intention of drowning myself, with the baby in my arms. Once the water was up to my waist, I began to think that I might accidentally drown the baby and not myself. That I would spend the rest of my life in jail! I did not want that. So, I walked out of the lake—that was a sobering experience!

WILLIAMS: When did you and your husband go back to Philadelphia?

SCHULTZ: Wally went two weeks earlier than I. A friend had somehow arranged for us to get an apartment—a third floor walk-up on south Fourth Street, above a tailor shop. Apartments had been very hard to find during the War, so having to live on a street lined with push-cart vendors of fruits and vegetables, was not all that bad, except for the rats that roamed everywhere. Besides, the low rent and easy availability of day-to-day supplies, as well as easy accessibility of a trolley line, were all assets. Wally got a job immediately upon applying, to be a substitute teacher in the public school system. The problem with that was that the kids in South Philadelphia public schools were so rowdy and disinterested that they were not even entrusted with textbooks. Wally tried reading to them and dictating assignments, but to no avail. Being such a gentle person, he was quite ineffective and had to quit after only a few weeks.

Wally wanted to work on his doctorate, so had enrolled for the fall, having been given a scholarship to catalog Theodore Dreiser's papers, recently donated to the Penn Library.

When I got back to Philadelphia I immediately tried, but in vain, to find some way to have the baby cared for during the day, so I could get a job. Daddy came to see us in our new apartment. He said he wanted me to give the baby to him and Mother until I had a job, and got my life re-organized. After protesting, I decided that it was probably the best solution I was going to find, so Mother came and got the baby. After that, Wally and I had to hitchhike to Harrisburg on Saturdays, to spend the weekend with Gawain.

WILLIAMS: Did your mother take good care of him? His name was Gawain?

SCHULTZ: Mother seemed to be delighted to have him—she was pretty much at leisure, but was still a somewhat troubled woman, so I worried a little about how she would treat him. It turned out pretty well. Yes, Wally, the English Literature major, named him for Sir Gawain in King Arthur’s Court. His younger brother was named Gareth, and our third child, our daughter, was to have been Guinivere, but I nixed that. Babies number four and five fared better, ending up as Wallace II, and Peter. Gawain actually liked his name. Once, when he was six or seven, he asked me, “Where’s that book about me before I was born?”—meaning *The Knights of the Round Table*. His best friend never got his name straight—called him Garwin. In the Air Force, he became “Walter”—I had named him Walter Gawain, just in case he hated the Gawain bit, so outside the family he is now Walter.

WILLIAMS: So now you were looking for a job? What developed?

SCHULTZ: I got one immediately—at the Wistar Institute of Anatomy and Biology, which is affiliated with the University of Pennsylvania and located on its campus. My title was “Librarian” even though I had no library training. The Wistar library has an interesting history; it is the repository for some important scientific work, but at the time I was there the library was not being used very much. My work was pretty much that of accessioning new issues of journals, and putting them on the shelves. Anyone could have done it; it was boring. That prompted me to apply for a job in the director’s laboratory where pioneering research on human reproduction was being done.

The director [Dr. Edmond J. Farris] was helping childless couples to conceive. That meant studying the woman’s ovulation cycles and counting sperm in the man’s semen, to establish the couple’s degree of fertility. Sperm donors would be used if the woman, but not the man, was fertile. If the woman was shown to be infertile, nothing more was done. Both of Dr. Farris’ lab assistants were leaving to take other jobs. He was concerned that I would look too young (I was twenty-one now) to be talking with men about their sex lives, and dealing with the ins and outs of the donation program, but after I promised to always wear a lab coat, and reminded him that I was a mom, he consented to try me out. I would have to be very accurate at counting fast-moving sperm under the microscope! I was. I got the job of both assistants, for the pay of one, after he saw that I could handle the testing of both men and women. The job was fascinating and I stayed for several years, learning how to collect and test semen from rats, chickens, snakes, horses, and dogs, as well as humans. Our lab was loaned one of the first phase microscopes, to enhance our studies. We had an excellent microphotographer working with us to record our findings as we studied different species. I got another kind of good experience by helping to prepare a new edition of Dr. Farris’ book: *The Rat in Laboratory Investigation* (1). Also, I used the library’s files to dig out data to ghost-write chapters for a book on the opossum—I forget what it was called.

Once, when Dr. Farris was away, and I was in charge of the lab, I took it upon myself to centrifuge the semen of a somewhat infertile man—to concentrate it, after I had injected his wife’s urine into immature rats and found that she was ovulating that day. The couple had been treated for months; this time she got pregnant. When the boss got back and learned what I had done he was very disturbed. What if the centrifuging had deformed the sperm and the baby should turn out to be a monster? I figuratively held my breath for nine months—in the end he

was born healthy and looked a lot like his father. Another woman, one who had a double uterus, was inseminated that same day. Her tummy swelled on both sides and she had twins. It really was a fascinating job, but the raises in pay that I got were not enough to support us. I was having our second child in 1948.

Wally's mother and also our first son, now sixteen months old, were coming to live with us. We needed a bigger and better apartment. We found one near the University. Wally managed to get a teaching job at Harcum Junior College, on Philadelphia's "Main Line" to help support the move. The best-paying new job I could find was at Sharp & Dohme, in the suburban town of Glenolden, to which I would have to commute by train. I was to be a librarian again, and there was still a problem with my age. I was twenty-three now. The older woman who had been the Sharp & Dohme librarian was being pushed aside. She had only clerical training, but she was familiar with the collection and her own procedures. It was going to be hard to have her still working there, along with a couple of other library assistants. Supervising that unhappy person was going to take maturity! I got the job in spite of competing with older candidates who had library training. My scientific training, and the fact that I had had the title "librarian" at Wistar both helped me.

WILLIAMS: So now you are at Sharp & Dohme, not yet Merck Sharp & Dohme [MSD]?

SCHULTZ: No, the merger was four years away. Sharp & Dohme was known primarily for its biologicals. Merck, of course, was a large chemical company with branches both in the USA and abroad. Drugs were only one of its products.

WILLIAMS: How large was the Sharp & Dohme Library?

SCHULTZ: Pretty small, but growing. I don't remember the number of volumes. As you would expect, most of the volumes consisted of bound journals, and commercial indexes to the journals, like *Index Medicus* and *Chemical Abstracts*, and *Biological Abstracts*. Mel, the "older woman" and I tried to get along, but it was an impossible situation. Within a year or so, she left, and I was able to hire a trained reference librarian to take her place.

I had started library school at Drexel, in their program for working librarians on evenings and weekends so I could feel more professional. Things perked along pleasantly, as I learned what being a librarian was all about, and then plans developed for the plant to move to West Point, PA, about twenty-five miles north of Philadelphia. Just after that came talk about the merger with Merck. I got to confer with the architect about what our new research building should have in the way of library space and equipment, but he had ideas of his own and did not pay much attention to me. We ended up with much more space than at Glenolden, and a good location, just inside the main entrance of our new research building—a pretty nice library.

WILLIAMS: When did you move there?

SCHULTZ: We moved in 1952. The merger with Merck took place at about the same time.

WILLIAMS: Did you start to experiment with punch cards before or after the move? I believe you began a relationship with Calvin Mooers while Sharp & Dohme was still in Glenolden?

SCHULTZ: Yes. I met Calvin Mooers through Dr. Verwey, head of our Bacteriology Department, soon after I arrived at Sharp & Dohme in 1949. Dr. Verwey was interested in how I would improve library services to individual scientists. He, and other department heads, had been struggling with the problem of keeping up to date with the literature, given its rate of growth and that the commercial indexes were falling progressively behind what was being published.

Calvin Mooers was selling the Zator system, which consisted of a small machine for setting up sorting patterns, to be used with a set of five inch by eight inch reference cards. The top and bottom margins of the cards were to be punched to denote attributes of a document, like authors, subjects, dates or whatever. A citation of the document was recorded on the body of the card, along with its indexing terms and their code numbers. Mooers advocated using a combination of four different random numbers to stand for each indexing term.

Dr. Verwey wanted to try Mooers' system in his lab, and thought I might also try it in the library. While Mooers was visiting him Dr. Verwey sent Mooers to the library to chat. Mooers was very dedicated to his mission—he spoke methodically, in great detail. At quitting time he was nowhere near to being finished with what he wanted to say. I needed to get home, so asked Mooers if he would like to come with me. He came, but he was put off by our children. And, Wally's mother had prepared hamburger and rice, wrapped in cabbage leaves, for supper. He said he hated the smell of cooked cabbage. We sat down at the table and my gracious mother-in-law found other food for Calvin while he continued to talk about the Zator system. Wally's mother said she would take care of the dishes and the children, so Wally and Calvin and I moved to the living room to continue talking. By now, Calvin had made it obvious that he was recording, on paper, what he was discussing with us, specifying the time of day as he wrote. He said this record was so he would have evidence of what he had disclosed to us. He was applying for a patent on his "idea."

Time kept passing. About eleven o'clock it was obvious that Calvin should depart. I could not offer him overnight hospitality, we had no guest room, so he went to the hotel that happened to be next to our apartment house, and was able to get a room.

WILLIAMS: He took down notes on all of the conversation?

SCHULTZ: He was taking notes on what each of us was saying, which struck me (and Wally) as odd behavior. We were shaking our heads after he left, but I was struck by the value of some of what he had said, and thought I would like to try his ideas.

WILLIAMS: You bought a Zator system?

SCHULTZ: Not right away. I experimented with Calvin's ideas about compiling a subject "dictionary," as he called it—to capture the terminology used by Sharp & Dohme scientists when they asked questions, and by the journals we were trying to index—language that the commercial indexes may or may not use. No single index contained all of the terminology

needed, because Sharp & Dohme's interests spanned parts of biology, chemistry, medicine, veterinary medicine, and so on. Then I experimented with using random numbers to code the terms in the dictionary. The mechanics of searching a huge number of cards in order to answer a reference question stuck in my throat. Among other things, it would take too long to do a search.

WILLIAMS: So what developed?

SCHULTZ: There was someone [Robert Ford] in the pharmacology lab, with whom I had been discussing the problems he had when keeping track of all of the compounds his lab tested, and documenting the results. I told him about Mooers' system and he listened with interest. We continued informal discussions in which we compared the library's indexing needs with the pharmacology lab's needs, and decided our problems were pretty similar. Bob had been in Army Ordinance during World War II and knew about the military's use of punched cards. He knew a lot about coding systems, too. He experimented with Mooers' ideas, and one morning came in all excited about an encounter he had had while playing bridge the evening before. The man he met was selling Remington Rand sorters, and had described the "logic bridge" the machine contained, which allowed for entering codes and using "and, or, and not" connectives among the codes being searched. We immediately agreed that we should try to use machine-sorted cards, *a la* Rem Rand. We succeeded in renting the machine, and placing it in the library where both of us could experiment with searching techniques. It did what we wanted, but being mechanical, it often was out of order, and that was discouraging, especially when we wanted to stage a demo for someone.

WILLIAMS: You could not use an IBM machine?

SCHULTZ: Not the IBM sorter, it had no Boolean capability. It was a little while later that we first heard about the IBM 101 and began to investigate it.

WILLIAMS: Through Pete [H. Peter] Luhn? He was working with [J. Malcom] Dyson and [James W.] Perry on chemical searching, wasn't he? You no doubt knew about that work (1)?

SCHULTZ: We were following what Dyson and Perry were doing, through the Chemical Literature Division of the American Chemical Society, and through *Chemical and Engineering News*. According to my book about Pete Luhn (2), I did not meet Pete until 1953, and that was at a Special Libraries Convention. Pete had been working with Dyson, using the Luhn scanner, a machine he invented just for the purpose.

WILLIAMS: How did your interest in the 101 progress?

SCHULTZ: Well, the only 101 that IBM had installed, so far, was at the Census Bureau, to help to conduct the 1950 census. Through our local inquiries, word reached an IBM vice-president that we wanted to know about the equipment. He invited us to the IBM development center in Poughkeepsie, to meet the inventor and tell him how we wanted to use it. The inventor was a

little surprised by our need for “and, or, and not” connectives, and said the 101 was not meant to do that. We were not discouraged because Bob felt sure he could construct an attachment for the machine that would make it do what we wanted. We got a chance to take some IBM punched cards to a demonstration of the machine in Philadelphia a little later, and proved to our own satisfaction that it would sort the way we wanted. Bob’s proposed attachment was for cutting down on the amount of manual wiring that needed to be done before starting each search.

I began working on my administrators to allow the library to rent a 101. Bob’s Department Head [Karl Beyer] liked our ideas and said he would put up some of the rent money—it cost about three hundred dollars per month.

WILLIAMS: That was a lot of money at that time.

SCHULTZ: I made up an argument that the 101 would do more work for the library than two professional searchers could do in the same amount of time, and it would cost less than the least-paid clerk. [laughter] The story was bought, and we got the 101! We could have the basic program, for searching for up to four indexing terms at one time, in the wiring board that came with the machine. With Bob’s attachment superimposed, we could just dial in the code numbers to search for answers to any particular question.

Bob and I were both very proud of our joint work and I decided to write a description of the library’s system as my thesis topic for Drexel. However the dean of the Library School (I have seldom gotten on well with deans) said the topic was not thesis material, and I should forget it. There was one teacher on the Drexel faculty who saw merit in it, and told the dean that I should be allowed to use the topic.

WILLIAMS: Who was this?

SCHULTZ: Margaret Kehl.

WILLIAMS: This interest in the punched cards began from your reading and knowing about Calvin Mooers’ Zator system. You played with a group of his cards, trying them for some of your information retrieval questions—search questions—and were only moderately successful. You say the Zator system was too cumbersome and too slow for the thousands of references you wanted to index each year. How many was that?

SCHULTZ: I think we projected that it would be about twenty thousand references per year. We were doing more like one thousand per month at the time—with two people perusing the journals and doing the indexing as only part of their daily work

WILLIAMS: You were doing the published literature, not internal reports?

SCHULTZ: I wasn't doing internal reports. Bob Ford was. So both kinds of literature had to be accommodated by our system. We were using the same subject dictionary. Bob coded chemical names in a separate field on his cards. Then I decided the library should code chemical names, too. We used the National Research Council's Chemical-Biological Coordination Center method of coding.

WILLIAMS: Ninety percent of this was chemical or pharmacological stuff?

SCHULTZ: Bob's pharmacology cards were filed separately from the library's cards—his were all concerned with pharmacological tests on chemical compounds. The cards for articles in the journal literature covered the gamut of Sharp & Dohme interests, including each of the basic sciences and medicine, including veterinary medicine.

WILLIAMS: About making that switch from the experimental Zator system to the Remington Rand system; the two of you made this decision, you and Robert Ford?

SCHULTZ: Right. But, of course we had to get approval from our administrators. The Remington Rand system would, in effect, be a more-mechanized version of the Zator system. When he learned of it, Calvin Mooers sent me a letter threatening to sue me for stealing his ideas. He was still waiting for his patent to issue. Our patent department told me not to worry about what he said—that one could not patent ideas, only applications of ideas. Mine was a new application. Mooers never got a patent for his system, only for his sorting equipment.

WILLIAMS: How big was your Remington Rand system?

SCHULTZ: I don't remember. We did not have the Remington Rand equipment for more than a year, so it was only a few thousand cards. We converted the ninety-column Rem Rand cards to eighty-column IBM cards and continued from then on with IBM cards, creating something like twenty thousand cards per year.

WILLIAMS: And when did you make the switch from Remington Rand to IBM?

SCHULTZ: I guess it was in 1951—I would have to check that. By the time I wrote my thesis in 1952 we had had a year or so of experience with searching by means of the 101.

WILLIAMS: Was the difference in the capability of the Remington Rand and IBM 101 systems considerable?

SCHULTZ: The IBM machine was faster and, with the dial-up control board in place, feeding codes into it was easier. With the 101, more versatile searching could be done. Yes, I would say the 101 was considerably better for our purposes—especially since it seemed never to break down.

WILLIAMS: Whereas the Remington Rand machine did?

SCHULTZ: Yes. Almost every day there would be times when it did not work. We'd have to coax it back into action.

WILLIAMS: Now, use of the 101 led to John W. Mauchly coming to see you?

SCHULTZ: Yes. That's kind of a funny story. Various industries were interested in what we were doing at Sharp & Dohme. They were sending emissaries to look at the system and see if they could use it at their companies. Outstanding among them was Procter and Gamble who sent their librarian, Elsie Schulz, to visit many times and attempt to copy our system. DuPont and Penn, people were also especially interested. Someone from other companies visited almost every week.

WILLIAMS: How did the word get out? You had not published any articles yet, as I recall?

SCHULTZ: Not formally, but I could show you my file of presentations that I gave at library association meetings (4). I had gotten very active in national SLA [Special Libraries Association] and its Philadelphia Chapter. I gradually achieved recognition; I was elected Chairman of the Philadelphia Chapter of SLA while I was at Drexel, and then in 1954, became national Chairman of the Pharmaceutical Section. So I had contact with many pharmaceutical and chemical librarians. I knew Jim Perry, who visited Sharp & Dohme several times. As you may know, he was spreading the gospel of what is now called information retrieval as he traveled, and he had come to visit Bob and me a couple of times.

WILLIAMS: This must have been in what, the 1949 to 1951 or 1952 period?

SCHULTZ: Yes. And I belonged to the Chemical Literature Division of the ACS. I can't tell you for sure what year that started.

WILLIAMS: That was 1947 or 1948.

SCHULTZ: As you know, I have now given away my personal collection of correspondence and collected documents to the Charles Babbage Institute at the University of Minnesota, including indexes to them. Checking dates is hard for me. Besides, my age is a factor in remembering names and dates as I'm speaking with you.

There were dozens of people coming to look at our Sharp & Dohme system during the early 1950s. They represented primarily chemical and pharmaceutical companies that wanted to use punched cards (early computers, in some cases) to keep track of internal and external files, in ways tailored to their companies. It had been recognized that being first to get a product to

the market reaped better sales throughout a product's life, so companies were competing for better means of information look-up and dissemination even before "the information age" had been recognized.

WILLIAMS: Any idea why you did not meet Pete Luhn until 1953—especially since you were invited to Poughkeepsie to talk about the 101?

SCHULTZ: Pete had his office in Armonk, NY, where he was a favored "inventor"—he had obtained an impressive number of patents for IBM. He could pretty well pick and choose his projects, but his participation in information retrieval had not quite taken off—cooperation with Dyson had not had a thrilling outcome. No doubt, it triggered thought processes within Pete, but he had not begun attending "documentation" meetings of SLA, and the like—not yet.

WILLIAMS: Oh, this was not Armonk where you went?

SCHULTZ: No, it was Poughkeepsie. And, after that, we did our test of the 101 in Philadelphia. There was one IBM VP with whom I talked on the telephone who said our ideas for using the 101 would not work. Bob's response was that he was just a VP, what did he know?

Bob asked me to find out where IBM might be showing the machine in Philadelphia, or DC, or anywhere nearby, and we could take some sample cards to check out what it would do. That worked out well—the 101 was going to be shown at the sales office in Philadelphia the next week, so we went there and did our test, in 1950 or 1951. We were convinced, and they were convinced that the 101 would do the job.

WILLIAMS: Let's try to get the chronology straight. Had you read the article in *Chemical and Engineering News* about the Luhn Scanner?

SCHULTZ: After I began working at Sharp & Dohme in 1949, I looked at *C&E News* regularly—as did most of the researchers there. So, I had become aware of IBM's cooperation with Dyson and Perry, but that work centered just on nomenclature. I do not have dates firmly in mind.

WILLIAMS: Luhn's work was distinct from that on the 101?

SCHULTZ: Yes. Pete was not involved with the 101 when I met him in 1953 at a SLA meeting, he told me so. I had just given an informal afternoon talk about my Sharp & Dohme system, to members of the Pharmaceutical Section, and Pete had attended the talk. When I was ready to leave the room, Pete approached me and asked if I was free to have dinner with him. I was. We talked rapidly for about twenty minutes after we ordered dinner. It turned out that he had a plane to catch, so had to leave before we had finished the meal—he had already signed for the check. I was charmed by his excellent manners and by the knowledge exhibited in the

questions he put to me. We agreed to keep in touch, and for him to come visit my library, when he had a chance.

WILLIAMS: We started the Mauchly story—how he came to see you at Sharp & Dohme.

SCHULTZ: The way that came about was through a conference at Johns Hopkins University, which Gene [Eugene] Garfield arranged. Gene and I had met in 1950 or thereabouts, at local documentation meetings. He had been to visit me at Sharp & Dohme. Recently, in Baltimore, he had begun to use a 101, but quite differently from the way I was using it. So Gene and I had interests in common, and kept in touch. He urged me to come to the Hopkins meeting—he wanted as many “documentalists” as possible to get together and compare notes. He did not think many people would come, but about three hundred showed up, including John Mauchly. I had never met Dr. Mauchly but had read about him in the Philadelphia papers. Mauchly was asked during the afternoon session how long it would take the Sperry Rand Univac to search for the answer to a reference question, supposing that all of the documents in the Library of Congress were indexed and needed to be searched. He thought for a bit, and said maybe half a day—an astoundingly short time, given the number of documents at the Library of Congress. The answer sent the room abuzz.

The Conference included an evening session. I went to dinner with a group from Sun Oil Company, who by pre-arrangement, I had sat with on the train from Philadelphia. They paid me to consult with them about a retrieval system they wanted to build. They asked me to go to dinner with them so we could continue our conversation; there they plied me with drinks. I was not accustomed to drinking alcohol, so the three martinis I consumed had an effect—I was feeling convivial. I mention it because when we got back to the meeting, a little late, Ralph [R.] Shaw of Rapid Selector fame, Director of the Department of Agriculture Library, and emcee for the session, was introducing Mortimer Taube as speaker. I had never heard of Taube, but Ralph was describing him in glowing terms as a logician who had devised a marvelous new approach to information retrieval, the Uniterm system.

Being late, I got seated on a chair in the center aisle, near the projection equipment, because all of the room’s usual seating had been taken. I did not agree with a number of things Taube was saying, so after he finished, in my extraverted condition, I stood up and gave a short paper from the floor—pointing out the flaws I found in what he said, and explained how my system did those things better. As I finished, Ralph Shaw thanked me for participating but pointed out that my criticisms of Taube did not show proper respect for our speaker.

WILLIAMS: He said that to you at that time?

SCHULTZ: Right from the platform.

WILLIAMS: At the Welch Library Conference. Right?

SCHULTZ: Yes, this was at the evening conference. Dr. Mauchly was there. He witnessed the Taube incident, then got to his feet and defended my position, even though he had never met

me. I was embarrassed by my own behavior, and realized that Shaw might have good reason to take me to task. Mauchly's declaring that he thought I was right gave me a big boost.

WILLIAM: So that is where you met Mauchly?

SCHULTZ: We did not actually speak to one another there. At the end of the session our group (Sun Oil and I) went to the train station, for the return trip to Philadelphia. I declined an invitation to play bridge on the way home, and went to another car to sit by myself. Dr. Mauchly came into that same car and seemed to be looking for someone. He was looking for me! He asked if he might sit with me, and, of course, I was delighted. He was my hero!

Dr. Mauchly seemed really interested in learning more about the Sharp & Dohme system. We chatted animatedly for the couple of hours it took to get to the North Philadelphia Station—arriving about 2:00 a.m. It was raining. I had missed the last train from Philadelphia to Lansdale, so I would have to phone Wally to come pick me up. Dr. Mauchly had his car at the station, and knew by now where I lived—he lived just a few miles from me, so offered to take me home. We continued our conversation in the car, and were still going strong when we got to my house. Inviting him into the house was out of the question, at three in the morning, so the way we left things was that he would come to Merck Sharp & Dohme as soon as he could, to have a look at my system. He knew our Director of Research, and would try to visit with him, too.

WILLIAMS: Did he come?

SCHULTZ: Within a day or two. I remember asking if he would like to choose a search topic for the demonstration I was about to do. He immediately answered, "Anemia," and specified a particular hereditary anemia for which he would like to know the latest therapy. As I set up the search he asked me where I had learned Boolean algebra. I said I did not know what that was. He laughed and said, "Well, you are using it right now." He meant, of course, our manipulation of "and, or, and not" sets of connectives among search terms.

He did not tell me then, but later I learned that he chose that search because he suffered from hereditary anemia. His mother died of it, as did he, eventually. One of his daughters has it, too. He was favorably impressed by the way our system worked. He asked me right there in the search room whether I would come work for him. I told him I could not leave Merck Sharp & Dohme because this system was my "baby" and there would be no one else who could take it over—not yet. Besides, I said, I did not know a thing about computers. His reply was that he did not know much about retrieval. But, he thought the combination of our two kinds of knowledge was very desirable. So, would I let him know if I ever wanted to change jobs? I definitely made a note of that. Four years later that time came.

WILLIAMS: I'm surprised that you had never heard of Boolean logic. You and Robert Ford set this system up. Can you separate out who was responsible for what kinds of things?

SCHULTZ: To some extent. Bob deserves a lot of the credit for the workability of the system because he's the one who had the know-how to build the auxiliary panel—a Boolean logic board, if you will. He never called it Boolean logic, but he definitely understood it, functionally, as I did by then.

WILLIAMS: I'm still curious. You never heard the term "Boolean logic" while you were in your MLS program?

SCHULTZ: No. Library schools did not talk about such things. [laughter] Back at Juniata, where I minored in math, logic was not yet a topic in that curriculum, either. But Bob visited the library to talk with me often. His office was in the pharmacology lab where he was engrossed in keeping track of which chemicals were being studied, by what methods, and with what results. For his punched cards, specifying animals, their experimental disorders, their degrees and types of response, et cetera, was not hard. The big problem was chemical nomenclature. He had to identify nuances among compounds, in order to keep the records precise, and still speak the same language as other pharmacologists with whom he dealt. Chemical nomenclature was in ferment at the time. He and I followed the various approaches being suggested for standardization. Dyson, and also [William] Wiswesser, got our attention, but the system used by the Chemical-Biological Coordination Center in Washington was, to our way of thinking, the clearest and easiest to apply to our work. That is the one Bob used for coding his cards. After a while, I started to use it, too—in a card field separate from the field used for "descriptors" such as diseases, therapies, and so on. Using chemical nomenclature rather than trade names, sometimes made it easier to answer questions research people asked.

To sum it up, Bob and I kept our cards in the same set of cabinets, in the search room where the 101 was kept. He prepared information about internal testing of compounds, and did the searches on that subject. My staff and I developed the dictionary of subjects needed for indexing and searching the published literature. Bob used it too. He and I worked as a team from the time of considering Zator or McBee cards as our medium, through each of the phases of considering Rem Rand and IBM cards. We both chose random, superimposed coding. There was a lot of give and take between us; we were a team. Bob was a very nice, witty guy, not quite as social as I, in the sense of going to meetings, and traveling, or showing the system to visitors. He sort of stayed in the background. Sadly, only a few years after I left MSD, Bob died.

WILLIAMS: You said you had trouble getting the description of your work accepted as a thesis at Drexel.

SCHULTZ: Yes. I'll tell you that story. Margaret Kehl, who taught "special libraries" was an excellent teacher. I had courses from her and we got on well. When I was pregnant with my third child, Margaret came and substituted for me at Merck Sharp & Dohme. There was a company law that you had to take off two months before and two months after a child was born. During my forced absence, while Margaret took my place, she got familiar with our library, and she learned to like searching by machine.

WILLIAMS: She was still teaching special library management at Drexel?

SCHULTZ: Yes, my baby was born in July, so my leave-of-absence corresponded pretty well with summer vacation at Drexel. She was interested in our machine, thought it was terrific, but Dean McPherson was not convinced. I wrote the thesis. Until about a week before graduation I did not know whether I was graduating. [laughter] Miss Kehl prevailed. I graduated. A postscript is that my thesis circulated more often than any Drexel Library Science thesis ever had; so I thought the dean should feel like she did the right thing. [laughter]

WILLIAMS: Talk about Drexel a little bit in other areas. Did you find it useful? You already had six or seven years experience by this time.

SCHULTZ: Not to argue, but Sharp & Dohme was my first real library job. When I graduated in 1952 I had been a librarian for four years. When I started at Drexel in 1949 I was still green.

WILLIAMS: Your Drexel program was strictly part time?

SCHULTZ: Yes. Saturdays and late weekday afternoons. I had to miss some afternoon Sharp & Dohme hours to take courses, but not very many. I voluntarily made up whatever time I lost at the library. There were family matters to attend to when I got home, but I took library work home with me all of the same, working on it early in the morning before anyone else was up. The company had no quarrel with me about going to school.

WILLIAMS: Did you convince yourself you needed to get the MLS?

SCHULTZ: I thought it would give me a little more dignity and prestige in my job, but I did not think I was learning very much.

WILLIAMS: Oh really? You were not impressed with the program at that time?

SCHULTZ: Not very, no. I mean, enough that I was willing to send staff members to get an MLS, because of what it would do for them in terms of promotion, but not so much for what the learning would do for them on the job.

WILLIAMS: Was there much interest at Drexel in documentation, or just none at all?

SCHULTZ: Early on, I think Miss Kehl was the only staff person who knew how the word was being used.

WILLIAMS: Because her interest in special libraries crossed between the two?

SCHULTZ: Yes. Special librarians were the only kind of librarians who were interested at all in information retrieval at that time.

WILLIAMS: This was 1952. Talk about the life of a special librarian/documentalist. Which of these names did you identify with most readily?

SCHULTZ: I was refreshing my memory about this the other day when I was boning up for this interview. My title was “Librarian” the entire time I was with the company. Other staff titles were: Cataloger, Reference Librarian, Circulation Librarian, and so on. After the merger in 1952, there were several other librarians at Merck, one for each of its somewhat scattered libraries. Rahway, New Jersey was the central location of Merck. Since 1952, Merck Sharp & Dohme has gradually shifted its research activities to West Point, PA. My library was in West Point, about seven miles from my home, where we are talking now.

I would talk to my boss and various others in the company, about “documentation” stuff, but people other than Bob Ford and Dr. Verwey did not have much interest in listening. On one or two occasions I was asked a question at Monday morning Department Head meetings, which I attended about something new that one of the research staff had heard. And, I remember that Mort Taube arranged to visit at West Point one time, and talked to top administrators. He had an impact—he was good at communicating with executives.

One time, I guess in 1953 or 1954, my boss, Dr. Richard Barnes, introduced me to someone and said, “This is our documentalist.” I got a kick out of it because it signified that times were a-changin’. He must have thought it more complimentary than the term “librarian.” Special librarians at the time—I was active in the local SLA—divided themselves into two groups: the ones who were, and the ones who were not, interested in documentation.

Documentation was still looked on by librarians as suspect—they thought it was a lot of improvising. I joined the American Documentation Institute [ADI] as soon as individual membership became available. Gradually my interests made me more active in ADI than in SLA.

WILLIAMS: Even within the Special Libraries group, there were not many who considered themselves documentalists?

SCHULTZ: No. There was a certain amount of contempt expressed by the people who weren’t interested in this new-fangled stuff like punched cards. That was the atmosphere at the time.

WILLIAMS: Did you have a foot in both camps?

SCHULTZ: Sure. I mean, I considered myself part of the avant-garde. The Drexel staff were still pretty disdainful of documentation. Some faculty, like the children’s librarian, were just not interested. Things were developing, though. The new dean of Drexel was attending a local luncheon group that I also attended. A couple of times he sat opposite me at the lunch table. We’d yak about what was new, and he seemed interested in what I was doing at MSD. I told

him I thought Drexel ought to start teaching a course in documentation. He asked questions like, “What would we teach?” “Who would we get to teach it?”

WILLIAMS: This was a different dean?

SCHULTZ: Yes, this was a very different dean—one that I got along with. Probably the only one in my history! [laughter]

WILLIAMS: Guy Garrison?

SCHULTZ: No, Garrison came later, and we were incompatible. This was John Harvey. Eventually Dr. Harvey got to the point where he told me not to talk to him anymore about a course in documentation because the people I proposed to him as teachers had all turned him down. His ultimatum was, “Either say you will come teach, or don’t talk about it any more.”

WILLIAMS: This was in 1963?

SCHULTZ: No, it was in early 1962, because I succumbed and started my course called “Search Strategy,” a six-week course—all day, every weekday, in the summer of 1962. Twelve people from scattered places around the USA, signed up for it. I was president of ADI at the time, had all sorts of responsibilities, but I taught the course. As you know, teaching all day takes a lot out of you, and then you have to go home and read students’ papers, prepare for the next day, and all that. I put everything I had into the course, to show everyone, especially Dr. Harvey, what could be done. The students were unusually motivated, putting themselves into it with the same sort of vigor as I. Some had had to leave their jobs to take the course—they could not be away from their companies for six weeks and expect to go back. That was good enough reason to do everything I could for them, and it worked. One student who had retained his job, got a two thousand dollar raise for having taken the course. Others got new jobs at higher salaries, et cetera. I felt well-rewarded, and justified, for having pushed for the course.

Dr. Harvey was anxious to incorporate “Search Strategy” into the regular curriculum—asked if I could teach it on a once-a-week basis, in the evening, starting in the fall term. I contacted Dean Jesse Shera, of [Case] Western Reserve, about whether he thought it a good idea. Until then, Western Reserve was the only library school that had taught a documentation course. Jesse said, “Go right ahead—the more schools who do it, the better.”

WILLIAMS: The fall term of 1963? I’ve read that Drexel started its information science program in 1963.

SCHULTZ: It was the fall of 1962-63 that my course started. It was the only documentation course taught, and did not constitute a program. By the next year a full-time teacher, one of my students [Barbara Flood], was hired to teach an introductory documentation course or two.

WILLIAMS: Were you at the conferences at Georgia Tech where they talked about that?

SCHULTZ: Yes. Dr. Harvey and I went together to them.

WILLIAMS: I believe it was Robert Taylor who talks, in his little article (6) in 1976 about Drexel starting its information program in 1963. Was your course part of that?

SCHULTZ: Yes. I taught the three progressive parts of “Search Strategy” over all three quarters (fall, winter, spring) each year during the rest of the 1960s. A look at the Drexel catalog will confirm that.

WILLIAMS: What else was being taught, starting in 1963?

SCHULTZ: Now you’ve got me. I don’t remember what Barbara called her courses. Charles Davis appeared on the scene, early on, as did James Ramey, an administrator at our Institute for Advancement of Medical Communication. I don’t remember when other teachers were added, except that Belver Griffith, an established research person, came a couple of years after I started at Drexel, and helped me, for one semester, with the overload of students in my research course. I was at the school only one evening per week, in the beginning, and usually had a lot of non-Drexel things on my mind—like what was happening on my research grants, and with Medlars, on which I was consulting.

By the second year I was there, I took responsibility for counseling people in the master’s program who wanted to write their required theses on a subject other than the standard “library science” topics—the standard ones being about cookbooks, or children’s literature. Those interested in documentation were having a hard time getting their topics approved. Some had gotten approval by one professor, and then another rejected it—like the experience I had had. Students were upset, partially because it was taking so long to get their degree, and they kept having to pay a thesis fee until they graduated. I guess that was the year I counseled thirty different students, trying to help them “pare down” their topics to a manageable size, and follow textbook examples of how their proposals ought to be written, starting with a review of the literature, then a statement of their objective, then their proposed methodology, and all that. It was experience with those students that led me to design a ten-week course in how to do research, so students could get their proposals understood and accepted, and then meet the thesis requirement and graduate on a reasonable schedule.

WILLIAMS: This was in 1963-64?

SCHULTZ: I think so. I’m not sure of the dates. If I could consult my collection at Babbage Institute, I could answer your questions better. I gave still another Drexel dean [Katherine Oller] a folder of materials that detailed the beginnings of Drexel’s information science program, but I am told it got tossed. I thought the details of what was taught might have historical value, since information science was so new at library schools. However, the Drexel catalogs at least specify what courses were being taught each year. I don’t know if the history about some of what you are asking will ever be reconstructed.

WILLIAMS: You were not teaching full-time at Drexel?

SCHULTZ: No. Never. I just taught in the late afternoons or evenings. But, if you consider it full time duty to teach three courses the same trimester, and do thesis supervision, for a dozen or more students per year, then yes, I had a full load there. My day job was with the Institute for Advancement of Medical Communication [IAMC]. That consisted of doing research under government sponsorship, consulting for the National Library of Medicine [NLM], and many other things.

Of course I had a family of five children, too. My husband had to take my place at home—along with his mother, who was wonderful with the children. She lived with us from the beginning of 1948 until the summer of 1963, bless her. Then she went back to Florida. My work was so demanding that Wally gave up his not-very-lucrative jobs and devoted himself to maintaining our twelve-acre property and oversaw the children. He considered the latter mostly a chauffeuring job, because of their many after-school interests.

WILLIAMS: Let's go back to the early 1950s period again, to the special librarian versus documentalist, because this interests me. You probably heard the phrase that was used very condescendingly by some special librarians—that documentation was special library work done by amateurs. Do you remember that?

SCHULTZ: It was true that most of the people identified as documentalists had experience in the sciences, engineering, or administration, rather than in librarianship. But they weren't usually trying to do library work, just what corresponded to reference work.

WILLIAMS: Did the scientists say, "You librarians haven't been doing this right, or don't understand the subject matter."

SCHULTZ: No. It was more a case of not speaking to one another, partially because they did not speak the same language. Librarians were not stupid, their orientation was to do what they had been taught to do in library school—acquire materials, be good housekeepers, protect the property of the library. They provided the tools for gaining knowledge. They did not involve themselves in the activities of clients of the library.

The reason scientists thought differently was because they were aware of the changes in the research climate that World War II brought with it. The government was being generous with research funds, and companies had become aware that putting their own money into research had a pay-off. Each new scientific discovery was leading to more discoveries. The literature was growing at a tremendous rate. The indexes were not keeping up with the literature. Individual researchers needed a lot of help just to stay current with what other researchers in their field were doing. Companies needed to capitalize quickly on internal discoveries so they could hurry products onto the market, competitively. Whoever came out second with the same or a similar product had lost the game. The information age was starting. It was frenetic, and conventionally-trained librarians were still pretty complacent. Most special

librarians with a feel for what was happening were unable to find easy solutions to the problems that the developments showered on them.

Documentalists were typically scientifically-trained, not library-trained. They were interested primarily in how to stay up-to-date with the literature. They tried to justify solutions they proposed and perhaps “sell” them. As was to be expected, some documentalists’ ideas were better than others. The in-fighting was mostly between individual documentalists. Librarians were more-or-less on the sidelines, perhaps not understanding what was happening, perhaps disturbed by the noise the documentalists were making. Librarians tended to think that documentalists had a lack of understanding about what was “right”—as taught in library school.

WILLIAMS: You understood these things because you had a foot in both camps?

SCHULTZ: Understood is too kind a word. Maybe, sensed would be better? Because I had some background in the sciences, I was not as overwhelmed as I would have been if I had had just library school training.

WILLIAMS: What did all this do to you, personally and politically?

SCHULTZ: Since there was no pre-determined “right” way to go, it made me thumb my nose at people who did not approve of how I wanted to handle these problems. [laughter] I just went about doing my business because I thought it was the way to go.

WILLIAMS: But you seem to have gone to the ADI side more than to the SLA side. Is that true?

SCHULTZ: Yes, because SLA members, as a whole, were not nearly as interested in non-conventional techniques.

WILLIAMS: So you generally found very little reception of your ideas within SLA?

SCHULTZ: Well, I considered myself a missionary, and missionaries don’t always get well received, but I would give papers and I would get audiences, and people listened. They might not approve, but they’d come and listen because they didn’t want to miss out on developments altogether. That was the general attitude.

WILLIAMS: There was a considerable feeling within SLA against the documentalists. You are aware of the discussions about the two groups trying to merge. Where did you stand on those issues?

SCHULTZ: I heard about them mainly from Pete Luhn at IBM and Gene [Eugene] Jackson at General Motors, the two who were leading the campaign for a merger. Gene was a straddler of

the two factions, and a leader within SLA. Pete was not trained in librarianship, but he saw a lot in common between librarians and documentalists—thought they ought to be working together. Pete was very active within ADI, but was beginning to be weakened by leukemia. He asked me to join with him and Gene in pushing toward the merger, which seemed like it might come off. I began helping Pete with the newspaper he was planning. The two of us had the first issue almost ready when Pete died in early 1964. Following through, I saw to it that first issue, dedicated to Pete, was published, but it was the only issue to be published (7). The steam when out of the movement toward merger when Pete died.

WILLIAMS: I've seen the issue of the newspaper. You were in favor of the merger?

SCHULTZ: I could see that it would be useful for us to join forces rather than fight one another.

WILLIAMS: Within ADI, who was against the merger?

SCHULTZ: I don't remember that anybody was. Many were disinterested, but I don't think they were against it.

WILLIAMS: You felt the opposition was more within SLA?

SCHULTZ: Yes, there was opposition within SLA, but of course, some SLA members were members of ADI, too.

WILLIAMS: Right. I've looked at some numbers and 60 percent of the ADI members also belonged to SLA in about 1963, like you, about the time you were president of ADI. You belonged to both, I gather, for many years.

SCHULTZ: Right. I helped to plan that statistical study with one of my graduate students [Paul Garwig]. There was good reason to belong to both ADI and SLA. Interests and activities only partially overlapped.

WILLIAMS: But there were animosities, particularly from which side?

SCHULTZ: Well, from the less technical-minded SLA members. I don't remember any animosity within ADI. As I said, there might have been disinterest within ADI, but I don't think animosity, except most people thought it was coming down a notch to associate yourself, to identify, as a librarian. They did not want to do that.

WILLIAMS: Was that feeling strong within ADI? Did you have to defend librarians when you were within ADI?

SCHULTZ: If it ever came to that, I would have defended librarians, yes, but usually that was not a topic.

WILLIAMS: Not within ADI?

SCHULTZ: “We let the darn fools do what they want to do,” was the attitude of those who were not librarians. [laughter]

WILLIAMS: I have a personal interest in what we have just been discussing. I have a paper (8) coming out in a special issue of *JASIS* [*Journal of the American Society for Information Science*] about the relationship between special librarians and documentalists at that time.

SCHULTZ: I wish I had been more helpful in answering your questions. If I thought about it more, I could probably think of instances, of things that happened on both sides, but at the moment they are not on the top of my head.

WILLIAMS: Back to the 1953 meeting at Johns Hopkins. You say this was your first acquaintance with Mortimer Taube?

SCHULTZ: Yes, the first time I had heard of him, even.

WILLIAMS: You said you all were good friends, but did not agree with each other on much.

SCHULTZ: Well, I don't know that we were good friends, but we were good acquaintances. When he was first getting his company [Doc. Inc.] started, there were times when he had no money. Few people were aware of that because he dressed well, and gave expensive dinner parties at SLA meetings, for administrators who he wanted to interest in his Uniterm system. I remember that one time he did not know whether he would be able to get out of the hotel when it came time to pay the bill—he could not pay it immediately.

Most of the people he entertained were male, but every party needs to include a few women. [laughter] I was often invited, as a worker in the field, to mix with the other invitees and discuss with them what their documentation needs were. Being against Uniterms, I never recommended Taube's product, but I would report to Taube what I had learned about interesting goings on within the companies of those with whom I spoke. My payment was a good dinner and a chance to learn.

I called myself one of Taube's “party girls,” but not in the sense that the term is used now. If Taube sensed that anyone was coming on to me, he soon squelched it—he played the part of a father figure.

As a representative of Sperry Rand, I sometimes found myself at the same meetings as Taube; we were competitors, in that sense. One example was bidding on the National Library of Medicine project, another was at ASTIA [Armed Services Technical Information Agency]. Taube had gotten a foot in the door a couple of years before ASTIA thought of getting a computer. He established a Uniterm system for ASTIA. The dictionary had gotten so big it was completely unmanageable, but he would not say so, and no one else dared to say so in his presence or they'd really get ripped out. But he knew that it was not workable.

Sperry Rand got involved because ASTIA bought one of Sperry's newer computers about 1960, but had no idea how to use it. I became a liaison for Sperry Rand, and volunteered to help ASTIA with some of its developmental work—such as a new thesaurus. For a while, Taube's staff and I bumped heads, but pretty soon the Doc. Inc. staff disappeared from ASTIA. If you want, I'll tell you the ASTIA story later.

I was very sorry when Mort died in the early 1960s. I spoke at a memorial dinner held for him in Washington. His being part of our field added considerable flavor and verve to it.

WILLIAMS: So you were not a fan of the Uniterm approach?

SCHULTZ: No, I wasn't. I preached the other approach.

WILLIAMS: The unit record approach?

SCHULTZ: Yes, the unit record. It is all in the past now, so let's not re-argue the ins and outs. The speed of computers has changed the game radically. Now, we can search languages, natural or otherwise—search for either words or sentences, or indexing terms, or any combination of such elements, at high speeds and without human labor.

WILLIAMS: For Medlars you still went with the unit record approach?

SCHULTZ: So did everyone else on the team. Computers were still limited, compared to now. Pete's KWIC index, for example was a sprawling alphabetic monstrosity—you had to read the entire listing to be sure you were not missing anything. Taube's Uniterm proposal did not get accepted during the screening process at Medlars—they tossed it aside. All of the experienced people at NLM wanted the more natural descriptor approach to be used—descriptors corresponding to terms in the National Library's Subject Heading List.

WILLIAM: Before we talk specifically about Medlars could we talk about your association with Eugene Garfield. I believe you worked with him to get *Current Contents* started?

SCHULTZ: That was sort of a fluke, it stemmed from my leaving Merck Sharp & Dohme. I'll set the scene. I decided to leave MSD, because I was annoyed that I had been passed over for promotion at the beginning of 1956, when I was on another forced, no-pay maternity leave (our fourth child). The Merck sales department was playing odd man out and made a non-librarian,

non-administrator, out-of-favor salesman the Coordinator of all of the Merck libraries. He had no insight into library work. He would ask me to record my thoughts about a subject, then have my memos to him retyped and sent to his administrators under his name. I asked one of our VPs why I did not get the Coordinator job. The answer was that I was out on (forced) leave when they needed someone! The whole thing rankled me. When I found I was going to have our fifth child, I made up my mind to use my maternity benefits—to pay the hospital bill—and then leave the company.

I wrote to both Pete Luhn and John Mauchly the spring of 1957 and told them I was looking for another job, but not until the end of the year. The day Dr. Mauchly got my letter he called and said I was hired. I explained again that I was pregnant, so I should wait until the end of the year to change jobs. Mauchly's reply was that he was interested in my head, not my belly.

I went to Univac headquarters in Philadelphia on a hot July day, to meet Dr. Mauchly's staff. He showed me the inside of the main frame of the Univac and asked if I would care to step inside—it was the only air-conditioned spot in the building. We stood in that tiny space and talked for a while. By the time we came out I had specified one month as the time needed to switch jobs. You can tell that I really wanted to leave MSD. I still pass that building where Univac was, every time I go to the city by train—it's been abandoned for a long while—and I sometimes recall that interview and having to climb the steps to the seventh floor when I wanted to get to my office—taking the elevator was usually slower than climbing.

The day after the interview was a Friday. In the afternoon we had our weekly library staff meeting. I told my staff that I was planning to leave. The next Monday morning when I got to my office at 9:00 a.m. the Coordinator from Rahway was there. I expressed surprise. He told me he was there because he heard (I have no idea how) that I was leaving, and that I should notice that he had "fire in his eye." He said I had not gone through channels to report my resignation—I was fired! I told him I intended to resign through channels that very day—that my telling my staff was a mistake, but that I meant no disrespect—it had slipped out during conversation. He would have none of it. I was fired!

I went to the Director of Research (a VP) who I liked very much, and asked him what could be done. He said that I had been doing an excellent job for Merck Sharp & Dohme for seven years, and he did not want this kind of thing to happen. In the end, I was allowed to resign. But things got still more complex. A day or so after I started my job at Univac, I was called to the personnel office for an interview and to sign papers. They mentioned a company rule that no pregnant woman was allowed on the premises, starting with her fourth month. I was in my fourth month. Dr. Mauchly, who had the title Vice-President, said not to worry, he would get a special insurance policy on me through Lloyds of London. But Lloyds would not insure me. I was out of a job, and expected that I had lost my maternity benefits at MSD. The somewhat happy ending was that even though I would no longer be paid any salary by MSD, the company would consider me to be on pregnancy leave and let their policy cover my hospital bills. All I had to do now was find a way to support the family for the next six months!

That is where the liaison with Garfield came in. Wally was working at home on the Cardiovascular Indexing Project directed by Dr. Isaac Welt from Washington, DC. Wally can read five foreign languages, so was covering foreign journals for the project. Gene Garfield and Isaac were friends. Isaac happened to tell Gene that I was at home, pregnant, and had no job. Gene phoned to ask if I would come work with him, to start a table-of-contents service, much like the one I had set up at MSD. I declined saying that I thought he and I would fight like cats and dogs. He did not think so. Wouldn't I please give it a try?

WILLIAMS: Why did you think you would fight?

SCHULTZ: Oh, I had sometimes found his manners—his mannerisms—objectionable. Given my Puritan upbringing, sometimes he did things I thought were out of bounds. Our visit was pleasant, though, and in spite of a seventy-mile round trip, the office space in the chicken house adjacent to the house, and his being unable to pay me right away, I agreed to help him. He said he would pay me once the project got going. He and his second wife were expecting a baby, too, so I guess that made me sympathetic. Within a couple of months Wally felt I should not be commuting so far. Gene said he would try to get an office in Philadelphia if that would suit me better. He got a third floor walkup, and I stayed until just before the baby was born.

WILLIAMS: What was it that you did?

SCHULTZ: Oh, a lot of things. Gene's first interest was in using my name in his newest advertising literature—I was better known in library and pharmaceutical circles than he. At first, I did not want him to do that, but I conceded. He had already printed an issue or two of *Current Contents*, to advertise how the product would look. He owed the printer for that. He was having trouble getting various journals to give him permission to copy their contents pages. They said it violated the copyright law. There were a lot of problems. Once, he included a postage-paid return postcard in a sample issue of *Current Contents*, to garner subscriptions. A number of the postcards were returned without information on them—as a mean-spirited trick to make him pay the postage. We discussed all of those problems and tried to think of ways to solve them.

Most of the time, though, I worked as a clerk, pasting-up additional issues of *Current Contents* for the printer, and I helped to write letters to publishers, seeking copyright permissions, answered inquiries, things like that.

WILLIAMS: I did not know you had a contents service set up at MSD. How did that come about?

SCHULTZ: This was in the early days of photocopying machines. I decided that circulating contents pages would help researchers to keep up with the literature, and it would ease the pressure on the library to circulate new issues of journals, and also have them available in the library at all times (a financial impossibility).

WILLIAMS: Was anyone else doing that?

SCHULTZ: As far as I know just one pharmaceutical company. The idea was not original with me, but I thought it a good one, and so did our research staff. I was telling everyone about it because it seemed like such a good thing to do.

WILLIAMS: Did Garfield get the idea from you?

SCHULTZ: I'm not sure. He may have, because it was still a novel thing to do. When I was leaving, Gene asked me to stay with Garfield Associates—the associates were fictional characters—after the baby came, but I was anxious to get started with Dr. Mauchly. I spent only about four months helping Gene, but things were looking up by the time I left. I think it was within the next year that Gene phoned me at Rem Rand, to ask what I thought of renaming his business “Institute for Scientific Information” [ISI]. I told him it was quite a leap. Wouldn't people laugh? He did not think so. He used the name, and now it seems properly foresighted. Pretty soon, by the time I was President of ADI, Gene was pushing to have ADI renamed “American Association for Information Science.” By that time I thought he had insight, and I was on his side. In recent years, Gene has enjoyed telling people about our having started ISI in a chicken house.

WILLIAMS: You went from MSD to Garfield and then to Sperry Rand.

SCHULTZ: Yes, I started at Sperry, for the second time, the first week of January 1958. Dr. Mauchly had funding for information retrieval research from the Air Force Office of Scientific Research and from the Office of Naval Research. He had hired Dr. John J. O'Connor, a logician, before I got there. John and I were the information retrieval staff. John liked to work alone on problems he discovered from reading the literature, but we talked everyday, mostly over lunch. Later I hired Clayton [A.] Shepherd, a graduate student from the University of Pennsylvania, to be my programmer. I liked to design new applications and flowchart them, but after trying for a while, decided I was not patient enough to write code. Coding was still done in a primitive computer language, just one step up from being merely ones and zeros. Dr. Mauchly had a staff of about thirty persons who sat in a pool of desks and chairs, working on separate problems. Collectively we were called the Univac Applications Research Center [UARC].

WILLIAMS: When you went to work, did Mauchly talk to you about specific projects or was it sort of a “do what you want” kind of job?

SCHULTZ: He let me try to find worthwhile projects. A stream of requests for help were being put to Dr. Mauchly. The U.S. Post Office wanted a mechanized solution to their mail-sorting problem. The FBI wanted a way to identify fingerprints quickly. The Mormons had a big genealogy problem. One on our UARC staff took that one on, and wrote the first automated genealogy program. Others on the staff helped some Penn people find a way to read X-rays more rapidly, using their Univac there. Some of the UARC staff worked with Walter Cronkite to develop the method for predicting election results that obtained CBS very favorable publicity. Personally, Dr. Mauchly was trying to solve the “traveling salesman” problem—how to touch base with the varying set of the cities a salesman needed to visit, and do it by the shortest route. All of us enjoyed that one because when we walked into Dr. Mauchly's office he sometimes asked us to pretend we were a part of the computer. Our assignment was to keep track of what information was in our particular register, as his hypothetical computation proceeded. Unfortunately, he was too preoccupied with daily business to achieve the problem-solution first. Another mathematician scooped him.

Back to your question about what I did. As you know from my bibliography, I chose first to have a segment of the MSD punched cards reproduced, with MSD permission, and translated onto magnetic tape, so I could play games with the descriptors. I counted comparative usage of terms, studied “pairs and triples” of terms, and did other busy work to learn what the computer and I could do (9).

When I ventured into the real world, a lulu of a problem came up. Dr. Milton Lee, Director of the Federation of American Societies for Experimental Biology [FASEB], based in Bethesda MD, was active in ADI, and had heard I was at Univac. He was in charge of the largest scientific meeting held in the U.S. each year, and needed help. I’ll say more about that problem when we discuss my move to the Institute for Advancement of Medical Communication.

WILLIAMS: You also began work on Medlars while you were at Sperry Rand.

SCHULTZ: Yes, but I had better tell you about consulting for ASTIA first, because that preceded and led to my work at the National Library of Medicine.

ASTIA purchased an improved model of the Univac computer from Sperry Univac in about 1959. They had no idea how to use it, thus depended on Sperry for help. I was the only information retrieval specialist at Sperry, so the Washington sales office contacted me about helping them deal with ASTIA. At first I declined, saying that I knew nothing about military matters. Given my pacifist connections, I did not want to get involved with the military.

We happened to have a big winter storm about then, and I was snowed in at home for three days before our road was cleared. Three days of idleness was overwhelming, so I kept thinking about the ASTIA matter, thinking that it was just another indexing chore, only a bigger one than I had ever tackled. They would need a thesaurus. Given the right personnel, I knew how to build a thesaurus, perhaps starting with the Uniterms Taube’s group had established. They would not have to code their subjects, as we did at MSD, simply enter a reference and its index terms, for each report they wanted to index. They could do Boolean searches. The more I thought about it, the more I could see the likeness of ASTIA’s intended system to the sample MSD system I now had at Univac. As soon as the snow was cleared, I called Heston Heald, my contact at ASTIA, and told him I would come down and discuss the problem with him.

When I got there, I was startled to find that my appointment was not just with Heston, but with a small auditorium full of ASTIA brass. I gave them a slide show of how we did indexing and retrieval at MSD and made suggestions about how they could modify that work to suit their purposes. When I was finished the response was that I should come do it. Again, I told them I couldn’t come. They would have to find staff who could.

They hired a colonel [William Hammond] who had enthusiasm, but little pertinent experience. He began to program a too-simplistic use of the computer—using it as a comparator, to match terms in questions with index terms accompanying references, but without any Boolean connectives. Some of the former Doc. Inc. staff were hired by ASTIA. They worked with volunteers—people underwritten mainly by ASTIA contractors—the volunteers were to convert ASTIA uniterms into a thesaurus. Calvin Mooers was brought in as a consultant for a short time. I agreed to be a volunteer thesaurus builder and was assigned to head up the section on Biology. Eugene Wall oversaw the thesaurus building, and at first he

and I were not in harmony, but he came around and used the techniques I was employing for the Biological section as a model that the other section leaders should follow.

Meanwhile the colonel, William Hammond, was learning too. When he thought the time had come to show off his work, and a sufficient number of documents had been indexed, ASTIA had an open-house. This was in 1961. At the conclusion of Hammond's demonstration, during the question period, I took it upon myself to give another of my papers-from-the-floor. I described some of the more sophisticated retrieval techniques ASTIA would be able to use in the future, given the same indexing of their documents. My remarks drew a lot of questions about machine capabilities.

When the meeting broke up and we were leaving, Col. Brad Rogers, Director of the National Library of Medicine, who had been in the audience, came and asked if I thought the machine applications I had suggested could be used at the National Library of Medicine. I answered with a glib, "Sure." I had been introduced to Col. Rogers only that day, by my acquaintance, Seymour Taine of NLM, who was with him.

WILLIAMS: Now is it time to hear about Medlars?

SCHULTZ: Okay. Only about a week after I met Brad Rogers my boss [Gilbert Kaskey] at Sperry got a call from Rogers, asking that Dr. Kaskey and I come to NLM for a talk. Dr. Kaskey was an applied mathematician and was not very interested in retrieval, but he agreed to go.

WILLIAMS: Dr. Mauchly was no longer your boss?

SCHULTZ: No, Dr. Mauchly had been fired from Sperry, for not being a good administrator! Administration was the last thing Dr. Mauchly should ever have been asked to do. He certainly did not enjoy doing it. At the time of the merger of Sperry and Remington Rand the negotiators thought it only fit to name him a VP, since he and Presper Eckert were the inventors of the computer. I felt angry about Dr. Mauchly being fired and blurted out, "They can't do this to you." His reply was a sober, "But they did."

He would have liked to take all of the UARC staff with him, to be part of a new company he planned to call Mauchly Associates, but he would need time to get the new company funded. A lot of reorganization had to be done at Sperry too, to accommodate retrieval research we had contracted for, but had not finished. I said I would find another job and John O'Connor could use the retrieval contract money. But, Sperry thought they still needed me and assigned me temporarily to work under Dr. Kaskey.

I stayed in contact with Dr. Mauchly. His leaving took away the fun of working at Sperry, and I wanted to leave. A handful of UARC people were at Mauchly Associates, but nearly all had left Sperry. Dr. Mauchly needed more funding, to support his new company. I was pretty lucky at getting money, so he kept his eye on me, but I did not like the idea of having to support other people on his staff, even if they were good mathematicians. One day in 1961, when Dr. Mauchly took me to lunch, to pop the question about whether I would come with him, I had to say I had decided to join Dr. Richard [H.] Orr at the Institute for the Advancement of

Medical Communication, but that I hoped he and I would still be friends. He seemed saddened by my decision, but just said, “That’s the way the cookie crumbles.”

WILLIAMS: Was that the end of your relationship with Mauchly?

SCHULTZ: No, if anything, we were closer after he was no longer my boss. He and Kay (his wife) continued to invite Wally and me to their house for dinner, and we invited them to ours. Kay is a lovely person. They, too, had five children and she was quite devoted to Dr. Mauchly. Mauchly Associates functioned for a while, but Dr. Mauchly got too sick to put a lot of energy into it. His anemia weakened him quite perceptibly.

I always addressed him as Dr. Mauchly, even at the dinner table, and one day he asked why I did not call him John. I replied that I couldn’t; I respected him too much. After that, when he phoned, he would sometimes say, “Claire, this is John Mauchly; Dr. Mauchly to you.” When he died, in 1980, Kay had me come to the house for a couple of days and answer the calls from news organizations, to give out biographical data about him. I hate to attend funerals, so she had me “watch” the house during the funeral, to receive flowers, to direct lost acquaintances to the church, and help the caterers, by telling them where to find things they needed while preparing the luncheon for friends and family. Dr. Mauchly was an important person in my life. I still miss his being there to discuss—almost anything. His sharp mind cut to the core of things, and his gentleness and sense of humor made conversations memorable.

WILLIAMS: Shall we go on with your visit to Dr. Rogers?

SCHULTZ: Dr. Rogers had a very handsome, large desk in his office. After the preliminary pleasantries when we arrived, he looked at me, pounded his fist on his desk, and said, “Damn it I don’t want to keep being told that we can use a computer here, I want to be told how.”

A lively discussion followed, with Dr. Kaskey participating infrequently. At the conclusion, Dr. Rogers asked Dr. Kaskey if he would be willing for me to become a special consultant to the Library. They agreed on the terms. Dr. Kaskey advised that the Library put out a request for bid, if they seriously wanted to gather suggestions about how the Library might use a computer. After I had made a few more trips to the Library to talk about how use of a computer could supplant their [Seymour Taine’s] current use of punched cards, the decision was made to request bids.

A complication was that both the Library and Rem Rand wanted me to bid, therefore I could not converse with other potential bidders when they came to NLM to ask questions. We decided that my assistant, Clayton Shepherd, could be there when Seymour needed to defer to someone who knew more than he did about computers. Having Clay there risked conflict-of-interest charges, if bidders learned of Clay’s connection to Sperry Rand, but no one did. Concern about the matter turned out to be unnecessary. My knowing a fair amount about NLM functions and operating statistics led to my not proposing a preliminary study to learn those things. Most of the other bidders did propose such a study and the proposal-readers thought it a good idea, so my proposal was rejected. That was something of a shock, but it gave me the opportunity to make an exit from my job at Sperry Rand. I made the move to the Institute for the Advancement of Medical Communication in mid-1961.

WILLIAMS: But I thought you were a special consultant at NLM during Medlars.

SCHULTZ: Yes, I was. The consultantship agreement would, of course, have been nullified if Sperry Rand had gotten the contract. Since Sperry did not, the contract was in force, and I continued as a consultant.

WILLIAMS: How many consultants were there?

SCHULTZ: I never met any other consultants while I was there. Charles Bourne quizzed me about this recently. He was under the impression that Dake Gull, for one, had participated in Medlars but on checking he found that Gull was a consultant to the contractor for a while, not to the Library.

WILLIAMS: Who was the contractor?

SCHULTZ: The General Electric Company; the company that had been developing the GE-125 for Perry's use at Western Reserve. The General Electric staff that was to define the Medlars project in systems terms during Phase I, and presumably go on to implement that system in subsequent phases, had no experience at all in information retrieval. That awkwardness, coupled with GE's obvious interest in selling their own retrieval machine, alarmed the NIH [National Institutes of Health] people who were allocating the funds for Medlars. Because of Brad Rogers' lack of knowledge about computers and how to apply them, they thought Rogers was a sitting duck. NIH added a clause to my consulting contract specifying that I needed to write a letter at the end of Phase I, saying whether or not I agreed with GE's definition of Medlars requirements. And then, if I agreed with what GE wanted to do, I had to co-sign, with Brad Rogers, a request that GE be given the contract for Phase II.

WILLIAMS: Wasn't that kind of thing unusual? How many phases were there?

SCHULTZ: There were three phases—I think Phase II was for coming up with the objectives of Medlars in great detail, and Phase III was for the evaluation and selection of equipment with which to implement the plan.

Yes, the consulting arrangement was unusual, I think. I forgot about the clause until the time came for me to write the letter. Brad was a little embarrassed by the whole thing. It all turned out well, though. I went to Washington each week to attend the meetings between the GE and NLM staffs, serving as a sort of translator when either side's terminology needed translation, or when I sensed a snag of any kind inherent in understanding what was being asked and answered between the two parties. Both staffs were intelligent and committed. It was a very enjoyable consulting job.

WILLIAMS: You have been mentioning Seymour Taine. And, I know Winnifred Sewell was at NLM. Speak a little bit about their roles in Medlars.

SCHULTZ: Okay. Of the two, I knew Winnie the longest. She was the librarian at Squibb Pharmaceutical before I began working for Sharp & Dohme. I met her through SLA, where she had been Chairman of the Pharmaceutical Division earlier than I. She and her friend, Jo Clark, who I also admired, more-or-less pushed me along within SLA by encouraging me to do things I might otherwise not have tackled. Winnie was curious about what I was doing with punched cards at MSD, but was not convinced that she would want to try using them at Squibb. Once, we devised an experiment in which we compared answers to a list of the same reference questions; questions that were not company-sensitive. Answers were in the form of a bibliography. We compared the references in the bibliographies for the time it took to answer them, and for quantitative and qualitative differences in our responses. Each of us thought our own library had done a somewhat better job. The test was inconclusive, so each of us continued on our different paths.

Winnie and I visited with one another both at home and at the office, in addition to working cooperatively on SLA projects like joint-abstracting of current pharmaceutical literature, with the goal of bridging the time gap of the commercial abstracting and indexing publications; and dividing among our group of pharmaceutical libraries the task of identifying new drug trade names as they appeared in the literature (including ads). We parceled out portions of the list of journals that needed to be screened for drug names and then circulated the resulting joint-list of what we found each month.

Winnie and I had gotten to know and respect one another. I was pretty much out of touch with her after I left MSD, but we were still aware of what each was doing. Winnie was at NLM before Medlars began—in charge of the List of Medical Subject Headings used in *Index Medicus*. I talked with her a few times about what she had in mind for changing the Subject Heading List to keep it compatible with changes in processing and publishing techniques as they occurred at NLM. I concluded that she was going to review the content of the List thoroughly, in keeping with what was happening, but she did not want to alter its general structure. I figured she knew what she was doing, and I kept my attention focused on other aspects of Medlars.

About Seymour. I had known who he was for some years, and liked him, but did not know him well. After I began consulting for NLM (he pulled the strings for getting me the consultancy) we became conversational buddies. We would sometimes meet at O'Donnell's seafood restaurant in Bethesda for evening Medlars discussions, and that way we could be very free in expressing what we thought about anything that came up, including making plans for what ought to be discussed at the meetings with GE. He sometimes asked for help in planning little statistical studies or experiments NLM ought to perform to clarify some point or other, pertinent to the design of Medlars. That was part of the fun of consulting for NLM.

WILLIAMS: Can you summarize some of the other high points of Medlars?

SCHULTZ: For me, the highest point of all was the day we decided which computer to use to implement Medlars as it had been designed. I had worked privately on my upcoming computer recommendation from day one of the Medlars project. Back then it was possible to memorize the features of the entire gamut of available computers. I did that. I subscribed to, and read the computer journals, gathered advertising literature, visited sites where various computers were being used, attended lectures and professional meetings—tried to be as well informed as it was possible to be. I constructed a large, handmade spread-sheet of all of the computer names and

models on the market and how each of their features, like input and output devices, memory size, operational speed, sorting techniques—everything—compared among them, and keep it up-to-the-minute in currency.

Seymour and I knew in advance that GE would argue for their GE 250 no matter what I recommended. They did. The top rows of the auditorium were filled with GE brass. The other seats held representatives from each of the major computer manufacturers; a lot of government officers, like one from the Office of Management and Budget [OMB]; representatives from the National Science Foundation, National Research Council, and National Bureau of Standards. They made me nervous!

Seymour sat behind me as I waited to stand up and do my thing. At one point he kicked me in the butt through the opening in the back of my seat and leaned forward to whisper, “Take it easy, you are going to win.” Somehow, that helped.

I did the presentation just as I planned it. The man from OMB had accosted me at coffee break, earlier, and told me I had better recommend IBM equipment because that was the way the government was going, and no other recommendation would pass muster. Some of the audience was primed to refute recommendation of the Univac III, thinking I would choose that out of loyalty to Sperry Rand. After I sat down, the only company to take the floor was GE, saying that they found no fault with my facts, but they wanted to recommend that two GE 250s be used in tandem, to achieve the speed required for avoiding need to change main frames within five years—a prime requirement I had specified. I was able to do a convincing rebuttal of GE’s petition, and the matter was settled. Medlars would have a Minneapolis Honeywell 800.

WILLIAMS: Congratulations, in retrospect. Your homework paid off. Or did it? How well did the Honeywell work out?

SCHULTZ: Recently, when I was helping to edit a small part of Charlie Bourne’s upcoming book about computer applications in our field, I read that the Honeywell turned out to be something of a disappointment, for a reason no one could foretell. Its tape drives operated so slowly that the computer became a bottleneck when doing batched searches. But that fact was discovered after Medlars had been operational for some time. NLM did switch to IBM equipment at the end of the first five years.

WILLIAMS: Anything else you want to say about Medlars?

SCHULTZ: I’ll just mention that developing a printer that would accommodate all of the characters needed to print foreign titles, and chemical names, et cetera, was a must. The team of Frenchmen who had put the Photon on the market were willing to take on the task, if we could make clear all of the specifications. Seymour had prepared himself for that, and luckily the machine that Medlars needed was readied in the nick of time.

I might add that there were perks associated with being the consultant. Word of my part in Medlars had spread as far as Europe—through Dr. Nacke and Dr. Wagner, each of whom frequently came to the States for ADI, and other meetings. Through them, I was invited to be a guest of the German government—to visit a string of industrial and academic organizations interested in what was new in information retrieval. Many of the details escape me now, but I

remember that in addition to visiting Dr. Wagner's university, near Frankfurt and Dr. Knacke's organization in northern Germany, I went to Bayer Fabrique near Cologne, for several days. Then I went on to Bonn, where someone who lived in a castle on the Rhine had a wine-tasting party. I had a ball.

WILLIAMS: Your only trip to Europe?

SCHULTZ: No, I had a number of trips to Europe; once as the guest of the Swedish government, where Bjorn Tell and Kjell Samuelson hosted me at Sweden's counterpart of our Atomic Energy Commission. We visited many organizations and government offices, as well as enjoying sight seeing. That was my only trip to Sweden and Denmark, but they made it memorable. As mementos, they suggested that I buy some beautiful stemware and other glass, which a shop shipped to me, without fatalities.

WILLIAMS: Did you ever go to Russia?

SCHULTZ: No, I almost did once, but it fell through. However, I was behind the iron curtain in Budapest, in 1972, to give a paper at a Federation Internationale Documentation meeting. I took a number of solitary walking tours during the week I was there, to absorb as much of the city as possible. The shell-damaged buildings were depressing, as was the jumping-off-a-bridge suicide that I witnessed. But because of my ability to speak German I managed to talk with a few citizens of Budapest. They were not easy to engage in conversation; they were too frightened of expressing their opinions. In the evenings, there were American style band concerts in a park across the Danube River—in Pest. I liked to wander over there, because just crossing the bridge across the Danube was intriguing.

WILLIAMS: We have not talked yet about your affiliation with the Institute for the Advancement of Medical Communication, IAMC for short.

SCHULTZ: Yes, that was a good experience, too. Dick Orr was trained in medicine, had a MD. He did adrenal hormone research for a while, and then he had gone into the military. When he returned he decided he was more interested in scientific methodology and writing practices than in doing lab work. There was an opportunity to get funding to start IAMC, through the widow of a recently deceased New York City MD; so he took the plunge. He began doing cooperative work with the American Medical Association, where changes in their communication activities were under discussion.

I had met Dick at ICSI [International Conference on Scientific Information] and was visiting his NY office the day the U.S. sent up the rocket with the first live astronaut in it. Everyone (a staff of three) had an ear glued to the office radio when I arrived. I was working at Sperry Rand, where we had started talking with Milton Lee at FASEB about a joint project—for which Milton was able to obtain grant money. Dick was interested in that project. He and Milton were discussing Dick's moving to the Washington DC area—and having an office in FASEB's "mansion" in Bethesda. Dick and I explored teaming up to do the planned FASEB work. Things developed from there, so that my later move from Sperry Rand to IAMC became sort of a natural in terms of our interests.

Working on both Medlars and FASEB took me to the DC area every week, along with being VP and then President of ADI. I had other commitments, like teaching a course in information science at NIH and at Drexel.

WILLIAMS: How did you do all that?

SCHULTZ: That's like asking a centipede how she knows which foot to put down next. I don't know, I just did it. It required a well-organized briefcase, among other things. [laughter]

WILLIAMS: You are being facetious about something that must have been very hard to do, but let's go on. Say something more about your financial arrangements with IAMC. It seems like you were being paid from a lot of different sources. Were you getting wealthy?

SCHULTZ: Good question, easy answer. All of my income from Drexel, FASEB, NLM, NIH, et cetera, was funneled through IAMC. I got one paycheck. I was just an ordinary "Joe." Women still did not demand salaries commensurate with those of men. I should have, but I didn't. Dick was pretty fair, but he had other workers to pay.

WILLIAMS: Do you want to describe the FASEB project? What did you do?

SCHULTZ: FASEB had six member societies, each society appointed one of its members to serve as its secretary, for preparing of the annual FASEB meeting, among other things. Dr. Milton Lee served as director of FASEB. Its headquarters was an old southern mansion, on a lovely hillside, in Bethesda, MD.

FASEB's annual meeting was the largest scientific meeting in the country at the time. Some three thousand, ten-minute papers were given in parallel sessions of ten papers each, over a five-day period, in various hotels of a host city. It was usually held in Atlantic City because there were few places that could accommodate the some twenty thousand attendees who came to the meeting. Authors were responsible for preparing their own abstracts of what they would say, and submitting them to FASEB a few weeks before the meeting took place. The secretaries decided how to group the papers into sessions. A KWIC index to the titles was prepared. Someone sent all of this to the printer to be made into the March issue of the journal called *FASEB Proceedings*, and the journal was mailed to the membership before the meeting took place. The issue served as a meeting program as well as an important announcement of what was new in biology. It was a must subscription in biological libraries.

As one might expect, some attendees complained about groupings of papers, and complained that parallel sessions kept them from hearing some of the papers they wanted to hear. Sessions scattered among hotels were difficult to attend. Some meeting rooms got overcrowded if a session was on a hot topic, and so on. To the extent possible, Milton Lee wanted to solve all such problems, by computer. I wanted to tackle one thing at a time, but he wanted them all solved, now. The secretaries just wanted me to go away and leave them alone.

To know the details of what happened you would have to read my write-ups of various aspects of the project (10, 11, 12). With the help of society members, we got together a classification of the subjects in which the members were interested, at a level that would provide descriptors for a thesaurus, also be a potential device for scheduling sessions, and a guide to be used by authors who were about to be asked to index, as well as abstract their own papers. It came to be known as the “B” form. The authors were cooperative about indexing their papers and sending them and their abstracts on the schedule Milton dictated. I could not see what was sent until the secretaries finished their scheduling. Then I had to get the index prepared for printing, and do the experiments Milton wanted done; experiments like scheduling the papers by computer, so that attendees could vote for whether the manual or the machine scheduling pleased them more.

The outcome of all of that frenetic work was that we got a program, an index and abstracts out on time, but much of it was done manually the first year, 1962. By 1963 I had experienced the process, and we had a printed form for authors to use as a guide when indexing their own papers. The guide could also be used by authors to circle the headings—used now by the secretaries for grouping papers—of sessions that they most wanted to attend that particular year. The “B form” was a very helpful tool for writing the computer scheduling programs and for making a machine-readable thesaurus, to be used for indexing the papers from titles and from whatever else the authors considered pertinent.

The time allocated for my work was worse than minimal. Dick Orr offered to stay up all night with me, as did the operator of the Univac I in New York City (I was no longer at Sperry Rand) to get the index completed in time, and fly it to the printer in DC the next morning. We did it! It did not go smoothly. Actually, I went without sleep for forty-eight hours. I had a migraine for the next three days. As far as I have been able to tell, that was the first back-of-the-book index ever published that was prepared automatically, using a machine-readable thesaurus.

We had done what we were funded to do. The grant was used up. I had other things on my plate. Milton Lee had a heart attack and retired. FASEB carried on, without the Univac the next year. I learned a lot from the experience, but was glad I did not have to go through it again.

Dick decided to move IAMC to Philadelphia so we could work together on new things, without my having to commute so far. The ACM [Association for Computing Machines] published the flow diagram and a description of how I scheduled the meeting. FASEB published other details of the experiment (13).

WILLIAMS: What did IAMC and you do after that?

SCHULTZ: Author indexing was a new thing, so we wanted to check out how good it was compared with using just the words in the title. The trouble was there was no established way to measure the “goodness” of indexing. So, we devised one. Our criterion became terms selected for each paper by twelve potential users of the papers. Proceeding that way, the author indexing won out over title words by a score of something approaching two to one—you’d have to read the papers to learn the details (14, 15). Our having done that comparison made us want to go a little farther in trying to measure “goodness”—to make up our minds whether we trusted what we had just invented. We did another study that involved professional indexers, Drexel library school students and middle school kids and felt that our methodology seemed to stand up (16). That’s what Dick was always after—dependable, trustworthy methodology.

WILLIAMS: Yes, I know. I was given his paper about good library services (17) in my first year as a doctoral student and they said, “Read this. Memorize it.”

SCHULTZ: Dick did a lot of projects having to do with measuring what medical libraries did—he did them with the help of medical librarians, again tried to establish methods to either substantiate or refute widely-held beliefs that had never been tested.

My bibliography reflects that I was concentrating pretty much on teaching. I kept reviewing things for the benefit of others as well as myself. And I was indexing-oriented, always thinking about how to do indexing better.

Because I had constructed a thesaurus for indexing FASEB papers, I checked out that terminology, gleaned from current biomedical authors, against the indexing terminology of NLM, NIH, and for contrast, DDC [Defense Documentation Center and formerly ASTIA]. That paper did not make much of a splash, but it still provides an easy reference to how alike/differently some leading index-makers were presenting information to their users (18).

Looking back on it, I probably should have paid more attention to things that interested Dick. ADI affairs and teaching—I taught at the University of Washington the summer of 1963—plus invitations to give talks were distracting. I wish I had concentrated on learning more from Dick. He was a great teacher, in his quiet way, but you had to pay attention.

We were also diverted by having to write proposals to get more research funds from government agencies. In the late 1960s, the amount of time spent on chasing funds became overwhelming. We decided to stop being involved. Dick went to England, where he was in demand as a mentor and consultant. I went home to think how I wanted to spend the rest of my life. I became a free-lancer for two years,

WILLIAMS: How long did Dr. Orr stay in England?

SCHULTZ: For about five years, or so. I think I visited with him over there a couple of times when I was in Europe for other reasons. He seemed satisfied with what he was doing—he was asked to do a lot of consulting.

After that he began to travel to places like China and Russia and Alaska. I did not know what was motivating him, other than curiosity. Later, I learned that he had contracted AIDS and wanted to enjoy life as much as possible, while he still could. He owned two apartment houses in “Olde” Philadelphia, and lived in one of them. His apartment was interesting to visit; it was crammed with valuable antiques. During the last two years of his life, he was sick and weak, but we visited one another as often as we could—he continued to travel. At his memorial service, his ashes were placed in the small, handsome garden he had constructed behind his apartment building. It was a very sad day for me.

WILLIAMS: How long did you go on teaching at Drexel?

SCHULTZ: Until 1970 when IAMC disbanded. Dean Garrison was having to make a new salary arrangement for me, so he took the opportunity to tell me that he was having budget problems and my salary would have to be cut. I told him I was having budget problems, too, and I quit. I did not want to have to drive to Philadelphia any longer, to teach a course or two, given the relationship I had with him. The students had always given me high ratings—they liked the Socratic method by which I taught, but pretty consistently the deans had thought me “obtuse.”

WILLIAMS: Do you know why?

SCHULTZ: I guess their reasons differed, depending on their personalities. The temporary dean reported me for being insubordinate. She had a rule that faculty could not eat in their offices. I broke that rule because I left my IAMC office in the afternoon, in time to keep appointments with Drexel students I was counseling, and then took the last half hour before my evening class to prepare for it. During that time I usually ate a sandwich. It was the sandwich that made me insubordinate, even though the janitor said he told her I didn’t even dirty the wastebasket.

Dr. Garrison did not like me because of my independence in choosing what to teach. I “invented” courses for the information science curriculum. When he told me one time that there would be no teacher for Drexel’s acquisitions course and he wanted me to teach it, I refused on the grounds that I would not know how—it was not my bag. When he got desperate he said I could teach it any way I wanted. I took the challenge and used it to have students investigate how Drexel’s collection of materials in our field compared with that of certain other universities. Drexel’s did not compare favorably. We gave the acquisitions librarian our findings, and, *viola!* The collection greatly improved.

WILLIAMS: I guess I’ve benefited from that. I’ve been using Drexel’s collection and find it a good one. Were you finished?

SCHULTZ: I was just going to mention one other instance of my relationship with Dr. Garrison. He was perplexed by my use of the Socratic method, that is, teaching without lectures. If I wanted students to have notes, I simply handed them out—did not make students copy from the blackboard. In class we discussed things, with questions from me to keep the subject moving and on track. Then they had homework assignments—usually problems that they solved step by step on a weekly basis—like building an index to the chapters in Perry’s book, constructing a thesaurus of sorts to do the job. In class I would ask both specific and generic questions to see which student could answer, using his or her index cards. They learned from one another how to improve their projects, and thereby end up with something satisfactory. They went on from there, by the third quarter, their assignment was to write a “pretend” proposal to the previous request for bid from Medlars. They had progressed through punched card systems of varying kinds and were ready to coordinate techniques that could be automated, for a really large indexing project.

One day when Dr. Garrison was talking with Jacques Tocatlian, who later had an important position with UNESCO, Dr. Garrison asked how Jacques liked the information science curriculum. Jacques said it was satisfactory and that he was majoring in “Schultz.” The dean’s reaction was to get very red in the face, so red that Jacques got alarmed. [laughter] Later,

Jacques asked me to explain the dean's reaction. I couldn't, really. I never quite understood it, either, but other people told me similar stories.

WILLIAMS: So what came after Drexel and IAMC—you weren't just staying home?

SCHULTZ: No, my career kept evolving. A former colleague at IAMC [Reginald Smith] was now Assistant Librarian at the Medical College of New Jersey in Newark. He was aware that NIH had recently given a grant to their state's medical association to help improve the function of New Jersey's hospital libraries. He wanted me to come consult with the MDs about making me the "legwoman" for the project. It sounded pretty weird, but I took the job, with an office in the NJ Medical School, one day a week, complete with a secretary. I traveled all over New Jersey one or more additional days per week.

To make that story short, the job turned out to be fairly interesting. I had freedom to do what I wanted. I formed an association of the hospital librarians, so they could get together to talk once in a while. Upon inquiry, I was told that MLA [Medical Library Association] wanted nothing to do with hospital librarians. I learned to know the few, trained librarians who were at major hospitals. They all seemed good at their jobs. Over time, I visited each of the hospital libraries in the state, to examine their contents, talk to the volunteer librarians and then to the hospital administrators about their views of what might be done to improve library services.

The pay-off was that the "association" did much of my job, it gave the librarians a means of comparing notes and let them learn from one another. It introduced them to the interlibrary loan and reference services of the NJ Medical Library. Things began to perk.

Being in NJ, I was asked to stop by Rutgers University on my way home one night per week to teach a course at the Library School. I did that, too, because I needed the money. I took various consulting jobs, as asked, and was as busy as ever.

I received a phone call one day while I was in my office in Newark, at the med school library. The gentleman on the line was Dr. Roberts, Head of the Department of Pharmacology at the Medical College of Pennsylvania [MCP]—the school that had kicked me out. He asked me to come for a job interview, saying that I had been highly recommended to their search committee to be their new librarian. What a shock! I told him there must be some mistake—I had not been a librarian in years, and did not want to be one. It ended with my saying I would come consult with him, free-of-charge, for an hour or so, to advise MCP what should be done to improve their library—it was the worst medical library in Philadelphia. Eventually, that interview led to my taking a position at MCP, after a lot of negotiation.

WILLIAMS: Interesting. This was now what year, 1972, I believe?

SCHULTZ: Yes. It took three interviews at MCP to convince me that I wanted to go there. Because I still had a couple of government service contracts, for producing abstracts of, and indexes to, government publications by computer, MCP was especially interested in me—that is, in my overhead potential. I was told to name the conditions under which I would become their employee. I did not try to be accommodating. I said I wanted to be a full professor and a department head, and to be paid accordingly. I would need two days per week of discretionary time, when I could do government contract work. I did not want to be called a librarian; my

specialty was Information Science. In reference to the new library they wanted to set up—I would want to work with other concerned persons, but would want strong input to decisions about both the physical plant, and the materials and staff of the library. Also, I would need access to computers for some of my work.

The amazing reaction to all that was, “When can you start?” The title chosen for me was Director of Libraries and Professor of Information Science.

WILLIAMS: There must have been a new dean by this time. Not the one from your student days?

SCHULTZ: Yes, but the dean from my student days was in the neighborhood, literally, and her emeritus status still put her on certain committees. So, when she heard that I was being hired, she tried to negate it. She said I was coming to get revenge, and that I was lying about her having kicked me out—that it had been a committee decision. The current dean, Dean Siegel, quizzed me about Dr. Faye’s comments, to get my reaction. He did not believe the revenge statement, and my report card, confirming my grades, et cetera, had been located, so no problem.

WILLIAMS: What about some of the other matters. Were they going to build a new library? What kind of computers did they have?

SCHULTZ: No, they were not going to build a new library—they were just going to move it to another building that the nursing school had recently vacated—a building with classrooms that were better than the classrooms in the present teaching facility, and a building adjacent to the cafeteria. The only trouble was that the space, the locker room, allocated for the new library was windowless, had a very low ceiling, and was much too small. When I learned all of this, I rebelled. I said I had made a mistake in coming there and would leave. But my fate was otherwise. A former Philadelphia legislator, then living in Florida, made it known that he wanted to give a considerable sum to MCP, in memory of his first wife, Florence Moore, who had been on its Board for some years. That money was allocated to constructing a two-story wing on the hillside outside the nursing school—the bottom floor for new classrooms, the top floor (ground level in relation to other buildings) for the library. The architect who was chosen turned out to be a delight. He and I worked together to achieve a bright, roomy library with all the features I wanted—a sky-lit, sunken reading room with a red rug, surrounded by built-in sofa seating; an entrance hall with immediate physical access to the administrative secretary as well as to the long, curving circulation desk. Visual access made it easy to know whether the librarian was “in,” also for the librarian to see traffic in or out of the library at a glance past her secretary’s reception desk. The entire library was planned for the convenience of its users.

One whole side of the library had windows, with carrels sandwiched among them. Its opposite side consisted of two private conference rooms with large tables, and two smaller rooms with personal computers, one for doing on-line searches, the other for students’ use of computers. There were A-V connections to the classrooms below the library, so the A-V librarian could respond to projection signals from the classrooms without anyone having to tote equipment and materials to the lower floor. For its size and time, it was a pretty spiffy library.

WILLIAMS: How soon after you went there was it finished?

SCHULTZ: Planning and building it took about two years. We could hardly wait. The timing was perfect for being able to stock it with computers—personal computers were just appearing on the market. I had purchased one for my government work at the outset of their availability, in 1973, from a company called “Commodore” in Cambridge, MA. The main-frame computer the college owned when I came was out-of-date and badly managed—I could not have survived without my personal computer. I got put on a committee to help get the college into the twentieth century with respect to a general-purpose computer.

WILLIAMS: How much did personal computers cost?

SCHULTZ: I don’t remember exactly. Somewhere around three thousand dollars, I think. The first ones came with no software, only a minimal operating system—like capability to turn it on and off, and hook it to a printer. We had to write our own word processing program—I got one of the brighter medical students to help me, after I had drawn a flowchart to show him what I wanted it to do. When the Commodore did not work, and we needed technical assistance, I had to pay airfare, motel costs and portal to portal time for a technician to come down from Cambridge. Fortunately it did not go down very often.

WILLIAMS: How were you able to provide personal computers for students?

SCHULTZ: It wasn’t easy. I added them one by one as I got new government contracts, allocating some of my own salary money to the cause.

WILLIAMS: I hope the students appreciated what you were doing for them. Did they know about all this?

SCHULTZ: They just knew I was trying to make computers available to them, not the administrative particulars. Yes, they appreciated them. Only a few knew how to use them at the outset; they taught others, and computers soon were in demand. I got to be friends with many of the students because of something else I did. After we had the new library and classrooms I requested time to teach a course to freshmen about how to search the medical indexes and read the medical literature, with emphasis on judging whether or not a research study was based on solid methodology. The response from faculty was a resounding “No!” The curriculum was too crowded to work in all that they wanted to teach, let alone an extraneous course like I was proposing. I said suggested I could teach it in the summer. Again, “No.” The students needed to earn money in the summers, and would not come. Stubborn me, I tried it, and the students came—about half of all the freshmen. The next year I got an even higher percentage of them. Then various members of the faculty wanted the course considered part of their program. Couldn’t it be part of almost any other course? I thought, “No.” I taught it the third year, and then it was snatched by another faculty member and revised. Using an off-line database, my staff began working with interested students to show them how to do computer searches, and worked in some instruction in how to judge relevance and validity of what was being found.

WILLIAMS: Where there's a will there's a way. Did any other medical schools teach such a course?

SCHULTZ: There was an indication, once, after we were into it, that some other schools were going to try. I never heard what came of their effort. I was in the process of retiring.

WILLIAMS: You were doing a lot at MCP. I'm curious about what your government contract work was for.

SCHULTZ: You'll notice I'm not calling it research. It was sort of development work, mixed with service work and some consulting for government agencies. Most of the time I was at MCP I had a contract with the Office of Social and Rehabilitation Services, to prepare indexes to reports submitted to them by their grantees. Another contract was for preparing directories of information sources about handicapping conditions. Once, I subcontracted to the Urban Institute, which was preparing a report to Congress on the needs of severely handicapped persons—we searched automated databases to find relevant literature. MSD gave us a grant of twenty thousand dollars one year in support of our work with medical students. I kept finding sources of funds to keep things going.

Another development I was proud of was our clinical librarian program. Our three reference librarians divided their time—by invitation, after the library announced their availability—among the clinical departments, such as Medicine, Surgery, Pediatrics, et cetera. The clinical librarians accompanied medical staff during patient rounds in the hospital and also attended departmental meetings at which resident-physicians presented overviews concerning particular patients. Either by request, or by discretion, the clinical librarians did searches when they got back to the library and fed their findings to the departmental persons concerned. The program soon became very popular and successful. Again, I was not the first to think of such an undertaking. One other medical school was doing it just as successfully.

WILLIAMS: You were getting along well with the dean this time.

SCHULTZ: Things went well under Dean Siegel, but the next dean, Dr. Sutnick considered me an adversary. He was not fond of all of my ideas—like wanting to teach medical students. But, by now, I used what you called the “where there is a will, there's a way” approach, and found the money necessary to do things the College said it could or would not fund. Toward the end my will was diminishing. I got tired and wanted to retire early, which I did in 1982.

WILLIAMS: You retired. To do what?

SCHULTZ: Oh, various things. In our backyard, my husband was building us a forty-foot catamaran on which to go cruising, but he was being so slow and a perfectionist about it that I wanted to help him finish. Even so, it was another five years before we got it into the water.

Meanwhile, I had to learn about being a sailor, so I joined the U.S. Coast Guard Auxiliary, took courses, learned to be a radio operator for the Coast Guard. One morning per week, I monitored calls for help from the Upper and Lower Delaware River. I sometimes helped to patrol the upper Delaware on weekends, to help boaters who got in trouble. I could do only certain things to help my husband with our boat—like glue, sand, paint, varnish, and apply fiberglass. I needed a little excitement from time to time, so got State certified and joined the ambulance corps of the local fire company, as an emergency medical technician [EMT]. Some of the experiences as an EMT were pretty exhilarating. I continued doing that until we were ready to start being sailors, in the fall of 1987.

WILLIAMS: What sailing did you do?

SCHULTZ: We had the boat hauled to the Delaware River, near the Philadelphia Airport, and took it from there to the vicinity of Annapolis, MD, where we managed to get blown into very shallow water during a night-time storm. The accident damaged the bottom of the boat to some extent. I radioed the Coast Guard Auxiliary to come help us. We had to be towed into Annapolis. We found some kindred spirits at the boatyard; they were vagabond sailors who were wintering in Annapolis to earn wages. They volunteered to look after our boat over the winter, so we could go home and relax until good weather came again.

In the early spring we picked up the boat, took it down the Inland Waterway without further incident, got to the outer banks of North Carolina and had an urge to go back home and garden, so left the boat along the Inland Waterway, at Masonboro Marina, near Wilmington. After that, for three more years, we drove to NC each fall, left our car, took the boat south to some destination along one of the coasts of Florida, or else in the Keys, brought it back to NC in the spring, and came home to garden. My sister and brother both wintered in Florida, and Wally's two brothers live there, so we were able to spend time with family as we went along.

In the spring of 1991 we found we were going to have our first grandchild. She would be living next door to us and would need day care. We were going to be grandparents at last and we would be needed at home. We decided to give the boat to a group in Wilmington, NC, that worked with inner-city kids from near and far—so they could enjoy the water, and get some kindly attention. Wally did not want to cruise, anyway. He said he had been sure every day he was on it that the boat was going to sink. On those same days I had been enjoying being close to nature, day and night, and feeling almost like a kid again. But having a grandchild was going to be a great experience, too.

It has been. She had a little sister one year later, so I have had the warmth of snuggling with them for five years—making up for the time I missed with my own children.

WILLIAMS: You have not been doing anything outside your home for the past five years?

SCHULTZ: Child-care has not been full-time. I've been volunteering at the local elementary school for a couple of half-days per week, as a computer assistant. The teachers like my being there, and it helps me stay current with new computer developments. It also gives me insights into what our grandkids will be doing in school, in various grades. Students in grades one through three are very sweet and trusting, and like to share experiences with me. As they

approach middle-school age they have more problems of a personal nature, and are less interested in sharing.

All together, I feel needed at school. I'm helping with more than just computers. The school is experimenting with ways to train children to be thinkers more than doers, so they will be prepared for the kinds of jobs that will be available in the next century, when it is predicted that factory jobs will disappear and "work" will center on thinking up new ideas for how to do things. Because that will take teamwork, the new way of teaching is to refrain from teachers' lecturing. At our local elementary school teachers split the students into teams who work together to accomplish some goal, rather than allow them to compete for grades. On the computers, for example, teams of two to four write a story, perhaps a history of some country, illustrate their work, manufacture sounds and scenery, and end up with a movie. The persons on the team parcel out the tasks, depending on who wants to volunteer to write, draw, sing into the microphone, copy pictures from a book, draw illustrations, or be the manager of the work. Each one does what he or she does best. Each gets graded on the execution of the whole assignment rather than on its parts. It's an interesting new way to teach. It lets kids show off their skills (now classified as "intelligences") at things that never used to be classroom skills. They continuously learn from one another.

WILLIAMS: That is interesting. Do your grandchildren use a computer yet?

SCHULTZ: Oh yes, since they turned two years old. The older one could read, count to one hundred, and do simple addition before she even started first grade. They draw and paint, solve puzzles, play many kinds of intellectual games that are contained on kid CDs that I buy for them. The idea is to make learning fun—a game. I'm sure it is a good investment—they practically eat up the CDs we have, and they are even learning how to classify and file them. [laughter] I can trust them to use the computer all by themselves.

WILLIAMS: Well, that brings us up to the minute in your career. If you have the energy and don't mind, there are still some odds and ends on my list of things I wanted to cover with you. Your perspective about things that happened along the way as the field developed—can we go on for a few more minutes?

SCHULTZ: I'm game, if you are.

WILLIAMS: Because of your overview of the field since the late 1940s, I would like to ask you to tell me your thoughts about certain trends and events, and the contributions of certain individuals.

SCHULTZ: I can try, for whatever my views and the accuracy of my memory are worth.

WILLIAMS: Tell me how you came to be the first woman president of the American Documentation Institute, in 1962.

SCHULTZ: I was very surprised when Sy Newman, who chaired the nominating committee, asked me to run. I told him that it would be crazy—a woman could not win, and anyhow, why choose me as the guinea pig?

Sy thought the time had come to try out the idea, and he thought that I had the necessary visibility, after having been associated with Dr. Mauchly, giving papers at meetings and being a participant in discussions at meetings. Besides, he said, he liked me, and thought that others did. With all those compliments, I thought, “Why not? I’ll just make up my mind not to care if I lose.”

That was before I knew who would run against me. They chose my good friend, Robert Taylor, at Lehigh University. Bob was also teaching a course at Drexel. After we both knew we were in a popularity race, we stopped at the pub near the Drexel campus and had a heart to heart talk about it. I was sure he would win and I was already embarrassed that I had said yes. But then it came out the other way around, and I did not know what to say to him. However, he ran again in a somewhat later election and won. The matter never hurt our friendship. I guess it was just a sign of the times—woman’s lib and all that. As you know, there have been a number of female presidents since then.

WILLIAMS: Yes. Did you have a good experience, once you were in office?

SCHULTZ: It was a good experience. There was a complication at the beginning, when I was vice-president. John Kaiser had just been hired as the first Director of ADI. He made an adamant statement that he would not work for a woman, never had a woman boss, and never wanted one. That caused anxiety for a time, but once Mr. Kaiser and I met, he warmed right up, and began to habitually call me Lady Claire—meaning it as a compliment. We worked together easily, but he never dropped the “lady” bit.

The membership of ADI grew quickly, in fact doubled, the year I was president, not because of anything I did, but because there was a mystery man named John Deere, who dedicated himself to making that happen. No one knew his background or his motivation, but he wandered around the USA, visiting each ADI chapter, and recruiting as he went. He would appear at places where I was consulting or speaking; I never knew how he knew my itinerary—it was kind of spooky. But, he would “report in” and then disappear again. After that year he was never heard from again! How’s that for a story? If it weren’t for the tangible results, and the many people who met him, no one would believe it.

ADI’s office was on N street for a while; just a few blocks from the office of Watson Davis, founder of ADI. Davis and ADI had been on the outs for a long time, but one day he telephoned while I was at ADI headquarters, and asked if I could come over for an informal lunch. I was surprised, but said I’d like to meet him.

He had sandwiches sent in and we sat on the floor in front of one of his many bookcases as he showed me the contents of the section on ADI. There were duplicate copies of much of the material about its founding and early activities. He gave me one of each and said he hoped ADI would find them useful. I said I would try to get a history of ADI written, so the facts about its beginning would be more widely known. He was so friendly that I asked if he would like to give a talk about ADI’s history at our upcoming meeting in Florida. He accepted and came, even though Washington was hit by a serious ice storm and he had a bad time trying to get a taxi to the airport. Everyone was pleased that the long rift between ADI and Watson Davis

was over. I'll never know what motivated him to call me that day, but I suspect it had something to do with my knowing his son-in-law, Calvin Mooers. Maybe he had premonitions of what was to come; he died not long after that.

WILLIAMS: That is very interesting. I've been glad to find your publication of that early history of ADI—it has helped me in my current project. Last year Watson Davis' son came and talked to an ASIS [American Society for Information Science] history group, in Baltimore. Mrs. Mooers had planned to come, too, but couldn't, so we did not hear about Mooers, just Davis. Now, could you tell me about some other people you knew. I'm wondering how strongly you think Mooers influenced your career—your interest in information retrieval.

SCHULTZ: As you know, Calvin claimed to have invented the term, "information retrieval." I guess the term was meant to express contrast with "document retrieval" as librarians practiced it. Mooers meant to include retrieval of specific parts of documents, like journal articles, or chapters of books, or in some cases, statements of fact. I was experienced in retrieving journal articles and answering specific reference questions, so that concept was not new to me. His ideas about indexing, though, made me think through the important factors in indexing vocabularies, or, as I came to call them, thesauri of indexing terms. As I began trying to build a vocabulary and a set of indexing rules that varied from existing library tools and teachings, I was influenced by things I had heard Mooers say during our few encounters, and his few public talks. Also, I doubt that I would have gotten interested in random, superimposed coding if it were not for Mooers. Use of random numbers was a workable idea, at the time that he was "selling" it. Numeric codes weren't needed once computers came along, because we could work with actual words in a computer, not representations of words. I think he was a very bright man, and I'm glad I met him when I did. It's hard to judge how much his ideas carried over into my later activities. I seldom saw him, except for a few times at MSD, and sometimes at meetings. Later in my career, his advice to ASTIA paralleled my advice to ASTIA, and that was of some help.

WILLIAMS: Did you know that [C. W.] Cleverdon claimed to have coined the term "information retrieval?" You never heard that? Speaking of Cleverdon, tell me what you thought of his work—the Cranfield studies (19).

SCHULTZ: No, I never heard that Cleverdon laid claim to the term "information retrieval." Cleverdon was an earnest person. I was always an admirer of his work. It did not seem earthshaking but I went over to Cranfield for a couple of his conferences. He sharpened the ideas about relevance measurement to a significant degree.

WILLIAMS: What did you think about NSF supporting him? I've heard that some States-side researchers did not like that.

SCHULTZ: That never bothered me. His work was enhancing our field, so why discriminate about where he lived? I was aware that some people poked fun by calling him the Clever Don, but I liked him and never paid much attention to efforts to discredit him.

WILLIAMS: Did you ever have funds from NSF?

SCHULTZ: Yes, I worked on a NSF grant to ADI the year I was VP and program chairman. The grant was for organizing a meeting that would review accomplishment in our field. Burt [Burton W.] Adkinson [NSF] did not like any of the proposals he received when he advertised for someone to do the review. He talked with me about how I thought such a review should be done, and as a result gave the funds to ADI, to carry it out at our next annual meeting. Accomplishing the task was not easy, but it came off all right—the papers were published in *American Documentalist* immediately after the meeting. Both the meeting and the published papers were well received. It took a couple of years, but that effort led to the Annual Review series that has continued ever since.

WILLIAMS: In Laurence Heilprin's introduction to ARIST [Annual Review of Information Science and Technology] he does not mention your NSF sponsored review at the ADI Meeting. Any idea why?

SCHULTZ: Larry and I were not the best of friends. In his words, he considered me an "uppity woman."

WILLIAMS: You began a project at ADI called Documentation of Documentation. What was that?

SCHULTZ: That was at a time when authors of papers in journals were given a packet of free reprints of their articles, for personal distribution. I had the idea that if ADI members would send Headquarters one copy of each paper, and the ADI office simply filed them by author, it would gradually build a library about documentation. Pete Luhn liked the idea and sent a box full of his work; a few others sent reprints, too, but nothing much happened. The ADI office was not too keen about the idea, because of space limitations. Without my knowing it, a couple of years later, the Doc Doc library just disappeared.

WILLIAMS: Luhn's papers were not saved? I'm having trouble getting copies of them for my work.

SCHULTZ: Nothing was saved, as far as I was able to determine. I'm glad I took Watson Davis' material home with me. It is now with my collection at Babbage Institute—not that anyone would think of looking for it there. You could probably find some of Pete's papers at Babbage, too. He gave me a duplicate of what he sent to ADI, but my students wrote papers about Luhn, and made off with some of what was in my collection.

WILLIAMS: What did you think of the work of Wilfred Lancaster and the study he did of Medlars after it became operational? He found some fault with Medlars.

SCHULTZ: Oh, I remember that vaguely. I think the important measure of Medlars' worth was that from its beginning, it caught on and was used internationally, to good effect. It was to be expected that an innovative, pioneering system would have some flaws and growing pains. But none of them were so serious that it could not be corrected. I'm still proud to have had a part in Medlars.

WILLIAMS: You mentioned Clayton Shepherd in connection with Medlars. I read that later he worked with Marjorie Hyslop, at the American Society of Metals. Tell me about that.

SCHULTZ: Yes, Clay appeared out of nowhere while I was still pretty new at Rem Rand. He was going to graduate school at Penn and needed a job. He had never programmed a computer, but wanted to learn how to do it. I was just learning to program, myself, and did not like having to spend so much time at it, so with Dr. Mauchly's approval I hired Clay to do it for me. He got to be a good programmer.

When Rem Rand was talking with ASTIA about how to use its new computer and I declined the offer to do it for them, Rem Rand got Clay to write a program that simulated how searching with the IBM 101 was done at MSD. But when Colonel Hammond was hired to be in charge of the computer at ASTIA, he was not interested in waiting for that program to be written, and it was dropped. He wrote his own program that compared words in a question (no Boolean functions included) with indexing words that described documents. Later he learned how to make his program more sophisticated. It took him longer than it would have taken Clay to do it, I'm pretty sure, but at least Col. Hammond was learning, and that paid off.

Clay left Rem Rand when Dr. Mauchly did. He went west and worked with Marjorie Hyslop for a while, and later joined the faculty of Indiana University. Clay was still young, but died within a few years after that.

WILLIAMS: I've seen references to Marjorie Hyslop. What was her contribution to the field?

SCHULTZ: I think she had the title of "Librarian", at the American Society for Metals. They were interested in Perry's search methods, and Marjorie was their representative in dealing with Western Reserve. Marjorie was a pleasant, articulate woman, who participated in SLA meetings to share what she had learned about information needs of scientists, and the kind of searching that needed to be done on their behalf. When I heard her speak I was impressed by her knowledge and common sense.

Harold Wooster, when he was an administrator at the U.S. Air Force Office of Scientific Research, had helped to support Perry's development of a Searching Selector. Anyhow, Wooster's office paid the way of a number of people, to go to Western Reserve, in the late 1950s, where Perry intended to demonstrate the GE 125, a machine that had grown out of his attempts to build his Searching Selector. At Rem Rand, I was a contractor supported by Wooster's office, so I was among the people he sent to critique Perry's accomplishment. I remember that Marjorie Hyslop was there, and spoke on behalf of the 125, because her Society had a strong interest in what would become of Perry's work.

The upshot of that meeting was that the effort fizzled. It was sad, because Perry had been on the right track, very early on, but it had taken so long to develop his ideas, that they

were behind the times and seemed clumsy, to say the least. Soon after that, [Allen] Kent, who had been associated with Perry, went to the University of Pittsburgh and Perry went to the University of Arizona. Madeline Berry [Henderson] had departed earlier.

WILLIAMS: What was your opinion of Perry? Of Perry, Berry and Kent, as I've heard the trio called?

SCHULTZ: I thought Perry was stimulating. He understood chemistry, and chemical nomenclature. He also had a strong interest in teaching scientists to read Russian in the years just preceding Sputnik, but his system design seemed a bit obtuse. I never understood, or liked, his ideas about preparing abstracts.

Perry had a leading part in forming the Chemical Literature Division of ACS. Several people, including Gene Garfield, have said that he helped them to get started on their careers. I thought of him as a sort of traveling mentor. He kept up with what was going on by visiting sites of activity. He contributed to meetings by critiquing presentations, as they were given—from the front row of the audience. He seemed to always be sitting there, with his longish hair standing straight up on his head, ready to challenge speakers. The one disfavor he did me was to hold my thesis, which he had asked to publish, until 1958 rather than publish it in the earlier edition of his book *Punched Cards* (20). That prevented my MSD system from being known as widely as it might otherwise have been. He explained that his doing that was just a slip up.

I never knew what Kent's contribution to the team was. Madeline Berry could probably tell you that story better than I. Madeline had always been the worker on the team—the systems person who kept things on track and on time, but she got little notice because she stayed behind the scenes.

WILLIAMS: I'm going to be interviewing Madeline sometime soon. Tell me a little more about how you saw her contribution to the field.

SCHULTZ: She deserves a lot more credit than she ever got for both her hard work and her understanding of developments. When she left Perry and joined the NSF staff, her ability to gather and organize information were already well practiced. For NSF, she visited everybody and his brother to get first-hand data about what was happening in their places of work, discussed it with them. She encouraged them to write up what they were doing, for the NSF publication she began to edit for NSF in 1957, called, "Non-conventional technical information systems." Her grasp of the field was so firm that she could personally compare individual applications, and thus help to make the write-ups clear and useful to readers. Her series was a big hit. The volumes were hard items to retain in a library.

WILLIAMS: Yes, I know. I have been looking for copies to use in my historical research.

SCHULTZ: Maybe I can oblige you. I still have some copies in my attic, probably not a complete set. Babbage Institute did not take my books when they took the rest of my collection.

WILLIAMS: There were only four issues.

SCHULTZ: We'll have to look. I do not use them anymore. But, about Madeline—her supervisor at NSF, Helen Brownson, also worked hard to serve the field and was appreciative of Madeline's abilities. I don't remember the how and why of their break-up, but Madeline went on to the National Bureau of Standards to work with Mary Elizabeth Stevens, another person who served the emerging profession well. Mary Elizabeth helped to plan special conferences on hot topics, sponsored by the National Bureau of Standards. She authored some very good reviews of various kinds of computer applications to our field. She and I liked each other, but one time she took me to task for having written a paper at Rem Rand that I entitled, "A generalized computer method for index production" (21). She thought what I wrote was pretentious and anything but generalized—she said I had not had enough experience to "know it all," and that she was surprised that I would be guilty of such an error. She interpreted "generalized" to mean "applying to all cases." It was too early for anyone to know it all. I just wanted to be helpful to those who were getting their feet wet, by making the elements of the process as evident and organized as I could. I've shied away from even looking at that paper ever since.

Madeline and Mary Elizabeth were strong women. Their management capabilities, their organization and leadership, were important to the development of information science.

Madeline and I have roomed together at meetings a few times, once in the Hague. Those times gave us a chance to do some informal talking and gossiping. She married later than I, but one time she said it was her ambition to have five children, as I did. That was an unusual compliment—almost everyone else thought my large family was a detriment to my career. I have always been glad I have known Madeline.

WILLIAMS: Well, that's about the end of the list of people I wanted to ask you about. What about Herbert Ohlman? Did you know him, and how he and Pete Luhn came to produce a KWIC Index at about the same time?

SCHULTZ: Yes, Herb was a computer pioneer. He was clever and insightful, but not affiliated with a wealthy company at that time, as Pete was. Herb told me that he had been an employee of IBM earlier in his career, but left because IBM wanted to bury his ideas under a bushel, given that the things in which he was interested would compete on the market with products they already had established.

Wherever Herb was working at that time—he moved around a lot—he happened to permute sentences into lists that made them usable as indexes. I think Herb's program was finished first, but both he and Pete presented their work at the ICSI Meeting, in Washington DC. Pete's index already had a catchy trade name—KWIC. Their techniques were almost identical, except, perhaps, for how they got rid of prepositions, conjunctions, and such, that they did not want to appear at the beginning of alphabetized sentence fragments. Pete had what he called a "stop list." I don't remember how Herb did it. Pete acknowledged that they had independently accomplished the feat.

WILLIAMS: You never saw their programs, to compare them?

SCHULTZ: Seeing anything written at IBM was a no-no.

WILLIAMS: Ohlman's work just disappeared? I've been wondering about other ideas that might have appeared and then disappeared. What are your thoughts about that?

SCHULTZ: There were many ideas and enthusiasms flying around, but in general, I think the ideas that hit the dust were less workable than the ones that survived—or else they were transformed as time went on. Uniterm indexes, for example, could be thought of as being like KWIC indexes, except that in KWIC indexes context is preserved and does not have to be pieced together through “lookups.” I've always thought that serviceable ideas survive—the less serviceable ones do not—it's evolution at work. But, of course, it helps to have backing for a new technique, if it is to get recognition.

WILLIAMS: All right. I'm especially interested, right now, in sorting out the history of relationships among librarians and documentalists. How did you see them? Did documentalists tell librarians that they just did not have enough scientific training to understand users' questions?

SCHULTZ: As we were saying, librarians did not have scientific training, but no, the documentalists were not calling them names or accusing them of being inadequate—there was little communication between them. The general run of documentalists were people with scientific training, and no library training, who were not interested in how collections were built and maintained. Their differences stemmed from librarians having been trained to acquire documents that would served readers' interests. However, librarians were not trained to involve themselves in individual readers' daily activities or involve themselves in screening incoming literature on behalf of readers. Documentalists typically came from the ranks of the readers, and knew what the problems were in keeping up with the literature. Some librarians were curious about what the documentalists were making so much noise about. It was those librarians who attended documentation meetings to find out.

The problem was the huge increase in the amount of scientific literature, partially due to government supported research during World War II. The indexing and abstracting publications were progressively falling behind the literature just after World War II. That time gap had to be bridged, or else researchers were spinning their wheels. Scientists could not keep up with what distant colleagues were doing, and their companies could not keep up with competitive introductions of products. That's why so many chemical literature specialists sprang up—departments in research organizations were appropriating funds to support their need to know. Librarians with both scientific and library training were in a position to help with the problem. That's why I began experimenting with punched cards—to see if that would be useful.

WILLIAMS: I see. You think it was just a sorting out of backgrounds needed to meet the needs. Librarians were still needed, but so were subject specialists.

SCHULTZ: Yes, among the subject specialists there was a mix of good and bad ideas about how to meet needs. There were feelings of inadequacy on the part of librarians who saw the needs, but did not know what to do about them.

WILLIAMS: What about Pete Luhn's development of SDI—selective dissemination of information? Wasn't that something librarians had been doing?

SCHULTZ: Yes, he acknowledged that. He was trying to speed it up with the help of a computer. And then, he added auto-abstracting in the hope of enhancing the product, but the auto-abstracts were not very good. Garfield's publishing of tables of contents had more appeal—as long as libraries kept new issues of journals constantly available in one place, the library—so the articles brought to attention in the circulated tables of contents could be consulted easily. Librarians had a hard time keeping the journal issues in the library. Some scientists put their own needs first, and simply carried the issues away, without charging them out.

WILLIAMS: Did Luhn's idea of adding abstracts to a SDI list make the idea more useful?

SCHULTZ: I think the answer is no, because automatic abstracts were not well constructed. Machine-generated abstracts, at that time, did not dependably capture the meat of a paper, and certainly did not tailor content to the needs of particular workers.

WILLIAMS: It is my impression that the predominant theme of your work was vocabulary control and thesaurus construction. Is that correct?

SCHULTZ: I guess terminology was my theme, or at least one of my themes. How questions were asked, or how they could be asked, had everything to do with the adequacy or suitability of answers. After the advent of computers, the easiest thing to do was to put authors and titles into machine-readable form and then search. It became evident that additional text was needed to attain more precision—either well-chosen indexing terms, or well-formed abstracts, or both. I'm not sure we have gotten beyond that point. Full-text searching is not as practical, in terms of time and expense, and it can still be less precise, depending on whether an author's language matches that of the questioner. An intermediate translation is still needed some of the time, and that translation can be aided by a machine-readable thesaurus. Maybe I should say, a machine-created thesaurus; one that accumulates experience in handling human language so that variant expressions of the same meaning can be equated.

WILLIAMS: What is your idea of how all of this is developing? What does the future hold?

SCHULTZ: I'm not a pundit, so maybe I should not try to answer that. Some interesting clues at present are the kind of thing I was mentioning about the training of school children. Kids are learning to work in multi-media; responding to assignments by using not only words and numbers, but sounds and pictures of many kinds. They ask questions like, "How can I get a picture of an Egyptian mummy that shows his bandages and also shows the pyramid where the

mummy was put? I also want to add Egyptian music to my computer file so I can use it when I switch scenes.” Or, “In my movie I want to have buttons that switch from one scene to another using pictures and sounds that represent Egyptian agriculture, trade, education and family life. Can you help find those things?”

Now that so much data, and so many kinds of data can be digitized, the “digital library”—the “world library”—is becoming truly voluminous. It is interesting that among other things, older manuscripts that have not been available for consultation for centuries. Some at the Vatican are now being digitized, or soon will be. Added to the current content of the Internet and World Wide Web, we are constructing a huge, formless haystack in which to find needles. On top of that, each potential audience asks its questions in its own language. These elements of future database searches make for some very complex mixing and matching.

Children will have to start at an early age to find their way through the complexity. Think how perplexing it is for an elementary school child to have to perform searches in what are considered simple databases, such as encyclopedias, that have entries under “rhetoric” when the child is looking for education of Greek children, or entries under “economics” when the child is looking up trade between countries. Projecting from such considerations makes it clear that the computer will have to provide a means for translating into the language of users. If I were going to be around, I might be very busy helping computers to build thesauri for such needs. [laughter]

Until now, we have not considered it necessary to index, for prospective users, the elements of a photograph or painting, such as its lines and colors. Or, to detail elements of musical works such as chords, intensities, et cetera, so the works would be located when specifying such elements. Nor have we made explicit the possible emotional effects of individual artistic works, for the sake of, say, psychologists or those who want to use those effects in other kinds of work. Such considerations make the future very exciting to contemplate.

WILLIAMS: Thank you, Mrs. Schultz. We have run out of time. Let’s leave it there.

[END OF INTERVIEW]

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