CHEMICAL HERITAGE FOUNDATION

SAUL HERNER

Transcript of an Interview
Conducted by

Robert V. Williams

at

Fairfax, Virginia

on

16 July 1997

(With Subsequent Corrections and Additions)

CHEMICAL HERITAGE FOUNDATION
Oral History Program
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Saul Herner

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

SAUL HERNER

1923 Born in Brooklyn, New York, on 29 January

Education

1945 B.S., biochemistry, University of Wisconsin
B.S., library science, University of Wisconsin

Professional Experience

1945-1946 Research Chemist, U.S. Army Air Corps

1946-1948 Chemical Reference Assistant, New York Public Library

1948-1950 Assistant Curator and Engineering Librarian, New York University

1950-1953 Johns Hopkins University
Chief Librarian, Applied Physics Laboratory

1953-1956 Atlantic Research Corporation
Head, Technical Information and Library Planning Group

1955-present Chairman and Consulting Specialist, Herner and Company

1964-1968 Adjunct Associate Professor, Drexel Institute of Technology

1966-1967 Lecturer, University of Maryland

1970-present Editor-in-Chief, Information Resources Press

Honors

1982 Miles Conrad Award, National Federation of Abstracting and Indexing Services

ABSTRACT

Saul Herner begins the interview with a discussion of his childhood and family background. He grew up in New York, and attended the University of Wisconsin, where he received a B.S. in biochemistry in 1945. In 1946, after a brief time in the Army, Herner was hired as a chemical reference librarian at the New York Public Library. At the same time, he began working towards a bachelor's degree in library science, taking correspondence courses at the University of Wisconsin. In 1948, Herner took a job at the engineering and science library at New York University, where he was first introduced to special libraries and the SLA. Two years later, Herner moved to the Applied Physics Laboratory at Johns Hopkins University, and he began developing an interest in user studies. He discusses his involvement in a number of organizations, including the ACS, and his colleagues in information science. In 1953, Herner joined the Atlantic Research Corporation. While there, he began to form his own company, now known as Herner and Company. Herner discusses how he gained clients, his company's involvement in particular projects, and the importance of government support in the field of information science. In addition, he discusses developments in information retrieval during his career. Herner concludes with a discussion of his teaching experiences, his involvement in IIA, and comments about the history of information science.

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 M.S. in library and information science from Florida State University; and an M.A. 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 many 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: Fairfax, Virginia

DATE: 16 July 1997

WILLIAMS: Mr. Herner, I have it that you were born in Brooklyn, New York, on January 29, 1923.

HERNER: That's correct.

WILLIAMS: However, I don't have much information about family background. Tell me about your parents and your early years.

HERNER: Well, I spent the first eight years of my life in Brooklyn. Then we moved to Queens, which is on Long Island. My parents were there until 1973 when they both died. However, I worked in New York from 1942 on. Let me back up a bit. During World War II, I was a civilian technician with the U.S. Army Air Force.

WILLIAMS: Let's go back first and talk about your degree from the University of Wisconsin [UW]. How did you get to Madison? That's my alma mater also. I understand that you have a B.S. in either agriculture or biochemistry. Which is correct?

HERNER: Oh, the biochemistry department at that time was in the school of agriculture.

WILLIAMS: Well, how did it come about that you went there?

HERNER: I was a pre-veterinary student. That was my intent.

WILLIAMS: Ah. You went from New York to the University of Wisconsin, then.

HERNER: Yes. I decided after a couple of years that I didn't want to be a veterinarian. I switched to the biochemistry department—agricultural chemistry department, technically—and ended up there. Then, it's sort of a complex story. When the war ended, I was at various Air Force installations—it was the U.S. Army Air Corps at the time—including Truax Field in Madison and Boxdale Field in Shreveport, Louisiana.

WILLIAMS: Now, when did you join the Army Air Corps?

HERNER: I was a civilian technician.

WILLIAMS: You joined just as soon as you got your degree?

HERNER: That's right. As a matter of fact, before.

WILLIAMS: Oh, before. That's right, because your degree was issued in 1945.

HERNER: That's right. While I was at Truax Field, I was still going to school. At the end of the war, the appointment was for duration plus six months. I'm trying to remember the exact date. Around 1945, I came back to New York, temporarily.

WILLIAMS: Some time around then, you got your bachelor's degree in library science from Madison.

HERNER: That's a complex story. I came back to get that.

WILLIAMS: Oh, all right. You got your degree in biochemistry in 1945. Then, you went back to New York.

HERNER: Yes. I was trying to decide what I was going to do. It's a funny story—sort of like a Mel [Melvin S.] Day war story, only a post-war story.

WILLIAMS: Oh, yes? Well, go ahead—tell it.

HERNER: Well, I was walking down 42nd Street and I came across a sign at the New York Public Library, which is at 5th Avenue and 42nd Street. At the 42nd Street entrance, there was a sign that said that they were looking for people with majors or degrees in science—any kind of science. I walked in to see what this was about, and they interviewed me and they hired me—it was real quick—as a chemical reference librarian. I was in the science and technology division.

WILLIAMS: Now, you'd already been discharged from the military at this time.

HERNER: Yes. That was the end of my six months. [laughter] As a matter of fact, it was before the end of the six months, but they let me—I should say, I don't know if they let me out or threw me out. They didn't need me anymore, so I went to work there. This is interesting stuff, you know.

WILLIAMS: Where did they put you?

HERNER: In the science library, in the main building.

WILLIAMS: In the main building?

HERNER: In the science and technology division. It was very interesting. It's just a huge collection. I had never seen anything like that. I spent all my time in the stacks just walking around. I couldn't get over it. The rest of the time I would answer, or try to answer, chemical reference questions. They just gave me chemistry. They also had the New York Public Library Reference. That big building is really run by the Astor-Tilden-Lenox Foundation. It's private. It's not publicly supported, so they also took on industrial clients. We'd get all kinds of fancy reference questions from the Borden Company, and occasionally a chemical company. I used to try to field those as best I could by using my chemistry, not my biochemistry.

I did that for about a year. Then I thought, "Gee, you know, it would be interesting to go back to library school." I had had a passing acquaintance with it.

WILLIAMS: This was while you were in Madison?

HERNER: Yes. As a matter of fact, I audited a few courses out of curiosity. I thought these people were very peculiar. [laughter] I took courses in cataloging and stuff like that.

WILLIAMS: This is while you were there in 1945 now, before you came back. Why? That's a strange thing for a biochemistry major to do.

HERNER: I don't know. You know, I really can't tell you why I was interested. I was more interested in creative writing, as a matter of fact. I was taking side courses in creative writing, and I was doing freelance writing in *Science*. I used to make about a hundred bucks a month publishing articles. I guess you don't remember *Pageant Magazine*, *Coronet*—there were a whole bunch of little magazines.

WILLIAMS: Now, were you doing this before you got your degree in 1945?

HERNER: Yes, and while I was at the New York Public Library, too.

WILLIAMS: All right, and while you were there, too.

HERNER: I remember sitting at the stacks typing articles with everybody wondering, "What is he doing?" [laughter]

WILLIAMS: Were these published under your name?

HERNER: Yes. Crazy articles I had. There was, I think, one on an anti-malarial drug. I can't remember where—I must have seen it in a medical journal at the library or somewhere. [laughter] It was right after the war. There was quite a scourge of malaria among the returning veterans. This stuff—which I guess is still used, strange to say—apparently was quite effective in checking it in some way or other. I wrote it up, and I remember it appeared in *Pageant Magazine*. It was called "Paludrene—Death to Malaria." [laughter] Then I had another one on—there was something in the stalk of the tomato plant that had an anti-fungal effect. They were trying to prevent tomato rot, and they discovered that this material also could be used on human fungi. That came out with a title like, "Tomatoes Used on Athlete's Foot." [laughter] That's what I used to do.

WILLIAMS: You were doing this on the side while you were at New York Public. Well, tell me about going back to the library school at Wisconsin. What was that like?

HERNER: It was mainly nerve, because at that time in Wisconsin, you could take a final exam in anything—I don't know if this is still true—and I was getting kind of heady, so I was taking

several correspondence courses and taking exams. I thought if I had a master's subject, I would go for the final exam. You take what you get. If you get an "F" in the exam, you get an "F"; if you get an "A", you get an "A".

WILLIAMS: You were taking the correspondence courses in New York from UW, then.

HERNER: Yes. I remember I was working around the clock, but I was having a good time. [laughter] That's how I eked my way through.

WILLIAMS: Did you do it strictly through correspondence, or did you actually go back to Madison?

HERNER: I went back. I was in Madison for about six months. Then I decided, "I don't need that. I can go this peculiar route."

WILLIAMS: You got the BLS [Bachelor of Library Science], though, right?

HERNER: Well, it was at that time. They didn't call it a BLS. What did they call it? They gave you a certificate. We went through stages. At the time I was taking it, you got a certificate and then they gave you the equivalent of a B.S. Then it was elevated to—this is like with law, where they give everybody an LLD now. At that time, a certificate, to a B.S., to a—I guess it's an MLS nowadays.

WILLIAMS: Do you remember any of the faculty who were there at the time?

HERNER: I only remember two people: Rachel Schenk and Henry Allez, who was the dean.

WILLIAMS: Oh, yes. Well, Rachel Schenk was one of the Wisconsin institutions. She was very famous in reference, and maybe cataloging too.

HERNER: I think cataloging.

WILLIAMS: Maybe that's what it is.

HERNER: When we started at first, I was sort of down on cataloging because I felt, "All these people do is transcribe tracings from the bottom of the card to the top of the card, and take great pride." Sometimes you type it in red, and sometimes you type it in black, and so forth. I was sort of intrigued by the whole business of what Henriette [D.] Avram was doing at the Library of Congress. You know, MARC [Machine Readable Cataloging]?

WILLIAMS: You're talking about a much later period now.

HERNER: Yes, well, she sort of rationalized the whole thing. What she did was computerize what these people were doing imperfectly. She perfected it. I congratulated her on it. She didn't realize what she had done, because she hadn't sat and watched these people cataloging.

WILLIAMS: Then you went back to the New York Public Library after your six months in Madison and continued working.

HERNER: No, as a matter of fact, I didn't go back to New York Public.

WILLIAMS: Oh, you didn't?

HERNER: I came back. I was feeling very assertive and confident. I still wasn't sure what I wanted to do. The Special Libraries Association [SLA], at the time—maybe they still have it—had an employment bureau. I said, "I want to see what career opportunities there are." They got me a job at the Engineering and Science Library at New York University [NYU] in the Bronx. I stayed there for a couple of years.

WILLIAMS: This got you into the special libraries world. When did you join SLA?

HERNER: Just at that time.

WILLIAMS: At that time. All right.

HERNER: Then I stayed there for a couple years.

WILLIAMS: How large was the staff that you supervised there, do you remember?

HERNER: Oh, about three.

WILLIAMS: Yes. This was in the Bronx?

HERNER: God, yes. I was going from Queens to the Bronx, about two hours each way. [laughter] Using the same route—I mean, through the SLA—I got a job as chief librarian of the Johns Hopkins University Applied Physics Laboratory. I stayed there for about three years.

WILLIAMS: I have here that you came to Johns Hopkins in 1950.

HERNER: Then I left in 1953.

WILLIAMS: You would have left in 1953, right? I'm not actually sure.

HERNER: I think it was in 1953.

WILLIAMS: Well, tell me about what it was like at Johns Hopkins then. How large was the staff you were supervising there?

HERNER: Oh, there I had about eight people. Well, I also discovered a new form of literature that I was vaguely acquainted with. When I was at NYU, they were just declassifying the atomic energy reports from World War II, and I guess, captured German and Japanese documents. One of the things we were doing at NYU was trying to organize these things and trying to disseminate them: "What are we going to do with them?" At the Johns Hopkins Applied Physics Laboratory, they were among the big producers of these reports, and users of them. They used them much more than conventional books, journals, and so forth.

The scientists didn't know or care much about journals or books or anything. I was wondering, "Why don't they use a conventional library? What <u>do</u> they use to get information?" This led me to do a bunch of interview studies over there (1). I discovered, "Gee, these guys use these reports." That did two things. One, it acquainted me with the significance of these reports and the fact that they have to be organized, and in fact, <u>are</u> being organized by some libraries. Various things were happening at the same time. They had at that time the Armed Services Technical Information Center, and they were organizing them.

In other words, in ignorance, I did this study, and the scientists educated me in what these things were, how to use them, and how they find them. They also had a research arm at the Applied Physics Lab that did basic research at that time. "Uncommitted Research," I think was the term they used—as opposed to, let's say, "Unapplied."

I noticed this diversity—this dichotomy, I should say. When the basic scientists, the long-haired, were looking for information, they did it one way; and the applied guys, the report users, they did it quite another way. I started making lists of ways of getting information and trying to relate it to type of activity. I thought, "For some reason or other, there must be some relationship between what you do and how you get information." I'm trying to remember exactly what happened.

WILLIAMS: Your first article on user studies was in 1954, then (1). It seems that what intrigued you was, when you came to Johns Hopkins, you saw that those scientists were not using the regular journal and book literature. Instead, they were really interested in technical report literature.

HERNER: Well, as a matter of fact, there's another anecdote. I attended a meeting while I was at Johns Hopkins. It was announced in the journal, *Science,* and I was just curious. The meeting was called "Operation Crossroads." It was in Philadelphia. I went to this meeting.

WILLIAMS: Now, who was sponsoring this?

HERNER: Oh, I think it was the National Academy of Sciences. I remember Detlev Bronk was the director. He was the head of the Academy at the time, and the National Research Council, and so forth.

WILLIAMS: This was in what year, now?

HERNER: That was in 1951.

WILLIAMS: 1951? I think I have a notice about that from some of your writings. I don't see it here at the moment, though.

HERNER: I mentioned it in something I wrote in the *ASIS [American Society for Information Science] Bulletin*, I think (2). The thing is that Jim [James W.] Perry was one of the speakers.

He was saying, “Here’s how scientists get information.” That sort of stirred my curiosity—as a matter of fact, my animosity—a little bit. One reason Eugene Garfield and I became friends is because both of us can’t keep our mouths shut. [laughter] I raised my hand and I said to Perry—he has one of the main tools, and I’m asking him, “Have you done an empirical study of some kind to determine what tools scientists actually use?” I guess he had written his book on punched cards (3).

WILLIAMS: It came out in 1951.

HERNER: He claimed that they took these pads. I saw these other guys, these reports users, and I thought, “Gee whiz, there are chemists among these reports users. It can’t be all that way.” That sort of embarked me on that study.

WILLIAMS: What did Perry say when you asked him this question?

HERNER: [laughter] He sputtered, as a matter of fact. Then, I remember a guy sitting next to me in the audience saying, “Have a heart!” [laughter]

WILLIAMS: Now, when you wrote your 1954 article on user studies, had you read the [John Desmond] Bernal study at that point (4)?

HERNER: Oh, sure. In fact, that’s one of my citations.

WILLIAMS: All right. You knew about that, then.

HERNER: That was another kind of issue. This was based on technique. He was using diary methods, and I thought, “Gee whiz, talk about biases.” If you have a guy living with himself and recording—as opposed to having a large sample and hitting him with a sort of critical incident—ask him to think of the last time or the last two times he went to get information and, “What did you do?” Then give him a list. First ask him what he did—anecdotal, sort of, or critical incident. Then double-check by asking, to see if he contradicts himself and so forth. It was amateurish, on the one hand.

[END OF TAPE, SIDE 1]

WILLIAMS: All right. When did you start that study that you published in 1954?

HERNER: About 1952.

WILLIAMS: You have a pretty good-sized sample, as I recall from reading that.

HERNER: I had six hundred and six, to be exact.

WILLIAMS: Yes, right. This seems to be the beginning of your long reputation concerning user studies. Was anyone else interested at that point?

HERNER: Oh, sure. Herb [Herbert] Menzel—remember him? He was interested, but from another viewpoint. I'm trying to relate these things because Belver Griffith was, but that was quite a bit afterward.

WILLIAMS: That was later on, right.

HERNER: Well, I had a big bibliography. There was an awful lot of discussion of methodology at the time.

WILLIAMS: Even in the early 1950s, there was? Well, when I was looking at your bibliography, I counted over twenty articles and reports that were about user studies in one form or another. You've made a kind of career out of user studies.

HERNER: I did. Some of them were ones that people asked me to do, and sometimes I was just interested. Some people said I was a fanatic. [laughter] Remember Ralph [R.] Shaw?

WILLIAMS: Ralph Shaw said that to you?

HERNER: That's funny. A funny story about Ralph Shaw—through a user study, he introduced me to my wife, who was doing studies.

WILLIAMS: Oh, he did?

HERNER: Do you know the name D. J. Urquhart? Well, my wife was working for him in England. She was sent over here for various reasons. I was doing a study with Ralph Shaw at the U.S. Department of Agriculture—Graduate School of Agriculture, I guess it was. He wanted me to go and meet her and pump her—"See what she has."

WILLIAMS: Now, I have her listed as cultural attaché at the Embassy.

HERNER: No. She was assistant scientific attaché.

WILLIAMS: Oh, all right. She was working for Urquhart?

HERNER: In England.

WILLIAMS: What kind of work was she doing?

HERNER: She was running an abstracting and indexing division for the Department of Scientific and Industrial Research.

WILLIAMS: Ah. All right. What happened when you went and met her?

HERNER: Well, we were basically interviewing one another. She was pumping me and I was pumping her. In other words, it became a banter. [laughter] Before you know it, we were going out, and before you know it, we decided to get married.

WILLIAMS: Now, how long a period of time elapsed between these two?

HERNER: Oh, about a year.

WILLIAMS: Was she doing studies here in the U.S. with Urquhart, or was she just continuing with the British Embassy?

HERNER: Well, her job was to make sure that the British scientific community was aware of developments in information science, or any kind of science for that matter. She used to facilitate visits. Some of the big scientists would come over, and she would make sure that they got to see the right people.

I remember one night shortly after we were married, she had a visit from somebody who was with this [Edmund C.] Hillary expedition. He was a physician investigating heat transfer, I think. How do you get from fifty degrees below zero to body temperature? He was studying all the mechanisms, how that works. I remember that. I remember he was smoking a great big cigar as he was talking. I was helping to entertain him or keep him out of mischief, or something.

WILLIAMS: Now what was Mrs. Herner's background in the U.K.? What was her education?

HERNER: She has an M.S. in physics.

WILLIAMS: Did she have any library training? How did she get into working with Urquhart?

HERNER: No, she had no library training. She did abstracting and indexing, and she did it on her own. In other words, she was an abstractor for *Chemical Abstracts*.

WILLIAMS: Oh, she was a volunteer?

HERNER: Well, they paid her two dollars a column. I remember, they did pay them by the column. She was a translator, also.

WILLIAMS: That's right. She knew several languages, didn't she?

HERNER: She knew a lot. These are all self-taught. It's quite interesting. She'd get a textbook or something, and before you knew it, she'd be doing it. She did French, which she just studied; German, Spanish, Russian. Actually, Russian she made money on. What she handled for *Chemical Abstracts* was all Russian. They only gave her Russian articles. She did Japanese. She could speak them slightly, but she could read and write with great fluency.

WILLIAMS: She had an amazing facility for languages then, didn't she?

HERNER: Yes, she did. She loved them.

WILLIAMS: You were married within a year of when you first met her, then. Did she continue working for the British Embassy?

HERNER: Through about, oh, 1958 when she joined the firm—or we joined the firm together.

WILLIAMS: Yes, right. Let's go back a little bit to the Johns Hopkins experience. Somewhere right around then, you began writing articles about special libraries management.

HERNER: Oh, yes.

WILLIAMS: Now, did this come out of both your NYU and your Johns Hopkins experience?

HERNER: [laughter] I remember sitting and writing these things. I was living in a room at the time in Silver Spring, and I was sitting. I don't know—when I look at these things, I think of how it was at the New York Public Library. I remember, I had joined the Special Libraries Association; therefore, I was reading *Special Libraries* regularly. I thought, "You know, these articles aren't very good. Why don't I try my hand at writing a couple?" I remember, the first thing was "Selected Reading List" (5). There was a service I had developed at the Applied Physics Laboratory. This was to alert the basic scientists—the journal-based scientists—of interesting articles. It was sort of presumptuous, since they knew what journals. I always had the idea that, "No matter how much they read, they couldn't possibly keep up. Maybe it'll help them with an occasional article." It turned out that the most productive scientists did use this damned thing. It's ironic, because the heaviest users of the literature were the heaviest users of my superficial service. I thought, "Gee, I must be doing something good, so I'll write it down." [laughter]

It was the pure scientists. The other guys didn't talk to me, because they didn't like the user reports almost exclusively. If you asked them, "How do you find out about a useful report?" it was, "It either gets routed to me or somebody tells me about it." This is the report's users. I thought, "Oh, boy."

WILLIAMS: These are the AEC [Atomic Energy Commission] reports that were floating around in your library?

HERNER: Well, those, and a hell of a lot of others from the Department of Defense [DOD]. The fundamental guys, I remember—I started interviewing sort of crudely. It started off, "Let me talk to them and see what they say." These are the basic scientists. I only started with a checklist, "What tools do you use?" and so forth. I gradually added this idea of the critical incident, "The last time you went to get information"—the last couple of times—and, "What steps and what tools and what techniques did you use to get that piece of information." Then I built up a set of tools and techniques that they might use, and that's how I got my check on the critical incident.

I remember asking one of the guys there, "Well, which of these techniques do you use? Do you use a card catalog? Do you use *Chemical Abstracts*? What do you do?" He said, "My main source of information about useful information is cited references." I said, "What do you mean by that?" He says, "Footnotes and bibliographies in things I read." I added that to the list. That's just about the time I met Garfield. [laughter] I just wrote that up as part of my study, that this is a way of getting information—cited references, and all the others: abstracting and indexing publications, reading lists, and so forth. That's what I published originally (6). That came out in *Industrial & Engineering Chemistry*, which doesn't exist anymore.

I presented that paper at a meeting in, I think, Atlantic City, of the American Chemical Society [ACS]. The American Chemical Society has, and had, a rule that all papers presented at their meetings are the property of the American Chemical Society. If you wanted to publish that in any other publication, you had to get their permission. The meeting I spoke at, at the American Chemical Society, was called "Searching the Chemical Literature." That was a rubric.

WILLIAMS: This was part of the Division of the Chemical Literature program.

HERNER: That's right. It went on for years. "Searching the Chemical Literature." [laughter] I remember, did you ever hear the name T. E. R. Singer? I guess you did. I knew him from the New York Public Library. He used to work there in the very position that I occupied, before me. He had an office across the street on 5th Avenue, and he was doing translations. He was the chairman of the "Searching the Chemical Literature" session. He did it for a number of years.

I remember my giving my paper and him coming up to me, and saying to me—he had an exaggerated British accent—"Mr. Herner, aside from running five, no, ten minutes overtime, what has this got to do with searching the chemical literature? If you ask for a release of this paper—a non-publishing release or whatever—I'll support it enthusiastically." [laughter] I asked for it. I didn't know what I was going to do. We asked for the release. Then I get a telephone call from the editor of *Industrial & Engineering Chemistry*, saying, "Would you mind if I published it?" Oh, my God. I knew *Industrial & Engineering Chemistry*. That's how it happened to be published.

WILLIAMS: Now, what year did you give the paper? Do you remember?

HERNER: In 1952. It took about two years.

WILLIAMS: Yes, I have a copy of the article in my file. I had seen it in your bibliography.

HERNER: Yes. It had all kinds of drawings in it. A friend of mine did illustrations for it.

WILLIAMS: Well now, say a little bit more about the connection between you and Garfield. Were you at the 1953 conference at Hopkins that the Welch Medical Library project held?

HERNER: Yes, I was, as a matter of fact. Yes, I was sitting next to Gene.

WILLIAMS: He was the chair of that meeting?

HERNER: He was the organizer and the chair.

WILLIAMS: Tell me about your reactions to that meeting.

HERNER: Well, I was all excited at the time because, gee, this was a mixture of all the societies. Mort [Mortimer] Taube was there; Ralph Shaw was there. Was he the chairman? Verner [Warren] Clapp was there. I remember feeling very heady at the time, thinking, "Gee, all these luminaries!" [laughter] Gene had asked me to give a presentation of what I was doing.

WILLIAMS: You said you had started your study in 1952 or so.

HERNER: Yes. It kicked off a lot of discussion. I was all excited because they were asking me questions, some of which I couldn't answer. I remember Ralph Shaw saying to Gene, "For Christ's sake, shut your mouth. They're trying to congratulate you!" [laughter]

WILLIAMS: He said that to Garfield?

HERNER: Yes, because Gene was iterating and reiterating some point he was trying to make. [laughter]

WILLIAMS: Ah. What was Garfield's reaction to this?

HERNER: Well, he told me, he shut his mouth. [laughter]

WILLIAMS: Now, Shaw was already pretty famous because of his Searching Selector, and running a big organization too.

HERNER: Oh, yes. He was internationally famous.

WILLIAMS: That's right. He had been at the 1948 conference in London.

HERNER: That's right, the Royal Society. Urquhart was there. It was interesting. Talk about cited references—because I'd heard of all these guys, and it was quite exciting to meet them. I met them through the Royal Society proceedings.

WILLIAMS: Who brought that book to your attention (7)?

HERNER: I remember being in New York at the Queens Public Library and just going through shelves and seeing it.

WILLIAMS: And there it was?

HERNER: I looked at it, and I thought, "My God, this thing's a gold mine!" It also introduced me to the dean of the University of Chicago library school, at that time. He introduced me to reference studies. He was doing a reference study of the use of scientific literature.

WILLIAMS: Who was this?

HERNER: Herman [H.] Fussler.

WILLIAMS: Oh, Fussler. Oh, yes.

HERNER: Yes. That was exciting, too. Who was this other guy? There was a guy by the name of Brown, I think. Who did reference studies. I remember Ralph Shaw objecting to this guy.

WILLIAMS: Well, you said you had some role to play, because you mentioned cited references to Garfield. When was this that you pointed this out?

HERNER: He and I have had many discussions about that. I've asked him numerous times, "What attracted you to this? I claim"—and this is jokingly, I don't know if I'm joking or not—"that you got at least part of the idea for the *Citation Index* from the significance that I established of cited references" (8). I never got a clear response to that. [laughter]

WILLIAMS: I think in his writings, he's given credit mostly to someone else.

HERNER: I know. Well, no. I can tell you because I was sitting with him at the time—to the—what was it?

WILLIAMS: To the *Shepard's Citations*.

HERNER: *Shepard's Citations*. Exactly. He spent a lot of time with the head of *Shepard's Citations*, who was retired.

WILLIAMS: Right. In fact, there is an article in *American Documentation* that this guy wrote before—I think—Dr. Garfield published his article in *Science* about it. He credited someone else. It may be you that he's crediting in terms of the original suggestion about it. I can't remember. I'll have to go back and double-check that.

HERNER: Could be. Well, he has credited me on occasion. When he got the Award of Merit, he mentioned—I don't know where he got this from—all the influences in the field, and he said that I had the greatest influence on him.

WILLIAMS: Well, it may have been this incident that we're talking about here.

HERNER: Maybe.

WILLIAMS: Tell me more about the reactions to this 1953 conference. This was one of the first discussions about punch-card equipment.

HERNER: As a matter of fact, at that meeting, John [W.] Mauchley, who is purported to be one of the inventors of the UNIVAC, or the ENIAC.

WILLIAMS: The ENIAC, and then the UNIVAC.

HERNER: Yes. He was at the meeting, and various others. I remember Mauchley ridiculing Mort Taube, who was trying to establish a philosophical, logical, logician's version of the rationale, using Boolean terms and so forth—expressions of the Uniterm system. I remember Mauchley at that 1953 meeting saying, "Do you use AC or DC electricity in the room in which you keep the box of Uniterm cards?" [laughter] I remember Taube saying, "Gee, I'm not quite sure."

WILLIAMS: Why was Mauchley asking him this question?

HERNER: He was being sarcastic.

WILLIAMS: Oh, I see. All right.

HERNER: He was trying to say, "You're making a hell of a lot more of this thing than there is." He explained that—and I've explained it at numerous meetings and discussions—that the thing that was exquisite about the Uniterm system was its simplicity. You can envelope it in all kinds of religious or philosophical or logical trappings, but the beauty was you could find things quickly, and it was very cheap. It also trained people in how Boolean algebra, in a rudimentary way, sort of works. You could do "ands," you could do "ors," and you could do "nots." It's complex to do the "nots"—negatives. Logical sums and logical differences, and so forth. I always thought that was pretty neat. Then of course, they added the Termatrex.

WILLIAMS: Was Taube making it overly complicated?

HERNER: Yes.

[END OF TAPE, SIDE 2]

WILLIAMS: You were saying that somebody called Taube a philosopher.

HERNER: Mauchley. Oh, no. Harold [A.] Wooster said that he's one of the few people anywhere—I don't know if that's true or not; I'm sure there are a lot of Ph.D.'s in philosophy—but he said, "You've got to remember that when you talk to Mort Taube, he's going to try to philosophize."

WILLIAMS: Yes. Well now, I've heard from other people that the 1953 meeting showed how many people were really interested in documentation, and that out of that came the movement to make it an open membership organization. Was that one of your reactions?

HERNER: You're talking about ADI [American Documentation Institute]? Yes. Well, two things. First of all—and this was Garfield's idea—he objected to the word, "documentation," which had a European and a vague connotation. He was saying. "We're talking about information. Why don't we call it information science?"

WILLIAMS: Garfield said this?

HERNER: As far as I know, yes.

WILLIAMS: Do you remember when he said this?

HERNER: I can't. It's difficult for me to put a precise date on it, on the one hand.

WILLIAMS: It wasn't at this 1953 meeting, though.

HERNER: No, absolutely not.

WILLIAMS: Well, with three hundred persons attending, were you surprised at how many people were there?

HERNER: I was astounded and so was Garfield, I remember.

WILLIAMS: Yes. He said he had to do it all on his own.

HERNER: Because his boss didn't like it. [laughter] His boss was away, as a matter of fact.

WILLIAMS: Yes. I think he was sick then, or something.

HERNER: It was Sanford [V.] Larkey, I think.

WILLIAMS: Right. Did you join ADI as soon as it became an open membership organization?

HERNER: Yes.

WILLIAMS: Now, at some point in here you switched from Johns Hopkins to Atlantic Research Corporation in Alexandria. Tell me about that. Was this a shock to you to leave the academic world?

HERNER: It sure was. What happened was that I became a friend of the editor of *Industrial & Engineering Chemistry*. I remember we were talking. We were standing outside, as I recall, and he invited me to join them. I was doing research with Ralph Shaw, and I wasn't getting along with him. I remember how he used to sit right in front of the Rapid Selector.

WILLIAMS: Oh, really? At USDA [U.S. Department of Agriculture]?

HERNER: Yes, it was at my back. He used to come in and give demonstrations all the time. I was saying that, "You just want me to be an abstracter. I'm not a good abstracter."

WILLIAMS: For some period of time, then, you went to work outside academic circles.

HERNER: A short period of time—very short. Six months, maybe.

WILLIAMS: Was the Rapid Selector actually operating?

HERNER: It was operating. It was making noises. [laughter]

WILLIAMS: It wasn't doing much selecting, then?

HERNER: No, it wasn't. It was a pretty crude version. It never got off the ground. All these photographic Minicards—which were image-based—they never got off the ground. They were too slow. God, they seemed to go fast if you look at them with your eye, but it had to be electronic.

WILLIAMS: You were not impressed with the Rapid Selector at all, then.

HERNER: No, as a matter of fact, I gave a critical lecture on all of them at a Gordon Conference. [laughter]

WILLIAMS: You talked about the Rapid Selector?

HERNER: Rapid Selector, and there was another one. Minicards. I remember saying— this got everybody angry—that, "These are products of cost-plus-fixed-fee contracts." [laughter] The Minicard, the Rapid Selector—this is research where the purpose of the research is to get money. Whereas the newly evolved punch card and small computer—specialized computers, whatever they were—"they produce products and sell them. One is a product of free enterprise and one is a product of sponsored research."

WILLIAMS: Sponsored by the federal government most of the time.

HERNER: I remember, it brought the house down. I thought they were going to kill me. [laughter]

WILLIAMS: At the Gordon Conference, were all these people there producing these machines?

HERNER: Boy, they were angry with me. I said all the wrong things.

WILLIAMS: What was the year of this Gordon Conference?

HERNER: It was the only Gordon Conference I ever attended. [laughter] It must have been—let me see, where was I at the time? It was about 1955, something like that.

WILLIAMS: I think that's right. I have the date of that conference, but I don't have it right in front of me at the moment.

Well, let's go back and talk about the Atlantic Research Corporation. What were you doing there?

HERNER: I was the head of the technical information and library-planning group, TILP. I ran a couple of libraries and more or less trained the staff in the methods of using them. I used to give courses there. For some reason or other, the president at the time, a guy by the name of Arch Scurlock, became intrigued. He used to get me to arrange courses. He insisted that I interview every new person, and the place was expanding very rapidly. His idea was, "In the course of interviewing them, you'll educate them." I spent a couple of years doing that.

WILLIAMS: Now, this was a chemical company more than anything else.

HERNER: Any kind of research. As a matter of fact, they were interested in solid and liquid propellants. It was mainly physical chemistry. They had a basic research group, too. It was vaguely like the Applied Physics Laboratory. The guys who were interested in the propellants business, they were interested in reports.

They used to synthesize customized chemicals. They did a lot of that—exotic compounds. I got to know all of them. Then, I was joined by a guy who was a librarian and a mathematician. I was with him for about a year and a half. He used to work for Mort Taube. Maybe Taube referred him to me, I don't know.

WILLIAMS: What was his name?

HERNER: His name was Robert S. Meyer. He induced me, or flattered me, into starting our own business.

WILLIAMS: This is the beginning of the partnership, then.

HERNER: Herner, Meyer and Company. Then we had a sort of falling-out. Well, we were working out of my house. Both of us were getting more and more irritable, and he decided that he didn't want to do this anymore. He took off for California and became the librarian of the Lawrence [Livermore] Radiation Laboratory. We were in touch, pretty much continually, until he died. That was about six years ago.

WILLIAMS: This was in 1955 that you started the company. Were you both still working full time for Atlantic Research Corporation?

HERNER: No.

WILLIAMS: It looked to me as if you had started this on some kind of part-time basis. Is that not right?

HERNER: We were working for the Atlantic Research Corporation, and I must say we were very honorable. We bought out all our contracts—everything we were working on. We gave Atlantic Research, for about a year, royalties—a piece of the profit—that we made on whatever we did. They used to come in and audit our books to make sure we weren't cheating them.

WILLIAMS: Oh, really? Now, was this still out of your house, or were you doing it in the company?

HERNER: No. Out of my house.

WILLIAMS: You were working out of your house, and they still came in. Atlantic Research would get the contract, then, and you would buy it out and work on it.

HERNER: Yes, and then we started getting our own contracts.

WILLIAMS: All right. You were working out of your house for how long, then?

HERNER: About two years, until we couldn't fit in the house any more. [laughter]

WILLIAMS: Now, my records indicate that the first publication that Herner, Meyer and Company produced was in 1956, entitled, "Use of Technical Information in Small and Medium-Sized Manufacturing Companies" (9). Was there one before that one?

HERNER: No, I don't think so. They had a huge meeting on information in industry or something. I remember President [Dwight D.] Eisenhower kicked it off, and it was pretty high-powered.

WILLIAMS: Oh, this was a White House conference?

HERNER: Yes. We prepared this thing for that. It was a pretty clumsy kind of thing. It had a lot of kibitzers.

WILLIAMS: In what way?

HERNER: Well, "Why don't you put some of this in, and put some of that in?" I remember we were constantly bickering, fighting. Some of it we said, "We're not sure of it. We don't know. That's somebody's opinion." It became very political. "Put it in anyway."

WILLIAMS: Was it political between the two of you?

HERNER: No. John Green, who was the head of the Office of Technical Services at the time. He was, more or less, our sponsor and patron and so forth. He used to give us leads, so we had great respect for him. He was and is a very likable guy. John liked us but he wasn't sure we knew what we were doing, so he would bring in consultants to help us. That report became a hodgepodge. [laughter]

WILLIAMS: He was in the Office of Technical Services, then?

HERNER: He was running it.

WILLIAMS: Was this office in the Department of Commerce?

HERNER: Correct.

WILLIAMS: He got you the contract to do this, then. Now, I see that you had several related publications on that topic that were PB [Publications Bureau] documents (10). Was that still that same contract on which you were working?

HERNER: No. As a matter of fact, we did—for the National Science Foundation [NSF] and various other agencies—studies of how small businesses get information (11). That became a preoccupation. We made all kinds of strange discoveries—starting with that report, but going on. We discovered, for instance, that the primary way that a small business gets useful technical information is through its vendors. Boy, that was an intriguing idea. Again, we reversed it. We went to vendors to see what facilities they had for disseminating. Why did they disseminate this information? "The answer, dummy,"—as they say—"is in order to sell products." If people don't know how to use their products, or don't know about their products, then they won't be able to sell their products. We became semi-famous as experts on getting information to small businesses.

In a review paper that my wife and I wrote, we were saying that it's ironic that institutions such as the National Technical Information Service [NTIS], which is a successor to the Office of Technical Services, catered mainly to large business which are organized to assimilate and use the information (12). We still have the problem of, "How do these illiterate, or whatever, small businesses get information?" We went around and around. We actually did surveys to find out how they get information.

WILLIAMS: As part of the survey techniques you knew about from your earlier study, you went to the small businesses and talked to them.

HERNER: Yes. Several years later, they had a State Technical Services Act or something, which was—my recollection is—to get information to small businesses. I think it was through the Department of Commerce. We did a couple of studies for them (10, 11). We did studies for firms in the six New England states where we tried to design a system that they could use (13). We kept on trying to work up theoretical and practical systems. With all these reports, everything is so interwoven.

WILLIAMS: It's hard to separate them out in terms of the number of reports that your company did.

HERNER: Yes, well, I'm discussing—when I talk about the six New England states—trying to figure out a system for reaching the smaller firms. We decided, "We're not worried about the bigger firms. The bigger firms are the disseminators. Just the smaller firms." That's the sort of paradigm we came up with.

WILLIAMS: How did you get to them? Did you do some kind of random sampling of a list of these small companies?

HERNER: From directories. We did it by random sampling, but we got a fair representation of the industries of New England. Then I actually went and asked them, "How do you do it? How do you get information?" Again, using this critical incident method.

WILLIAMS: Now, speaking of the critical incidence technique, had you read in the literature about it, or did you come up with this idea on your own? Or was it some combination of the two?

HERNER: I certainly didn't invent it. It was invented—the term, "critical incident", I think—at the American Institutes for Research. Was that the name? Did you ever hear of that?

WILLIAMS: No, I didn't.

HERNER: I'm trying to remember the name of it. In other words, I stumbled onto it. Then I remember, Hal [Harold] Borko said in a paper that we were the first people in the field to use critical incident. [laughter] I remember saying to Borko, "What the hell is that?"

WILLIAMS: I wondered about this myself, because I'm not sure when that technique got named that. You weren't calling it that at the time, were you?

HERNER: No.

WILLIAMS: You clearly used that methodology in your 1952 study, though.

HERNER: The methodology, yes. That was funny.

WILLIAMS: When did you see that term first in the literature? Is it something Hal Borko introduced?

HERNER: I think Borko introduced it to me. [laughter] He was a big psychologist. He was an expert in research techniques. I think he did a lot of studies. He liked to study technique—how people abstract, and how they do this and how they do that. I was always sort of consumer oriented: "How did the end user get it?" He was interested in, "What are the processes involved?" It was very interesting.

WILLIAMS: Did you read the methodology literature before doing survey research, during that time?

HERNER: Only a couple of basic texts. I remember my favorite was Mildred [Bernice] Parten. It was published by Harper [Collins Publishers], called, *Surveys, Polls, and Samples* (14).

WILLIAMS: Oh yes. I remember that book, too. All right.

HERNER: That one is terrific, as far as sampling techniques.

WILLIAMS: Before we discuss the running of your company and that kind of thing, one of the things I noticed in your writing is that you've always been interested in standardized approaches toward things. For instance, I noted your writings on furniture design, library-layout designs, et cetera (15). How did this interest start?

HERNER: It's just that I liked interior decorating. I liked to cook and I liked to decorate. I should have been a girl. [laughter] It was purely aesthetic—I just liked it.

WILLIAMS: You carried this interest on to standards in a number of other areas as well. This was one of the approaches that the company took, too, to try to work on these kinds of issues.

HERNER: Oh, yes. Well, that led us to a study of conscious statistics that libraries collect (16).

WILLIAMS: Right, yes. Your ACRL [Association of College and Research Libraries] monograph on staffing is a good example (17). Your writing on handling technical reports (18), and the planning aspects—those early publications all struck me as being very standardization oriented. I just wondered what initiated this.

HERNER: I remember being interested in negantropy. I remember discussing this with Garfield at some length. I was interested in, "It can't be random. It's got to be organized on some logical basis. All these things have to be predictable." Yes, I guess you just raised a point that I never thought about. "Why am I interested in it? Because I am totally disorganized myself." I always felt that way, maybe because I'm disorganized.

WILLIAMS: Well, probably, as you said, it might have been because you were interested in aesthetics and interior design, and those kinds of things.

HERNER: And a respect for structure.

WILLIAMS: Well, it follows to some extent along with your interest in user studies. This was getting back to really saying exactly, "Let the user say how he or she is getting information."

HERNER: Yes, well, I've often said that the customers of the information apparatus, whatever it is, essentially design it whether they know it or not. In a perfect society, it would be that way. In an imperfect society, you wouldn't do this, because the thing would not be responsibly handled. It would mean that the users and the originators or disseminators are not talking the same language. They're going their separate ways, and that is chaos. What I guess I'm driving at—you're making me think about the whys. [laughter]

I wanted to raise one other thing, which is interesting. When we started the firm, I acquired a client, and I remember exactly how we did. This was Esso Research and Engineering and their scientific—I've forgotten what it's called—information apparatus, was just being founded. They called me in to help them develop it and design it, after interviewing me at length for a whole day.

[END OF TAPE, SIDE 3]

WILLIAMS: Now, talking about your interest in standardization, and particularly the interest in user-centered approaches, supposedly that was one of the things that Calvin [N.] Mooers

stressed in the development in descriptors and those kinds of things. Did his work influence you?

HERNER: No. Of course, I knew Calvin. He was into Zatocoding, and he is a mathematician and a statistician. No, I mean, we all started using the word "descriptor." As a matter of fact, he more or less invented special information retrieval, which we all picked up. That's strange.

WILLIAMS: From my readings, what I had read was that he was saying, with descriptors, "Get the terms that the users use. Out of that comes your vocabulary."

HERNER: Yes. Taube had a theory too, which is, "The terms that are written are the terms that are used." This was Taube's idea. As I recall, Mooers said, "There's an awful lot of redundancy in the written word. There's a difference between retrieval words and discursive words, written words. Most text, particularly by scientists, is discursive; so it could be purified, should be purified." That suited his convenience. If you combine terms, you can produce the levels of specificity or generality that you need. That's going to be a retrieval technique. If you want to do a generic search, use a few terms, provided that you start out with the right one. If you want to do a specific search, combine terms. What did he call that? He called that "Atomic"—he had a peculiar expression.

WILLIAMS: Is that right? I'm not familiar with that.

HERNER: Atomic Retrieval. I guess what he was trying to say was, "Let's get down to the elements of whatever field it is, or fields." [laughter]

WILLIAMS: Well, your work in user studies, in which you said, "Let's go ask the user. Let's see what the user is actually doing," and his emphasis on saying, "What terms do the users use?" struck me as very much parallel with each other. They're different, though.

HERNER: Yes, but the method of determining what they are is different. The goal is the same. I remember having a big fight. I claimed if I were going to make a thesaurus, I would start out by interviewing one hundred people in whatever field it was, then asking them to tell me what the primary words are that they are using. You can base it on stream of consciousness. "What words occur to you when you think of your field?" I'd make a list from that. Then I had a whole procedure, which I've since written up on numerous occasions, for using that as the beginning step in the development of a thesaurus.

In essence, coming back to Calvin, we were trying to attain the same goals, but by different methods.

WILLIAMS: Speaking of thesaurus construction, other people were doing word counts from titles. What did you think of that approach for thesaurus construction? This would have been people like Claire [K.] Schultz.

HERNER: Oh, I believed it had a future. I was interested, and I wrote a number of reports. Unfortunately, I can't remember where any of them were published. We made thesauri for people. Our approach was, "Let's find the core words—the most frequently occurring words—and then in descending order, what words co-occur with them in the literature." My theory was, and is, that this will tell you when you need bound terms.

I used to say, "Okay, now, when you index by this method, you're going to have a list; you're going to have a matrix like this, and a matrix like that. When you index by this word, in descending order, you should also be indexing by that word, that word, that word, and that word. When you search under this term, in descending order, you should be searching on this word, this word, or this word. Gee, that's what a thesaurus is supposed to do. Why can't you use this to make thesauri?"

WILLIAMS: Is that the approach that you used in the company, to construct the ones you did for contracts?

HERNER: The big weakness was that then, we had to go another step and say, "Well, what are the synonyms? What are synonyms for these words?" As far as related terms, that was our big contribution. We could always pull related terms like no other method could.

WILLIAMS: Synonyms were the problem, I take it.

HERNER: Yes, well see, you'd have to do a search. You'd have to go to thesauri and so forth—Roget or whatever—and try to find synonyms. It was never perfected. It always improved, because you'd find a new way of saying a given concept. That was the general approach. My argument was, "It's better than what there is." Somebody would always say, "Yes, well, what about synonyms?" I'd say, "What about related terms?" [laughter]

WILLIAMS: Yes. Well, let's talk about the company. You started in your house. You said you stayed there until it got too big. Did that mean you had too many staffers?

HERNER: Yes.

WILLIAMS: What year did you move out of your house?

HERNER: About 1962.

WILLIAMS: Oh really? For seven years, you were essentially operating out of your house, then?

HERNER: [laughter] We had another house. We had one house. Then we went to another house until they threw us out, more or less. In other words, we were breaking zoning.

WILLIAMS: Oh, I see. You mean, you bought bigger houses as you went along. From 1955 to 1962, you pretty much operated out of your house, then? Or houses?

HERNER: Yes. I loved it.

WILLIAMS: Talk to me about those tough issues in terms of getting a company started: cash-flow, personnel, getting contracts—particularly getting contracts.

HERNER: Well, getting contracts—now, most of our work is for a government agency. Government and non-profits. It evolved. It used to be really a matter of contacts and PR. It is still to a large extent that. It's become very highly structured and political, in that they used to advertise. They had all kinds of ways. You'd look at budget hearings, you'd look at various sources of information about what agencies are going to be doing, and then you'd get the names of the key people involved and get to know them. That's one way. For about ten years, we didn't do anything. People would call us if they needed us.

WILLIAM: This was in the early years, now?

HERNER: Yes, but you can't do that anymore. Everything has to be competitive. We used to get regular jobs from the National Science Foundation—just friends.

WILLIAMS: From [Burton W.] Adkinson.

HERNER: Adkinson and before. I remember Helen [Louise] Brownson. Between my wife and I, we knew a lot of people and they would give us jobs. "Think of us." We'd have to write a letter of proposal or something. Give them the price and tell them how we were going to do it. How we told them we were going to do it. That all changed, and it's changing more and more.

WILLIAMS: Yes, it's becoming more bureaucratic and based on bids.

HERNER: Getting very tight.

WILLIAMS: What kind of size contracts are we talking about in those first years?

HERNER: Twenty thousand dollars. I remember the first thing that we got; I remember being in a house. We got a twelve thousand-dollar contract from the National Science Foundation. That was pretty big at the time for us. They really didn't know how to handle these things.

WILLIAMS: The NSF didn't know how?

HERNER: They had no mechanisms. One day in the mail, a check for twelve thousand dollars comes in, which was a Godsend. [laughter]

WILLIAMS: Yes, I'll bet. What kind of staff did you have? When did you first add on the first staff member?

HERNER: Oh, I remember the first one. It was a secretary. Then we had a guy who was a survey specialist. We had an engineer who was interested in information centers. These were all around 1960.

WILLIAMS: This was before you began to hire employees other than you and your wife?

HERNER: Yes.

WILLIAMS: You were living entirely off of this, once you left Atlantic Research Corporation. You and your wife were both living off of the company's work, is that correct?

HERNER: Yes.

WILLIAMS: Did she quit her job with the British Embassy?

HERNER: Yes, she quit in 1958.

WILLIAMS: Were things a little tight sometimes?

HERNER: Sometimes. [laughter] I can't remember. I don't recall ever suffering any privations, but we must have.

WILLIAMS: You may have held off on eating out a little bit, did you?

HERNER: I remember going to a lot of cocktail parties. [laughter]

WILLIAMS: I have always imagined starting one's own company as just kind of being terrifying, because that dependable paycheck is hard to give up.

HERNER: Yes. Well, both of us are sort of adventurous in a sense—she in her way. She was always a freelancer. She did a lot of freelancing—the translating and abstracting and indexing. She had one foot in the government and one foot outside, so she was sort of used to it. I was sort of an adventurer. We never discussed it in those terms. She always considered herself very prudent and conservative, but she was pretty courageous.

WILLIAMS: She was bringing in money with her translating work. Who was your main competition at that time?

HERNER: I remember consulting firms, you see. I remember talking about Booz, Allen, & Hamilton. They would get into it every once in a while.

WILLIAMS: The big guys?

HERNER: Yes. I remember being in shock. They were past masters at marketing, and we really didn't know anything about marketing the concept. The idea of taking somebody out to lunch was unheard of. Never. [laughter] I remember bragging, telling somebody, "My clients take me out to lunch. I don't take them out to lunch." Talk about presumption and naïveté.

In a sense, for a period, we were sort of popular. In other words, I don't know whether we were comedians or something, but people enjoyed our company. We did a lot of selling that way. Go to meetings and raise hell. I remember Claire. They were, all of them—Garfield, Harold Borko—yes, we used to have good times. We were selling to one another, in a sense.

WILLIAMS: They had various contracts with which they were dealing, then.

HERNER: Garfield used to throw me an occasional contract, yes. I remember him berating me, perhaps rightfully, that I don't throw enough stuff his way and he's always trying to help me. I guess he was.

Garfield, for a long time, was a bachelor. When I got married—and he had been married long before—I wouldn't say we became estranged, but we sort of separated. I became preoccupied with being married. As a matter of fact, he married about four times after that. [laughter] He made up for lost time. That had an effect. I just liked the idea of being married.

WILLIAMS: He was kind of the free-wheeling type as a bachelor, then.

HERNER: Yes, sir. I remember, we were at some meeting and we were registering for the hotel. Garfield comes up and his whole face was covered with lipstick. [laughter] He looked dazed. He must have been in the middle of an affair. He always ended up marrying them.

WILLIAMS: Well, you said that Taube was your main competition, more so than anyone else.

HERNER: Well, various people were. It depends. In user studies, this American Institute for Research, which you've heard of, they gave us competition. Gee, there are so damned many of them.

WILLIAMS: Yes. What about Jonkers [Business Machines], Termatrex and Westat and those folks?

HERNER: Jonkers. Not Westat. The Westat people were friends of ours—Don [Donald Ward] King, at the time. As a matter of fact, we did a lot of talking together with Don King at Westat, before he left Westat. We always discussed methodologies, and discussed collaborative efforts.

WILLIAMS: What about Jonkers?

HERNER: Jonkers. Well, I'll tell you what they did. What happened was that he was just in the machine business. He was selling his Termatrex—trying to sell them. Then—this would be about 1962 or 1963, I think—everybody was having underwritings. I remember, he and Gerry [Gerald J.] Sophar raised two million dollars. They went to a little bucket shop that got them two million dollars. It got them into a completely different—they were still doing Termatrex, but then they started competing with us for projects.

WILLIAMS: Oh, to do the kinds of studies you were doing?

HERNER: Not only studies, but they were also operating information services, and so forth. Another thing that we got into was also one of the first projects we took on, which was the re-cataloging of the United States Post Office Library. They had a legal library. It was a huge thing. We did a re-cataloging. That was a big job for us. There we competed with Taube. He was the competitor, and we got the job. That was a job right at the beginning—one of the first jobs we did.

WILLIAMS: Was it possible to stay friends with these folks?

HERNER: Not with Taube.

WILLIAMS: No? He was what, too competitive?

HERNER: He was nasty.

WILLIAMS: [laughter] How so?

HERNER: Well, I remember getting a call from Taube one day. He wants to have lunch with me. I have lunch with him. He says, "The reason I want to talk to you is because I am being sued by members of my staff who have put in a complaint to the Labor Department about me not giving them compensatory time or something. Did you have anything to do with this?" [laughter] I said, "How would I know what you do? The answer is no." He was so paranoid. I would say that's a very unlikable guy. He used to do that. He used to have fights with Perry and all the folks whom he would disagree with intellectually.

WILLIAMS: Well, I read in one of Perry's articles, in the discussion that was recorded and printed, that somebody asked Perry a question about Taube's machines or ideas. He said, "Well, now, I have to be very careful because I have been threatened with a suit by these folks." I figured there was hot stuff going on there. Was Taube the type who would sue in a flash and accuse people of stealing his ideas?

HERNER: He was also trying to hurt them for spite. He had this idea, I guess. That was how he acted, and I guess he assumed logically, "That's how people act."

WILLIAMS: What other unpleasant dealings did you have with him?

HERNER: Well, I just didn't like him personally. I thought he was ostentatious—I didn't like the way he dressed. I didn't like anything about him. He was very, very vain.

WILLIAMS: Oh, yes? He was a flashy dresser, was he?

HERNER: Oh, yes. He just went for appearances. That meant a lot to him. I was my old sloppy self. I remember when I had this lunch—and I did this intentionally—where he asked me if I had anything to do with the fact that his staff was suing him and so on. I remember I had gotten my first suit in Brooks Brothers. I thought it was a beautiful suit, and I remember taking great pains to wear that suit just to show him.

WILLIAMS: [laughter] You wore it to the luncheon. Did he comment?

HERNER: No, but I wanted him to be duly impressed and not be getting all kinds of food over my new suit. [laughter]

[END OF TAPE, SIDE 4]

HERNER: We had a whole series in the late 1960s, starting perhaps around 1965 through, I would estimate, 1969. We were approached by friends—acquaintances in the government, mainly—to set up a bunch of clearinghouses. While we had to write proposals, they were only nominally competitive. We set up the clearinghouse on child abuse and neglect, smoking and health, and family planning. We had a whole series of them. We had to write complex proposals, but we really weren't competing. There was a bias, but it was in our favor.

We were pre-interviewed, as it were. They would spend about a day—maybe they interviewed other firms; they probably did. Then they would decide whom they would ask to write a proposal. That's how we got these various things.

WILLIAMS: This was all NIH [National Institutes of Health] work, then?

HERNER: Oh, no. Let me see, what is it? The Clearinghouse on Child Abuse and Neglect was not NIH at all. It was in HHS. There was a unit that took care of social problems.

WILLIAMS: Within Health and Human Services, then?

HERNER: Yes. That one. The one on smoking and health was out of CDC [Centers for Disease Control]. First it was a separate unit; then it went to CDC; then it came back separate. I think it's separate now. No—I think it's at CDC now.

WILLIAMS: Did you staff all of these places? You had to hire people and interview them, then.

HERNER: Oh, yes.

WILLIAMS: What kind of people were you looking for?

HERNER: Well, one type was people who could handle telephone inquiries and interviews. Then, specialists in various subjects—chemistry, biomedicine. We also hired biomedical indexers and abstracters, people would could process information of various types. We had subject specialists; we had guys who could write representations of written materials—the whole gamut.

WILLIAMS: Were these more like information analysis centers than special libraries?

HERNER: Oh, yes. The closest thing would be information analysis centers. Yes.

WILLIAMS: You were not hiring many librarians, then?

HERNER: No, no. As a matter of fact, now that I think about it, our experience was that librarians would not do the job.

WILLIAMS: Really? Why is that?

HERNER: I don't know. Personality?

WILLIAMS: What about lack of subject training? Was that a problem?

HERNER: Well, no. We had other people who had had no subject training, who could do it. That's a strange phenomenon. Matter of fact, I have a librarian whom we appointed to head up this alternative medicine thing. For personality reasons or other reasons, she failed miserably.

WILLIAMS: You found this to be the case generally with librarians, then?

HERNER: In that kind of work.

WILLIAMS: In the scientific, technical work?

HERNER: Yes.

WILLIAMS: You'd say it was personalities?

HERNER: I think. Temperament. In other words, they are seeking a certain structure that doesn't exist, perhaps.

WILLIAMS: Do you think they are not innovative enough? Not able to roll with the punches, so to speak?

HERNER: That's right.

WILLIAMS: Why do you think this is the case?

HERNER: I don't know. I still have a theory that if you've got a terrific reference librarian, it would work. Most librarians, or many librarians, are introverted. They don't meet the public well. We used to go through regular training courses. We had interviewer protocols and all the things you say. That would work very nicely if they could follow that. But, boy, the stuff you had to put in there—"Hello, how are you?" You don't just start with a question, but the whole script. That worked. On the other hand, I can make calls to one of our clearinghouses right now and I can get a whole spectrum of types of responses. I know one. We have two of them going, Alzheimer's and alternative medicine. The alternative medicine staff is trained, and they're very nice—a very smooth operation. On Alzheimer's, it's a different crew and not as good.

WILLIAMS: Do you have any idea as to why?

HERNER: Well, we have subcontractors working on the Alzheimer's. We try to control their staff, but we can't as readily as with this alternative medicine. We're it, and we can run it a little better. That's the only thing I can think of. It's partially political—I don't know.

WILLIAMS: Now, what struck me in looking at your projects was that they were an interesting combination of research and development work. Was this deliberate, or is that what was available?

HERNER: No. I guess that's why we got the projects, because we were research oriented.

WILLIAMS: That's primarily because of your interest in user studies, would you say?

HERNER: That's where it started.

WILLIAMS: In the fields of documentation or information science, what areas have you seen over the years that needed research that wasn't being done?

HERNER: I would have to put under the roof of motivational. At least, working backwards from what they did, what caused people to do it? Was it their previous training? Or is it their environment? One of the questions that arose was, "Do people respond first to their current environment, and then to their past training and environment? Or do they respond to primarily their past environment and training?" That's always intrigued me. Again, you can segment them. In the highly applied fields, it's their current training, I think—environment. In the more basic sciences, it's a full use of their total training. I think that has to do with it.

WILLIAMS: Do you think this is because people who focus on basic science are more theoretically oriented?

HERNER: Yes. The other thing is that they are more inclined to attend meetings—the basic scientists—and interact continually. They pick up a whole mix of methodologies from their colleagues. They're swapping, whether they know it or not, methodologies and motivations as well as specific techniques, as well as specific pieces of information. The greater the exposure, the greater the opportunity. Then, they are more likely to be using the literature of the field. You get this mixture, and it becomes a pretty dynamic thing for them. You can see things happening and churning. They're getting ideas on how to get information, and they're getting ideas about their specific subjects.

To come back to your earlier point where you were talking about librarians and so forth, people who are active in the field: let's say you have a technical information specialist who's answering questions—some people pick up, use the questions themselves as fuel. Every question contains an answer. You may not even know that such information was required. That's a piece of information in itself. Some people absorb that and then assimilate it and add it to their fund of knowledge. They become, in a sense, knowledge-based expert systems themselves.

WILLIAMS: This would be whoever is doing the technical information work? Interesting.

HERNER: Yes. Of course, one of the things that I push—and I guess a lot of other people do, too—is now, if you could keep a record of all of those experiences, you could really develop a realistic, effective, knowledge-based expert system.

WILLIAMS: Were you able to get funding for any of these ideas to pursue them, or were you able to do them in your contracts?

HERNER: Well, we did some of it in our contracts. We're doing some of them, sure.

WILLIAMS: This puts together both your interest in user studies as well as your interest in the other areas.

HERNER: Yes. It doesn't happen in so many questions, but I guess instinctively I'm always churning away, I'm always adding. It's like I'm hoping to make one gigantic—in whatever field it is—knowledge-based expert system.

WILLIAMS: Have you been able to computerize this in any way and get it into an operational system?

HERNER: We have. As a matter of fact, in all instances we keep records of the experiences, diaries. They've got another thing going on now that is interesting. [laughter] They're trying to automate everything, so we are developing or purchasing or refining what they call "Fax Back Systems," where you get a request and it's on a form. You put it on a form, so that you can quickly use the letter of request or the record of the request and send it back. It says, "On such-and-such a date, you asked for such-and-such. Here is what we found."

WILLIAMS: You put that into the computer and then fax it back to the person. How is that working out?

HERNER: A little clumsy, but it's being refined. I think it'll work.

WILLIAMS: Now, your folks are doing this in the various contracts that you have, like the one on alternative medicine and so forth?

HERNER: Right.

WILLIAMS: Let me ask you about an automation project. In 1960, I saw you were working on something called the Herner & Company special computer. Tell me about that.

HERNER: Oh, yes. First of all, it was a statistical machine. It was an analog computer. [laughter] This was worse than anything I said about the Rapid Selector or the Minicards in that it could only count, but it could do fairly complex correlations. We used to reduce data on surveys with it. It was a matter of voltages. Number one had so many volts, code two had so many volts, and so on and so forth. We could combine six subjects at a time.

WILLIAMS: Were you trying to perform information retrieval on it also, or just statistics?

HERNER: We tried to.

WILLIAMS: Who built the basic system for you?

HERNER: A guy who worked for me named Henry Heatwole—a brilliant guy. [laughter] He used to make his own printer circuits. He could do anything. In fact, I still have some, I guess at home. They're beautiful works of art.

WILLIAMS: I understand you produced two of these. Where did they go?

HERNER: We gave them away to—was it the Smithsonian? We gave it to somebody, some institution.

WILLIAMS: You used them strictly within your company?

HERNER: Only within the company.

WILLIAMS: Yes. I understand you lost money on it.

HERNER: A fortune. [laughter] It was a lot of money, anyway.

WILLIAMS: I believe you were buying components from places like IBM [International Business Machines] and such.

HERNER: Yes, that's right.

WILLIAMS: How big was this thing?

HERNER: It was about the size of this sofa.

WILLIAMS: It would have been about six feet long, then?

HERNER: Higher than that.

WILLIAMS: It was an analog machine, you say. That's interesting. Now, this is right when the IBM 1410 came out.

HERNER: [laughter] Just at the wrong time. We used it mainly for publicity, to tell the truth. We didn't do a hell of a lot with it.

WILLIAMS: You did use it to do some correlation work and that kind of thing, though.

HERNER: Oh, yes. I remember we did a survey of the use of the stacks at the Library of Congress (19). We reduced all the data on that. That was pretty good.

That was interesting. We used to get into experimental design. They wanted to know—I'm trying to remember why they wanted to know—how to allocate study spaces in the stacks, because there was terrific traffic. They wanted to know who was there for frivolous reasons and who was there for concrete reasons—like, Congressional staff as opposed to scholars, which is a loose concept. [laughter]

We did a number of things for the Library of Congress. We assigned each section of the stacks a random number from the table of random numbers. Then we did a count—just a count—to see how many people on the average day were using a given section. Now we have a total of what percent is using this section. Then we took a set of random numbers and we raised them in random order. [laughter] This sounds absurd when I say it. We had interviewers going around in random order—random as to time of day, day of the week, and so forth—to find out what they're doing there and how they're making out, and various other things. That was an interesting study, as a matter of fact.

WILLIAMS: That sounds like a nice methodological way to go about doing it. Were you pleased with the results? Was the Library of Congress pleased?

HERNER: Yes. I was doing it for reference at the library at the time. He takes me to Quincy Mumford's office. I'm going to explain what I'm doing. I remember Mumford saying to me, "But it's all random." I was telling him, "That's the beauty of it. It's absolutely objective and representative and so forth." He kept saying, "I don't see how it can be representative if it's just random."

WILLIAMS: [laughter] He didn't understand the mathematics.

HERNER: That was the end of my audience.

WILLIAMS: That's interesting. Now, I'd like you to talk about your problems and advantages in the information business, compared with people like Garfield and Taube and others in the competition. Now, we've talked about who the competition was. How would you compare with them in terms of what advantages you had and what disadvantages you had?

HERNER: Well, they both thought on a bigger scale than I did. I always wanted to keep it small.

WILLIAMS: That is, focused in Washington, D.C.

HERNER: More or less D.C.-focused, with a small staff, small space, limited number of activities. "Don't stick your neck out. If you can afford it, do it. If you can't afford it, don't do it. If the competition is too tough, forget it." Taube went one route. He was more or less bought out, and so forth. Garfield just started producing products.

WILLIAMS: He became a publisher, for the most part.

HERNER: Yes. I didn't do that until late. I remember saying to somebody, "If I wanted to be a publisher, I'd be a publisher." Then I got suckered into the publishing end, which I still regret.

WILLIAMS: Do you? Is this when you started Information Resources Press?

HERNER: Yes. It was not a good idea.

WILLIAMS: It's been a financial drain, I gather.

HERNER: Terrific drain, yes. Well, various things happened. My main—how do you say, source—the first books we published were by Wilf [Frederick Wilfrid] Lancaster. They did pretty well. Then he decided, if I can do it, he can do it, so he started publishing. He was plagiarizing books that I had published for him. We started getting into disputes. We're still disputing, as a matter of fact.

WILLIAMS: I remember you published the first edition of *Vocabulary Control*, as I recall (20).

HERNER: Yes. We also published the first edition of *Measurement and Evaluation* (21). That's what he's plagiarizing.

WILLIAMS: This latest one that he's done on evaluation, he published himself? Is that what he did?

HERNER: There were two of them. We published one. Then he had another one that was called *If You Want to Evaluate Your Library—* (22). Well, a lot of that is from *Measurement and Evaluation*. We started going through attorneys and stuff. The thing got so sick, I decided, "I don't want to pursue it."

WILLIAMS: Well, back to Taube's advantages. Now, Taube went big into the contracting business. For example, he got the NASA [National Aeronautic and Space Administration] contract. Were you a bidder for that contract?

HERNER: No, as a matter of fact, we weren't. [laughter] The funny part of it is, about ten years later we got about half of that contract as a subcontractor to the Planning Research Corporation. We got all the abstracting, indexing, and so forth.

WILLIAMS: You were producing *STAR* [*Scientific and Technical Aerospace Reports*] then? I did not really realize that you had that contract to produce *STAR*.

HERNER: Yes. We had that for ten years and also the *RECON* [*Retrospective Conversion*] project; the works.

WILLIAMS: Oh, you were doing the on-line work on project *RECON*, then.

HERNER: We had a hell of a lot of it. It was a big contract.

WILLIAMS: What was it like working with Mel Day?

HERNER: Oh, it was not bad. I don't know if he told you this, but when we finished the whole thing, he retired from the government. He came to work for me. [laughter]

WILLIAMS: I know. He said he came to work for you. He also said he learned a lot about how to run a business from you.

HERNER: Yes? He's a funny guy.

WILLIAMS: Yes. He was, as I said, a good storyteller. Well, how would you describe the nature of the changes that have occurred in the information business from 1955 to now, as you saw it?

HERNER: Well now, as a matter of fact, it intrigues me because, let's say ten years ago, nobody ever heard of the Internet—just as recent as ten years ago. Now, everything plays into the Internet as part of the Internet or related to the Internet.

I was writing a guide on one of my contracts. I remember we had all these sources of information laid out. They were vaguely related to one another, but you could categorize them. I was trying very hard to follow the pattern of this brief guide that I published in 1970 (23). I found it harder and harder, the different kinds of information. In the original brief guide, it was information about ongoing research—no, where to go when you don't know where to get the information.

[END OF TAPE, SIDE 5]

WILLIAMS: You were discussing the nature of the business over the years.

HERNER: Yes. Well, I was saying that my categories were: recent information less than a year old; published but recent; then, past information. We had some other stuff that people asked me about, how to set up personal files and so forth. As far as kinds of information—I was doing it temporally, not by subject, because I felt that that was a practical approach. There were subject guides all over the place. That's what the first chapter was about, "Where to go when you don't know where to go."

Then I found more and more that these things were becoming intertwined, and also computerized. For instance, you could start out with an SDI [Selective dissemination of information] system, which would be current information. Just keep it going, and it would become a retrospective retrieval device. You'd use the same techniques, and you could build up that way. That was a new development. It started with "Current." It makes sense.

Then you had these on-line databases all of a sudden, which you subscribe to, you can log into. That was a switch. Some of them were based on originally an SDI system that is allowed to age, and some of them were based on just current indexing and abstracting. That was another way of doing retrospective searches. That was a change. Now, of course, how do you get access to these things? It used to be, you used a modem. You were on-line with the thing. Now, of course, it's on the Internet probably, which poses a terrific control problem. That's changed everything.

WILLIAMS: How did the development of on-line services affect your business?

HERNER: I guess we did searches for a long time using everybody's system. That was fine. Eventually, I think what's happened is that more and more people, because of AOL [America Online], is it?

WILLIAMS: Yes, or CompuServe.

HERNER: Or CompuServe. That was one of them, or Lexis[-Nexis]. More people started to do their own searching at their desks, from their terminals. When we run these clearinghouses, we don't get too many requests from people who have any knowledge. It's usually the man on the street, or it could be the physician on the street. They're comparatively unsophisticated nowadays, the people who call you.

WILLIAMS: Now, was the company's advent into on-line the NASA *RECON* contract, or was that just strictly the production of *STAR*?

HERNER: No. We did all the intellectual input that went into all those systems. We did all the abstracting and indexing.

WILLIAMS: Oh, you did. All right. You ran the processing center, then.

HERNER: The processing center, mainly. We were allowed to use all their abstracts, but we had to exercise judgment. We did all the intellectual stuff. Now, Mel was not connected with it at the time.

WILLIAMS: He was gone by then.

HERNER: He was gone. He was at the National Library of Medicine or somewhere. He stopped for a while at the National Science Foundation, and then went on to the National Library of Medicine. We didn't have much to do with him at that time. Then he retired and turned up. First he went to work for—who the hell was that?

WILLIAMS: Was this the Information Technology Group?

HERNER: Yes. I remember he used to tell me it was owned by some outfit in Holland. [laughter]

WILLIAMS: Yes, I think so. Big company.

HERNER: I remember the word Bournemisza [Thyssen-Bournemisza] in there. Then he came and joined us. Just why, I wasn't sure. He was in the process of retiring, but he also had gotten divorced and remarried. Apparently it was—what is the word—non-affable.

WILLIAMS: Oh, not a happy situation, then.

HERNER: No. He married somebody from NTIS, a lady in charge of procurement. [laughter] I heard about this: that his former wife socked it to him.

WILLIAMS: Oh, my. No, we did not get into that at all.

HERNER: Well, that's how he happened to come to me. He needed to work. I remember him telling me he's going to work for the rest of his life.

WILLIAMS: [laughter] To pay divorce proceedings? That's too bad.

HERNER: Alimony, or whatever he was paying. That was the circumstance. I'm sorry I raised it, as a matter of fact.

WILLIAMS: Well, that's all right. Now, did King Research compete directly with you?

HERNER: A little bit.

WILLIAMS: You were conducting studies, and so were they.

HERNER: Yes. Their emphasis was much more statistical than ours. They were much more interested in experimental design. He's a pretty fancy statistician, which is funny because he got into all kinds of other things that he's not good at.

WILLIAMS: Yes, he became involved in surveys in a big way, too. That was your principal arena.

HERNER: Yes. We almost hooked up together, but then that fell through.

WILLIAMS: When was this?

HERNER: Around maybe 1970.

WILLIAMS: This was about the time he left Westat, then.

HERNER: Just about.

WILLIAMS: In your company, what's the largest number of people you have had on staff? At what point in time has your company been at its largest? Is it today, or was it some other time?

HERNER: Well, God, we were up to about one hundred and twenty at one point.

WILLIAMS: Now, are these including the people to whom you were subcontracting in the information clearinghouses?

HERNER: No, not including the subcontracting. Individual analysts.

WILLIAMS: You are including only the people who were on your staff?

HERNER: Well, for instance, we had, as of a couple of years ago, fifty-three indexers indexing for us for NLM [National Library of Medicine]. Then we had another twenty or thirty on various other projects.

WILLIAMS: You also must have had a large office staff all this time. Who was running the day-to-day office operations? Were you doing this, or was someone else?

HERNER: I had an executive vice president.

WILLIAMS: Now, what role was your wife playing in all this?

HERNER: She retired from day-to-day and was working at home—her preference—doing abstracting, indexing. She did this. In other words, she would take care of corporate matters a couple of days a week. The rest of the time, she was at home doing abstracting, indexing, translating—whatever she wanted to do. She was very happy doing that.

WILLIAMS: Yes. Well, she was good at it, too, apparently. With all those languages, she could handle it.

At what point since 1955 were you able to say, "Okay, I'm solidly established. I'm not afraid." Did there ever come a time at which you said, "I know this company is going to make it"?

HERNER: I thought around 1970.

WILLIAMS: It took fifteen years before you felt really secure, then. Was that because you largely went from contract to contract? That's a long time to go with uncertainty.

HERNER: Well, other people are smarter or more certain than I am. [laughter]

WILLIAMS: Well, it's probably best not to ever take your own company for granted.

HERNER: That's right. My wife wouldn't let me, anyway.

WILLIAMS: True enough. Information Resources Press, which you started in 1970, has not been a happy experience?

HERNER: I would say not.

WILLIAMS: What about the *EIS [Environmental Impact Statements] Digest*? That's another publishing venture, I believe.

HERNER: That was great fun, but it was handled all wrong. It's still in existence. I ended up selling it to *Cambridge Science Abstracts*.

WILLIAMS: Oh, you did? All right. I had not heard that.

HERNER: Originally they had Disclosure, Inc. It was the same outfit. That was a nice publication, as a matter of fact. It was very useful, except that the thing changed. They sort of de-emphasized environmental impacts. They were not taking them as seriously as they used to.

WILLIAMS: You seem to have been the primary person to look at those environmental impact statements and to say, "Here's a really rich information resource." How did this idea strike you? How did it work out?

HERNER: It is a very important resource. How did it strike me? Somebody told me they exist, and I said, "My God. You mean all this is documented, and nobody knows about it?" The first thing I said is, "Gee, I bet a lot of government agencies are approving projects that have been done before, or are making decisions that have been made before. Wouldn't it be nice to spread it out for them?" Then people showed me, "Well, some publications are doing that."

WILLIAMS: EPA [Environmental Protection Agency]?

HERNER: Well, EPA was a source. *CQ*.

WILLIAMS: *Congressional Quarterly* or *CIS*?

HERNER: No. There's a Council on Environmental Quality or something.

WILLIAMS: Oh, there is. All right.

HERNER: Yes. They want to also oversee. We went around, and it turns out that they get all of them. They let us have them for a while so that we could go through them. That's because we couldn't figure out, "How do you get them?" All of them have to go through that office before EPA gets them, so one of our customers was EPA.

WILLIAMS: You got them, digested the information and indexed it. After that, to whom did you sell the product?

HERNER: To industrial firms, to government agencies. One of our big customers was the U.S. Department of Agriculture. They subscribed for one for every one of their regions. It was pretty good there for a while.

WILLIAMS: You were making money on that, then.

HERNER: Then I got sick. That clouded a lot of things that were happening, because I wasn't paying attention. Then my family decided that I've got to sell it. I did, to my great regret to this day.

WILLIAMS: Oh, really? Well, now, you're still very much involved in the day-to-day operations—well, not day-to-day so much, but the administrative end of the company, right? You're still the sole owner of the company. Who's in charge now, when you're not there? Who reports to you?

HERNER: A guy by the name of Cameron [S.] McRae. I am in the process of appointing a new COO [Chief Operating Officer].

WILLIAMS: This must be a difficult decision to make.

HERNER: Very difficult.

WILLIAMS: When did you first start feeling ill and have to drop out of the real day-to-day operations?

HERNER: Oh, God. I tell you what, I was limping badly for years. They sent me to a neurologist, and the neurologist put me through an MRI [Magnetic Resonance Imaging]. They discovered that I was hemophilic. Had water on the brain—pressure.

WILLIAMS: Hydrocephalus?

HERNER: Hydrocephalus, exactly. They put a shunt in. That worked for a couple of years; it just stopped working. I they think they have to, what they call, "revise" it. Everybody's busy debating over me, "Should we give him drugs? Should we give him this? Should we give him that?" [laughter] They put me on Parkinson's disease medicine. Purely speculatively. They said, "It sometimes works on this kind of patient." It's been going on for a good long time. The sad part of it is, it affects you sort of mentally. Then my wife came down with Alzheimer's.

WILLIAMS: How long was she affected?

HERNER: I would say about four years—sort of a gradual thing.

WILLIAMS: Yes. My mother just died last December with that problem. She was eighty-seven. You could see it coming on very slowly, but they didn't diagnose it until really just maybe six or nine months before she died.

HERNER: Well, they pretty well had her diagnosed. Right to the end, she was very athletic. She was a big tennis player and walker and so forth, and she would not hold still. She was in this building with me, which is why I'm here. I used to spend hours with her every day, and she would always take off on me. I used to have her up here, and she would leave. Finally what happened is, she fell walking around and broke her hip. They sent her over to the Fairfax Hospital, which is very suspicious. "A teaching hospital," they say. They left her there. At the end of forty-eight hours, they said, "She's got to leave and come back to the nursing home."

We were having big fights about that because she also had a history of—what's the expression—irregular heart beats. She was at GW [George Washington Hospital] for a month for that. They took care of it, got her out of it. Then, they put her in the nursing home. She was there for one day and she went into ventriculation—is that what you call it? She went into a coma and died within a couple of days. I claim that they should have moved her; they should have watched her—but you can't go argue.

WILLIAMS: Yes, that's difficult, isn't it? Well, now let's talk about some professional aspects of your life, going back in time. I gather you joined the American Chemical Society fairly early. Do you remember exactly when that was? Then, when did you get involved with the Division of Chemical Literature?

HERNER: I started in the Division of Chemical Literature.

WILLIAMS: Was this in 1943, or was it later?

HERNER: No, it was not that early.

WILLIAMS: Was it in 1947 or 1948?

HERNER: No, as a matter of fact, it was in the 1950s. Let me see—I joined it in about 1950. I didn't want to pay the full dues. They said, "You can be an associate member, but then you'd only be a member of the Division of Chemical Literature." I said, "That's okay." Then they decided, "You can't do that. You've got to be a member or not a member."

WILLIAMS: That is, of the ACS?

HERNER: In 1950, or maybe as late as 1965, I became a full member. I took the cheap route.

WILLIAMS: You weren't one of those people who received their *Chemical Abstracts* for the cheap price.

HERNER: Well, you got it if you were registered for a meeting. Oh, you mean for nineteen bucks or whatever it was?

WILLIAMS: Right. They were twenty-five dollars.

HERNER: Yes, that was funny. [laughter] I remember having a big debate. The debate was about, "How can the American Chemical Society afford it?" The answer is, "They're getting grants from the government, you dopes! The National Science Foundation is paying for this."

WILLIAMS: They got an awful lot of money. Mel Day said it was fifteen million dollars over a period of years.

HERNER: Sure. That was funny.

WILLIAMS: Principally, the money was earmarked for the automation.

HERNER: Theoretically.

WILLIAMS: Now, were you following the early work that was being done, by Perry and [Allen] Kent and Berry [Madeline Berry Henderson] and those people, on using punch cards for chemical literature searching?

HERNER: As a matter of fact, yes, I guess I was <u>following</u> it. Garfield was in it, and I was following <u>him</u>. He was the first one I saw who used—was it a 108?

WILLIAMS: Would this have been an IBM 101?

HERNER: Yes, a 101. We could do multiple-column searches and correlations, and that interested me. This other stuff didn't interest me.

WILLIAMS: You mean, the edge-notched cards and that kind of thing.

HERNER: No, or Bob [Robert S.] Casey's stuff. It was too clumsy. I was intrigued by the idea of the 101, and the success of it. That, to me, was Garfield. He introduced me to it.

WILLIAMS: Oh, he did. Yes, you were both at Johns Hopkins. Now, you knew him before that 1953 meeting, right? You had met, because you were right there close together, anyway.

HERNER: Yes. Oh yes, we were close collaborators, and plotters, and schemers. [laughter]

WILLIAMS: What struck me was how long it took from the early 1950s to the middle 1960s before this handling of chemical information by computers was really nicely automated. To what do you attribute this long delay?

HERNER: Mainly lack of imagination. People were in a rut. In other words, a lot of time goes into something. When you dedicate your years to using a 101 and that concept, or using even a more elementary machine, you tend—or they tended—to try to do everything by that device. Now, the idea of that—and a unit card, which was the original idea—I've got several thoughts going here. As soon as people started thinking in terms of getting away from the unit card and into inverted indexes, I think we started taking off. In other words, you have two sets of cards. One is the unit record. That's the library, as it were. Then you have the retrieval device, the retrieval machine.

[END OF TAPE, SIDE 6]

WILLIAMS: The development of the unit card, and then the movement to the inverted index—is this the process?

HERNER: Those were two steps. I'm trying to think who started this idea of a record with fields.

WILLIAMS: Well, pretty much that's what had been done with the various IBM punch card machines.

HERNER: Well, now we're getting into it being on tape. You have fields or zones, and you've got a subject. Only one of the fields is a subject field. Then they reached the stage where you can focus. I remember Garfield giving me a lecture on this, saying that people frequently want everything by a given author on this combination of subjects, and you could do that. That was the real kick-off, when you could start doing that by field.

WILLIAMS: He was able to do that with the 101 machine, then.

HERNER: He could do some of it. But when we got into computers, then you can really do it.

WILLIAMS: Yes. Well, of course, Claire Schultz was doing some work at the drug company for which she worked.

HERNER: That's right. Merck Sharp & Dohme.

WILLIAMS: Right. She was also using a 101 machine about the same time, and I think they were coming up with some of the same kinds of findings and approaches. We talked about all the special-purpose machines, whether they were manual or automated. You mentioned that Shaw's Rapid Selector wasn't worth anything. The Western Reserve Searching Selector came to naught. All of these.

HERNER: Well, they were "Rube Goldberg" machines, sort of—but they were all too slow. It would take ages to do anything. Even though they were ostensibly fast, to the eye they're fast, but it had to be electronic.

WILLIAMS: Was there too much concentration on those things, or were they just paving the way for when we finally got the general-purpose computer that had high speed and a lot of storage? How do you assess that?

HERNER: Well, we've gone in two directions. First, we went into an era of mainframes where the thing would hold everything and do everything, but had limited access. Then they started continuing with mainframes, but with terminals attached to them. Mooers was involved in that.

He had the thing called the interactive typewriter. There he was saying that you could read instructions and you could read questions into the mainframe. If you had your records set up right, it would tell you what we've got on that subject, or whatever you want. We had to have terminals, we had to have modems, so that the terminals could communicate with the mainframe and the records in the mainframe. They could be business records or they could be technical records. The thing is, every record is chopped into fields. That was fairly revolutionary. I think that was a kick-off. Now, of course, there are so damned many opportunities and ways of getting at it, if any given record that you see or know about can be on the Internet in some form.

WILLIAMS: Yes, true. Now, you mentioned a conversation you had with Henriette Avram. I gather this was about the MARC record.

HERNER: Yes, well, I had many conversations with her.

WILLIAMS: Were you involved in the development of that?

HERNER: I did a study of the use of the MARC record for Henriette. They wanted to do a study of how far back should they go in a conversion to MARC. That was my main relation to that. That was another example where she just met me one day and said, "Hey, would you like to do a study for us?"

WILLIAMS: Oh, yes? Contacts, then. Let me ask you about the controversy between ADI and SLA. You were a member of both.

HERNER: Yes. The controversy?

WILLIAMS: Yes, particularly that controversy between the documentation people. There was an expression that particularly the special librarians used that said, "Documentation is special library work done by amateurs." How did all this affect you? You had a foot pretty firmly in both camps.

HERNER: Well, I mean, I sliced the pie slightly differently. I said that if you can get the information by whatever means, you get it. Let's say these guys who deal with reports ask a guy across the street, "Hey, you know about any good reports on certain subjects?" If it works, then you get it. I used to get arguments, "Well, you don't get everything." I didn't say this guy <u>wanted</u> everything. He wanted something. Maybe he wants the latest paper anybody knows about. That's good. That's anti-librarian, in a sense. It turns out that the great users of the

libraries, your basic scientists, they do the same thing, by tracking outsiders' references or by talking to their colleagues in meetings. I remember sitting in the middle of these things and frankly, wherever I was, I was with them. [laughter] I didn't want any controversy.

WILLIAMS: You didn't want to take a side because your business was dependent upon it, is that it?

HERNER: Well, I couldn't make up my mind who was right. I think everybody's right.

WILLIAMS: Other people have said to me that the special librarians struck them as being very conservative and resistant to the new methods.

HERNER: They were.

WILLIAMS: Were they? How so?

HERNER: Well, they were interested in card catalogs. They were not interested in, say, retrieval systems. They didn't want to call a card catalog a retrieval system. I remember having arguments. See, I was talking to all these guys—basic scientists and applied scientists—and they all told me they never used a card catalog. I said, "You never use a card catalog?" "Oh yes, after by another means I've identified a title, then I look in the card catalog to see whether the library has it." [laughter]

WILLIAMS: They weren't using it for subject searching, anyway. It was just about ownership.

HERNER: As a matter of fact, by I guess a misunderstanding—taking me out of context in a report or a paper or something—I said, "Which means that the library card catalog is only used as a finding list." That's what I said. Which is ambiguous at best—a finding list. The next thing I know, I'm quoted in *Webster's Unabridged [Dictionary]* under "Lists." You can still find it. [laughter] It's still sitting there, that, "The library card catalog is mainly a finding list." That was interesting.

WILLIAMS: Well, did you find the special librarians resistant to technical reports?

HERNER: A little bit. I was, too. I remember various people were, as a matter of fact. *Chemical Abstracts* refused to include them for a long time, because it was not refereed. Yes. Then of course they started getting more and more ornate—report preparations, divisions. I remember they had a very fancy one at the Johns Hopkins Applied Physics Lab by the time I left. Some report series were pretty fancy.

We did a study; we wanted to make a report citation index. We actually proposed this to somebody, one of the agencies—I can't remember, maybe NASA. I was intrigued to see to what extent papers and reports get cited in reports. There was a whole spectrum in the more basic subjects. You get into the citation of journal articles and the more applied hardware-oriented ones or whatever. They tend to cite reports. I remember having numerous discussions with Garfield about that.

WILLIAMS: Were there other areas? Let's just take one example. ADI and SLA came pretty close to merging. They talked about it for a long time, contemplated it. Did you take a stand on either side?

HERNER: No.

WILLIAMS: You didn't care one way or the other?

HERNER: I didn't. Or I was otherwise occupied or preoccupied, or whatever. I just never got into that discussion. As a matter of fact, I was feeling that I was being hypocritical in a sense because, "If I go to one of their meetings, I'm with them. If I go to one of the others, I'm with them." [laughter] Trying to be friendly. This was just instinctive. I just didn't feel like having any fights.

WILLIAMS: Well, there were good arguments on both sides.

HERNER: Oh, there were. Extended arguments.

WILLIAMS: Now in 1958 at the International Conference on Scientific Information, you gave three papers, from what I read (24). Were you involved in planning the conference? How did you get to present three papers?

HERNER: As a matter of fact, I was the first secretary of the conference, and I resigned. I subsequently submitted three studies that I wrote. On speculation, I just submitted them. One

was "Subject Slanting of Abstracts." Another one was "Using Reference Questions to Create a Classification System." The other one was, "How Medical Scientists Get Information." I just wrote them up and submitted them. I remember enjoying it. I wrote them all up in about one day. These are studies I had done recently. I remember sitting in a room in my house. It was very sunny; it was a pretty day. Sitting at a bridge table and writing them up. Boy, that was a good feeling.

WILLIAMS: Yes. Well, how did they go over at the conference?

HERNER: The one on subject slanting—there was something about that. They had review panels. The panel that reviewed the subject slanting paper, one of the members was a member of the Atomic Energy Commission at the time, Will [Willard Frank] Libby. He thought it was an interesting paper. Then he said, "All you're saying here is that they mainly use their leftover abstracts. Therefore, they can't be slanted. Couldn't an abstract agree with your viewpoint? With the author's viewpoint?" [laughter] I remember saying, "Dr. Libby, I think they could."

I remember being queried on my methodology on the medical information. I had this thing that, "One of the sources of information of my medical scientists and medical practitioners certainly is medical detail men from drug companies." I was claiming a lot of them never heard of the thing before the detail man comes around to try to sell them. [laughter] Some people didn't think that was nice.

WILLIAMS: [laughter] I think that's definitely the case, though. You were certainly finding that's the way physicians got a lot of their drug information.

HERNER: Oh, sure. I had a lot of other fights with Marty [Martin M.] Cummings at the National Library of Medicine. [laughter] He assembled a panel to challenge me.

WILLIAMS: On that paper?

HERNER: On another study like it. I had lined up six different studies on the use of detail men, and other methods of getting information, used among practicing physicians. They were overwhelming. They were questioning my methodology, and they were questioning the methodology of the studies. I was saying, "Gee, if you have ten different studies and they all use different methodologies, and they're all crummy but they all come up with the same conclusions, can they be crummy in the same way? Can they be biased in the same way?" We finally scored. They said, "They're all crummy studies, but they all conclude this. Make of it what you will." [laughter]

WILLIAMS: What did Cummings say? He still wouldn't accept it?

HERNER: Well, as a matter of fact, I remember I met him at a subsequent meeting years later. He said, "Boy, I really gave you a hard time, didn't I?" [laughter]

WILLIAMS: I can see how MDs would not like to admit that they got their drug information from detail men.

HERNER: Particularly Marty. He was very proud.

WILLIAMS: Yes, that MD degree. Do you think that 1958 conference had a long-term effect on the profession?

HERNER: I think so. I think it did very much what Garfield's meeting did, and the Royal Society conference. It once again defined the field. This is what they were trying to do. They had all these six or whatever divisions, and they were saying, "This, for now, is what information science is comprised of"—with the understanding that ten years from now, it would be entirely different. I tried to get them to do a twentieth anniversary, but it just wouldn't come off because everybody said there were so many other meetings going on.

WILLIAMS: The twentieth anniversary of the 1958 conference? Part of the work that I'm doing is to try to plan a history session next year, in 1998. We're considering that as maybe one of the themes. It's will be fifty years—in 1998—since the 1948 Royal Society conference, and forty years since the 1958 conference here. We're looking at those as theme possibilities. Now, of course, we have to find people who have done some research on the influence of these conferences. We also have to locate funding in order to afford to bring in people who have been studying that. Yes, it's interesting, though. Those anniversaries are nice. We're hoping that this eventually will be one of the sub-themes of this conference.

You called H. P. [Hans Peter] Luhn, whom we haven't talked about yet, the Thomas Edison of information science. Why is that?

HERNER: He's just ingenious, that's all. Let's say, he mechanized SDI. He was one of the greatest innovators I have ever met. He got into indexing, and he did a lot of rationalizing that was very clever. I remember something that has been attributed to me, but I picked it up from him: that is, indexing by assignment and indexing by lot. In other words, where you get it from

the language of the article, or you get it from a planned vocabulary. He did this kind of rationalization. It doesn't sound like much, but it was revolutionary at the time.

WILLIAMS: You mean, whether you derive the index terms from either the document or an outside source such as a thesaurus.

HERNER: Indexing by derivation.

WILLIAMS: Oh, yes. Derivative indexing. Right.

HERNER: God, I had a long list of things he did. There's a whole book on what he did.

WILLIAMS: Yes, right. Claire Schultz wrote that book (25).

HERNER: I remember her telling me off. I'm saying, "It's indexing." I wrote a paper in which I talked about indexing by assignment (26). [laughter] When she was preparing the book she said, "I thought you invented that." I said, "No, I was quoting Luhn." She said, "Well, you didn't make that clear!" [laughter] I told her, "Well, maybe I was trying to take credit." She was mad as hell at me.

WILLIAMS: Oh, really? Of course, Luhn's scanner was, again, one of those machines that never quite made it. Do you think there was a good core idea there?

HERNER: Oh, yes. One of the problems is, he hung onto punch cards too long. The Luhn Scanner, yes. At the time, he was exciting. Now he would be passé.

WILLIAMS: He had all the force of IBM behind him, and he had these good ideas, as well.

HERNER: He used to churn out these reports, which were very well written, very entertaining, very interesting. When you think about it, now they're archaic. You've got to, in a sense, put yourself in the context of the time. Compared to everybody else, he was a genius.

WILLIAMS: Was Luhn easy to talk to?

HERNER: Luhn? Very. Very funny guy—humorous.

WILLIAMS: Claire Schultz said that, since he was on an IBM expense account, he would invite a group of people out to dinner. These people would be talking about anything and everything, but particularly information retrieval. You frequently would have been one of those invited.

HERNER: Frequently. Lots of booze.

WILLIAMS: [laughter] Luhn, Taube—these folks are now gone. Someone said to me that Taube was the salesman of the information business—that's what he should be recognized for, more than anything else. He went around, talked to CEOs, and even though perhaps he wasn't able to sell his system, he sold the idea.

HERNER: I'm telling you, he also rationalized it. With the Uniterm system, he made people understand what information retrieval was—and in a sense, I guess, sold it to the field. People understood what you're talking about. "What do you mean, information retrieval?" He was talking about multi-subject searches. Of course, I used to have fights with him. I used to say to him, "I can do multiple subject searches with the catalog cards. On the top of the card is the subject, or I can look at the tracing on the bottom of the card. I can tell you, I'll pull out all the cards that have these two concepts on them."

WILLIAMS: What did he say to that?

HERNER: "Drop dead!" [laughter]

WILLIAMS: If it wasn't done using a machine, it was not as successful a search.

HERNER: Well, no. What I'm saying is, he used to say to me, "If you want to, stand on your head to do retrieval. I'm trying to simplify it." [laughter]

WILLIAMS: Well, it was certainly true that you can do that with a card catalog. It's slow, but you can do it.

HERNER: Well, he was, in a sense, an ambassador. Yes. He was mainly publicizing himself and his great intellect, but in so doing, he was selling the ideas.

WILLIAMS: Do you think his flashiness helped him, or did it hinder?

HERNER: Oh, I think it helped.

WILLIAMS: He could get into the CEOs' offices with that kind of approach.

HERNER: Yes. Well, remember, he's a dashing dresser and so forth. I remember his baby-blue Lincoln. Everything about him was flashy. He exuded prosperity. No matter what was happening to him, he exuded prosperity.

WILLIAMS: Was he prosperous?

HERNER: Pretty prosperous.

WILLIAMS: Tell me about the selling of his company—when that happened and who bought it. I know it may be documented, but I haven't traced it yet.

HERNER: Well, I think that Leasco [Inc.] purchased it. You know this guy—he's a big international financier type now. Saul something-or-other [Saul Steinberg]. He founded Leasco. There was an ingenious idea. They rent these machines from IBM. They amortize them out in five years, and then they're finished with them. He did a study at Wharton [Wharton School of the University of Pennsylvania].

[END OF TAPE, SIDE 7]

WILLIAMS: This was after Taube had died.

HERNER: Yes. I mean, Gene [Eugene] Miller was still there at the time.

WILLIAMS: Were you tempted to buy the company?

HERNER: No.

WILLIAMS: It would not have been advantageous to you?

HERNER: No. That was way out of my league. I didn't have any reason; I don't know, probably Garfield was. It was mainly an indexing and abstracting operation. I hired a number of people from them who came to me, but no.

WILLAMS: Leasco went on with the contracts for a while, I gather. They didn't get into the information business, did they?

HERNER: No, they didn't.

WILLIAMS: I've been trying to track down the records of the company of Documentation Inc. I haven't been able to determine what's happened to them.

In your 1962 article in *American Documentation*, called "Methods of Organizing Information for Storage and Searching" (26), it seemed to me that you were expressing some frustration about the ability of people in the field who take one another's word for what works and is best for retrieval, going from simple to complex systems and then back again. I sensed some frustration on your part in your statement that we don't seem to have an empirical or scientific basis for what makes a good system. Am I putting words in your mouth, though?

HERNER: No. At the time, I didn't think they had evaluation criteria. Most people were arguing just for the sake of arguing. We used to sit and discuss around and around, and again, everybody was right and everybody was wrong. Where was that paper published?

WILLIAMS: *American Documentation*. You felt, then, that the people in the field were not making the kind of progress that they needed to be making—for example, the kind of progress you were making in the user studies. It looked to me to be very good, and that your people were building a pretty good, solid body of information. However, I gather that for storage and searching, you were not at all happy with how things were developing.

HERNER: Either that, or I didn't understand it.

WILLIAMS: What are your feelings now about the field?

HERNER: Oh, now—my God. I hate like hell to read *American Documentation*, or *JASIS [Journal of the American Society of Information Science]*. Everybody's trying to find the magic formula for retrieval or whatever it is. They want the model. That's all I see in there.

Once, in the course of a Miles Conrad lecture, I was intrigued during one part by the fact that everybody celebrates [Claude E.] Shannon and [Warren] Weaver's communication theory. They always focus on the communication part. If they read the book closely (27), there's a big section by Weaver on by what mechanisms do these messages—I mean, what do these messages contain and what do they do. He says, "What about negantropy?" I still feel that these people are sort of desensitizing the meaning. They want to know how fast, how many, and they try to combine all kinds of things like relevance and recall, and the purity of the message. Not the goodness of the message—what effect there is of the message—but what can be quantified. Of course, you can have an index to anything and you can make your own arbitrary grades. Sometimes they do that, and that's interesting; but there has to be a method of evaluating impact—meaning, the meaning to the recipient.

WILLIAMS: You mean, the value of the system.

HERNER: Yes.

WILLIAMS: Speaking of the recall and precision, what were your reactions when you first read about the Cranfield studies (28)?

HERNER: Oh, as a matter of fact, I was in London with my wife. We stopped off at ASLIB [Association for Information Management] headquarters, and I heard about it. I met Wilf Lancaster, who was working there at the time, and I was very impressed. The only thing is, who determines whether this is relevant? We used to have big arguments. To whom is it relevant, the user? Wilf said, "No." I mean, I go through and I say, "This is relevant to the reference question, and this isn't." I would say it's just general. Of course, what is the relationship of relevance and recall? What's he call it? Precision and recall. The greater the precision, the lower the recall, and vice versa. I don't know. You can prove it—it's true, but I don't think it's very beneficial.

WILLIAMS: Yes, but it's the relevance issue that has caused so much trouble—trying to determine how that operates.

HERNER: Yes. Well, everybody liked it. It's a nice package.

WILLIAMS: Yes. Well, now, did you have something to do with Lancaster coming to the U.S.? You hired him.

HERNER: I brought him here.

WILLIAMS: Oh, you did. You offered him a job, then. I noticed that you had collaborated on a number of articles.

HERNER: Yes. Well, when I was over in London—his wife's American. The first thing he said to me is, "If you hear of any jobs in the States, let me know. My wife is"—what did he say—"aching to get back to the States." A circumstance arose where I needed somebody in a hurry who knew all about indexing. I called him and said, "Would you be interested in a non-research indexing position?" He said, "Absolutely." He was over here two weeks later.

WILLIAMS: He was on your staff full time. For how long was this?

HERNER: About two years. Then he went over the NLM to do this study.

WILLIAMS: This would have been the evaluation of the MEDLARS project.

HERNER: I was furious.

WILLIAMS: I hope he didn't abandon you in the middle of a project.

HERNER: Well, no. I got somebody else. What happened was that Marty Cummings wanted to do his study. He kept sounding me out, would I be interested? It wasn't Marty directly; it was one of his staff members. Then the next thing I hear is, "Marty doesn't want a profit-making organization to do it." Instead, he hires Wilf away from me. Wilf was so overwhelmed by the opportunity. I'm saying to him, "Don't do it, Wilf." He says, "God, I can't pass up this opportunity," so he didn't. We remained friends, but—

WILLIAMS: You lost business right there, though.

HERNER: Oh, yes. My plan was that he would do it working for us.

WILLIAMS: He had been on the Cranfield studies, is that correct?

HERNER: Yes. He was with [Cyril W.] Cleverdon.

WILLIAMS: Now, during this time, 1964 to 1968, I believe you also taught at the University of Maryland.

HERNER: No, mainly at Drexel [University].

WILLIAMS: Drexel. How did you manage to do that and keep your business going?

HERNER: I used to go up once or twice a week at six o'clock. It was tough. I used to come back on a ten o'clock train, I remember. I enjoyed it.

WILLIAMS: Once a week you were doing this, then, for one class.

HERNER: Yes. It was a three-hour session.

WILLIAMS: How did you get involved with Drexel?

HERNER: I guess I was asked by John [F.] Harvey, who was the dean at the time. I thought, "Gee, this is a funny idea. Let's try it."

WILLIAMS: This was about at the time that Drexel had started their information science program.

HERNER: Right. No, this was the library school. I was one of the first information science people they had there.

WILLIAMS: Right, that's what I mean. I understand from them that they started their information science program in 1963. I believe you and Claire Schultz were the two professors in the program.

HERNER: Yes, Claire. Yes, I remember. [laughter] I remember Belver Griffith coming in and pooh-poohing us. He was an old friend, as a matter of fact. He lived in Washington. Griffith was a client. He was with the American Psychological Association, and he was a client at the time. Then he went over there and he got on his high horse, because they gave him a special professorship—I think well-deserved. Still, he was nasty to me, and I guess to Claire. You know, sarcastic.

WILLIAMS: What course were you teaching at Drexel?

HERNER: I was teaching methods of mechanization. I was using Charlie [Charles Percy] Bourne's first textbook as a text (29). At that time, it was a bridge between, you could say, punch cards or elementary machines and the computer. That was one aspect. Different forms of communication, we talked about: what they called a facsimile, but it wasn't facsimile at the time. Long-distance facsimile—LDX—and all the early machines. I had about twenty different categories—communications devices, searching devices. It was a sort of a hodgepodge. It was interesting. Had a terrific class.

WILLIAMS: What was Griffith unhappy with?

HERNER: Oh, that was after. Well, he thought it was all amateurish. I suppose in a sense, in its time, it was.

WILLIAMS: Should you instead have been teaching the general-purpose computer or using the mainframe?

HERNER: Well, no. He wanted me to be concentrating on studies, not this crap. I remember him saying, "That's not your bag."

WILLIAMS: Would these have been studies of information retrieval, or user studies?

HERNER: User studies, any kind of studies. We subsequently tried to do a couple of studies together, but we couldn't make them go. Tried to get grants from the National Science Foundation and from the National Library of Medicine, and they just wouldn't give them to us—contracts, I should say—so we sort of fizzed. He was busy. All these guys get married every fifteen minutes, you know. [laughter] He had a new wife.

WILLIAMS: Oh, really? How would you describe the Drexel program at that time? Was this strictly the two information science courses, the one that you taught and the one that Claire taught?

HERNER: At that time, yes.

WILLIAMS: The rest of the program was pretty traditional?

HERNER: Absolutely traditional.

WILLIAMS: Harvey wanted to take it in another direction, however.

HERNER: I think he did, yes. Yes, he did. It was ill-defined. Then they had me teaching a course in research methods. That sort of fizzed. We discovered that the students weren't interested in research methods. Research to them meant doing a bibliography. I was doing all kinds of operations research exercises, and it was driving the students crazy.

WILLIAMS: Were you doing much with statistics then?

HERNER: Yes. Boy, that drove them up the wall.

WILLIAMS: I teach a research methods course also. I have the same experience. [laughter]

HERNER: One of them wrote a letter to Harvey about me, saying, "This is not research as I think of research." Harvey sent me a copy of the letter. I got angry and insisted, "Whoever wrote that letter, get the hell out of here!" [laughter] The person I suspected wrote the letter disappeared. I told John, "I don't think I'm comfortable with this set-up." I was teaching this other course, and it was getting kind of cluttered. Now I was going up twice a week. I remember saying, "I don't have to come up here twice a week to be insulted!" [laughter]

WILLIAMS: Didn't you teach a course at the University of Maryland also? When was this?

HERNER: Gee, I taught for one year. It was on communication methods. Wide open, whatever I wanted to make it. We had sessions dedicated to the sciences. Who was the guy who wrote about the two worlds?

WILLIAMS: Oh, C. [Charles] P. Snow.

HERNER: Yes. We focused on that for a while.

WILLIAMS: Was Maryland also fairly traditional in the 1960s?

HERNER: Yes. The dean was Wasserman, Paul [W.] Wasserman. Yes. He didn't know what to make of me, and I didn't know what to make of him. We finally agreed to disagree. Well, all these things, I was very busy, at least at that time. I can't remember what I was busy about, but I found it very difficult to drive out to College Park.

WILLIAMS: Well, you were getting a lot of business during that time for the company.

If you could, please sum up for me the problems and opportunities that the independent entrepreneur in the information field has had to contend with over these last few years.

HERNER: Well, too much dependence on the government and its idiosyncrasies, which are many. Also, too much temperament in my stage, in the early stages—too many prima donnas in the field who really weren't communicating. Mooers didn't communicate very well with Taube, for instance. Taube didn't communicate with anybody. He was always watching his back. That was one of the biggest problems. Then the people in government who were running most of the shows—and that was the National Science Foundation—you could sell them a bill of goods and if they liked you, they bought it. That was a problem at the time, because I'm not likable. If they like my jokes and they like my humor, then I'm likable, but if they don't—and a lot of them didn't.

WILLIAMS: It sounds as if it was more based on personality than on science, then.

HERNER: Absolutely.

WILLIAMS: Why was this?

HERNER: There were no controls. What I find is that people respond not to their instincts, but to what they have to do. Most people are good and honest, but given a set of strictures—rules—they spend all their time evading them or working within constraints. Sometimes a lot of evasion and a lot of peculiar things go on. They meet the letter of whatever it is, not necessarily what's needed. I still find that. As a matter of fact, we seem to be reverting to that.

It used to be where you could put out a competitive proposal and either give it to a friend—competitive, or a request for proposals—or you could make it truly competitive. In many cases, it was truly competitive. For a while there, everybody played by the rules. They would try to get advantages through intelligence: like talking to people, by knowing people, by networking. That was fair game. If somebody's that ambitious, he ends up deserving. He's probably going to be the most knowledgeable person writing the proposal. I think that's pretty healthy.

WILLIAMS: I take it you have been a stock-owned company; but one of you—you or your wife—owned 100 percent.

HERNER: That's right.

WILLIAMS: What seems to me is that you tried to play a dual role here. You tried to advance the field, and you tried to make a living as a private entrepreneur. Am I assessing this correctly?

HERNER: Yes.

WILLIAMS: Certainly you've been successful as a company. How do you feel you've been successful in trying to advance the field?

HERNER: Oh, in a very tangential way. Oh, for instance, with Gene Garfield and Boris [Anzlowar], one of the founders of the Information Industry Association [IIA]. It's mainly through contacts with friends. You sit around and complain. That's how Garfield got from ADI to ASIS. I've sort of been in and around all those things—those pivotal times—just circumstance.

WILLIAMS: If you would, I'd like you to talk about the formation of IIA. How did this idea begin and grow?

HERNER: Well, it started out, Garfield and Boris Anzlowar called me. I was not an initiator. They said, "Don't you think we should have the equivalent of ADI or ASIS for for-profit outfits?" That's the way it was introduced to me. [laughter]

WILLIAMS: Garfield called you with this idea. What happened next?

HERNER: We had a meeting and decided, "Yes, it's strictly for for-profit firms." Then Bill [William] Knox was looking for a job. He was in McGraw-Hill. They fired him. It's funny, I thought I was going to get a lot of business from McGraw-Hill through Bill Knox. The next thing I know, he's the head of IIA. [laughter]

WILLIAMS: How did IIA grow? Did the two of you comprise the initial two companies?

HERNER: Oh, we had about eight companies. I remember, because we had a board of directors.

[END OF TAPE, SIDE 8]

WILLIAMS: About eight companies comprised the originating group, then. Were there dues that each company had to pay?

HERNER: Yes, we paid about—I can't remember, something like five hundred bucks a year in the beginning, depending on the size of the company. We had Eastman Kodak. We had some pretty fancy ones.

WILLIAMS: How did you get these big companies? Did you go talk to them, or did Garfield or Bill Knox?

HERNER: Knox went from there to NTIS. What was he doing there? He had an office. I remember it was General [John J.] Pershing's old office in the executive office building. Oh, he

was the head of COSATI [Committee on Scientific and Technical Information], yes! Then he went from there, I think, to McGraw-Hill. Then he went from there to NTIS.

I remember when we were going to appoint him head of IIA, Garfield saying, "We don't just want a publisher, you know, to run IIA. It's not just a publishing organization." I remember Knox saying, "Well, McGraw-Hill doesn't think I'm a publisher. [laughter] Does that qualify me?" He was potent. He moved all these guys.

WILLIAMS: Was he the principal one to advance IIA, do you think?

HERNER: I would say so.

WILLIAMS: Yes. How long did he stay there?

HERNER: Until he took over NTIS. [laughter] About three years. He was really very potent.

WILLIAMS: Are you happy with the way IIA has developed, as the information industry?

HERNER: I guess, yes. I don't recognize it anymore.

WILLIAMS: It's a very powerful lobby now.

HERNER: Oh, Paul Zurkowski was pretty potent in arranging that.

WILLIAMS: Well, returning to your own history, what do you consider to be your major accomplishment? We were just beginning to get into this a little bit.

HERNER: Well, to keep a firm going for forty-three years, I guess.

WILLIAMS: Yes. This certainly would not have been an easy thing to do in the information business because there are not those huge contracts, and like you say, there is too much dependence upon the federal government.

HERNER: That's right.

WILLIAMS: What about within the field of information science?

HERNER: I would say that I think of myself as a sort of dilettante. That is, I'm interested in anything—any kind of study, any kind of project—that produces or helps the dissemination of information. I'll try anything. I have tried anything.

WILLIAMS: Do you still see yourself, in your core, as a user studies person? Do you think that has played not only an important part in your company but also in your satisfaction about, or understanding of, the field?

HERNER: I would say so, yes.

WILLIAMS: You seem to have avoided offices in ADI-ASIS over the years. Would there be any reason for this?

HERNER: Correct. I did have various offices at IIA. I was the secretary and treasurer, and so forth. I never stood for president. I'll tell you an anecdote. I'm at the Division of Chemical Literature, and they were trying to elect a chairman. Then they were trying to elect a board of directors, or whatever it was. They have a vote. It turns out that I was out-voted by a lady librarian. It turns out I did get in subsequently, because they discovered she wasn't even a member of the division. [laughter] I decided, "Boy, you'd better be careful about running for office. You're not a great campaigner."

WILLIAMS: Now, that was in the ACS division. What about within ADI or ASIS?

HERNER: There I don't know if I lost heart or just lost interest. My wife was active. She was the treasurer for years and was very active. I decided, "That's enough. That's our contribution."

WILLIAMS: When we moved from this term of "documentation" to "information science," what were your thoughts about that?

HERNER: At the time I thought, "Gee, it's inconsequential." I've since decided it was a good idea.

WILLIAMS: What did you mean by the word, "inconsequential"?

HERNER: Well, I was saying at the time, "Look, you have FID [Federation for Information and Documentation]. Everybody knows what that does. You have ASLIB. That's Information Bureau, and somebody pointed out that it's also Libraries and Information Bureau. I just didn't think it would have an effect. I also admit now that "documentation" is a vague European term. Nobody's quite sure what it means.

WILLIAMS: Do you prefer the term, "information science"?

HERNER: Oh, yes. Well, it's more descriptive. When people ask you what you do, if you say you're in information science, that's pretty vague. If you say, "I'm a documentalist," it sounds as if you deal with maps. You're like an archivist. From that viewpoint, I think the change was a good one. I think one of my problems was that anything that Garfield thought of, I objected to. [laughter]

WILLIAMS: Even though you were good friends at the time?

HERNER: Well, he did the same thing to me.

WILLIAMS: Oh, is that right? How do you view Garfield's contributions?

HERNER: I think they're tremendous. I think they're great. I think he's nutty as a fruitcake, but God, I admire him. I remember him struggling and persevering.

WILLIAMS: Mrs. Schultz has some interesting stories to tell about those early years.

HERNER: About the chicken coop?

WILLIAMS: Yes. She also mentioned borrowed typewriters and those kinds of things. Did you have to go through those same kinds of struggles, or were you a little bit better off because of the government contracts?

HERNER: I was a little better off, but he got better off pretty fast. I remember when *Current Contents* took off (30). Boy, it was like overnight.

WILLIAMS: It took a long struggle, though.

HERNER: Yes, putting it together.

WILLIAMS: Well, getting acceptance, apparently, was a problem also.

HERNER: Oh, yes. Tremendous. Well, first he called it *Contents in Advance*. That was too clumsy. Then I remember Sam [Samuel] Lazerow suggested *Current Contents*, and that was good. Then he started working on methods of production. That's when things started taking off. He streamlined that. Then he started writing these editorials, which were a feature.

WILLIAMS: Yes, either in his editorial or as a preface to each issue. Well, what areas are we lacking in, in terms of coverage?

HERNER: Well, I write by editing. I usually write a first draft, which is completely obliterated, and then I do a second draft. Let me go to work on that thing.

WILLIAMS: All right. Are there areas that we haven't covered?

HERNER: I'll see.

WILLIAMS: All right. Again, just for the record, as you know I'm trying to work on the history of information science. Is there a particular approach you would use for this? I know you wrote that 1984 article, which you called "A Brief History of Information Science" (31). Apparently you've done some work and some thinking in this area.

HERNER: Well, I'm following your path, in a sense. I'm saying, "Let's start with the most cited people. Let's consider them the main actors. Then let's do it through them. If we understand them, we'll understand the field." That's what you're doing, in essence.

WILLIAMS: Essentially, although I'm not looking at citations so much.

HERNER: Well, I want to start it. I don't want to do it randomly. There'll be randomness enough, because one will always lead to another. I discussed this with Claire on numerous occasions. We were going to write the be-all and end-all. I would say that you should start with a core, and it reaches the whole field. Have you contacted [Robert A.] Fairthorne?

WILLIAMS: No, I haven't. I've been conducting my research mostly on Americans. Well, in fact, only on Americans.

HERNER: He's a very important guy.

WILLIAMS: Yes. Now, is he still living?

HERNER: Yes, as a matter of fact, I had a letter from him. He's ninety-three years old.

WILLIAMS: Yes, it would really be great to interview him.

HERNER: I'll see if I can find it. It's in my office somewhere. I wrote an appreciation of him for some reason (32). It was never published. I remember I was talked into it by Madeline Henderson. I might send you a copy.

WILLIAMS: I would love to have a copy.

HERNER: You got a card?

WILLIAMS: No, but your secretary has my fax number. If it isn't too long to fax, you could just fax it to me or mail it.

HERNER: It's about five pages.

WILLIAMS: Yes, that would be good. I'd love to have that. Now, I have been in touch with Cleverdon. I just had a letter from him a couple of days ago.

HERNER: He's a talkative guy. I hope he's still able to talk.

WILLIAMS: Well, this was a handwritten letter.

HERNER: Oh, good for him.

WILLIAMS: He had read about the fellowship [Garfield Post-doctoral Fellowship]. He wrote the president [Arnold W. Thackray] of the Chemical Heritage Foundation. Then that letter got sent on to me, so I wrote him. He gave me some interesting things. Because of finances, and because of when I started with the ASIS project—remember when I called you a few years ago—the ASIS project was to identify where the papers of individuals are.

HERNER: Oh, I see.

WILLIAMS: It was strictly to do Americans, or North Americans.

HERNER: Well, Fairthorne's published quite a bit in this country.

WILLIAMS: Yes, right. He's still from the United Kingdom, as Cleverdon is. It would be nice, though. This project really should have an international scope, but that takes more money.

HERNER: Well, this points out what I see to be his highlights.

WILLIAMS: Oh, I see.

HERNER: Like this use and mention concept. He did some stuff on—what the hell was it? He wrote a paper that was selected by Garfield as a citation—a sort of award study or something.

That was interesting, what Fairthorne did using mathematics. He is a mathematician. You might want to see it. I'll fax it to you.

WILLIAMS: Definitely, yes. Well, are there other directions that you think need to be taken in trying to research the history of the field? Mrs. Schultz gave me a copy of her paper that she read in Philadelphia (33), and I would love to have anything because none of that was published. Apparently someone was supposed to take it and get it published, but it never happened.

HERNER: Well, Garfield talked off of 3 x 5 cards. I was just talking. Gerry Sophar had nothing to say.

WILLIAMS: No one was recording this for anything, though?

HERNER: No.

WILLIAMS: Well, let's stop at this point and thank you for so generously lending me your time.

HERNER: You're welcome.

[END OF TAPE, SIDE 9]

[END OF INTERVIEW]

NOTES

1. Saul Herner, “Information-Gathering Habits of Workers in Pure and Applied Science,” *Industrial & Engineering Chemistry*, 46 (1954): 228-36.

2. Saul Herner, “Library and Information User: Then and Now,” *ASIS Bulletin*, 2 (1976): 32-33.

3. R. S. Casey, J. W. Perry, M. M. Berry, and A. Kent, eds., *Punched Cards: Their Application to Science and Industry* (New York: Reinhold Publishing Company, 1958).

4. J. D. Bernal, “Paper No. 46,” *Report* (Royal Society Scientific Information Conference, London, 21 June-2 July, 1948): 589-637.

5. Saul Herner, “Selected Reading List: A Means of Improving the Use of Periodical Literature,” *Special Libraries*, 41 (1950): 324-326.

6. Saul Herner, “Information-Gathering Habits of Workers in Pure and Applied Sciences,” *Industrial & Engineering Chemistry*, 46 (1954): 228-236.

7. *Report and papers submitted: Royal Society (Great Britain) Scientific Information Conference Proceedings* (London: Royal Society, 1948).

8. Eugene Garfield, “Citation Indexes for Science,” *Science*, 122 (1955): 108-111.

9. Saul Herner. *Research and Development and the Use of Technical Information in Small and Medium-Sized Manufacturing Firms* (Washington, DC: Herner, Meyer, and Co., 1956).

10. Saul Herner. *Research, Problem-Solving, and the Use of Technical Information in Small and Medium-Sized Manufacturing Firms,* PB 131 578 (Washington, DC: Herner, Meyer, and Co., 1958).

11. S. Herner, R. Meyer, and R. Ramsey. *How Smaller Firms Solve Problems and Keep Abreast of Technical Developments* (Washington, DC: Herner, Meyer, and Co., 1957).

12. Saul Herner and Mary Herner, “Current Ststus of the Government Research Report in the United States of America,” *UNESCO Bulletin for Libraries,* 30 (July 1959): 41-42.

13. S. Herner, E. Leyman, and M. Herner. *A Study to Determine the Feasibility and Design for a New England Technical Information Referral Service* (Washington, DC: Herner and Company, 1969).

T. Mulholland, E. Leyman, and S. Herner. *Survey of Technical Information Patterns and Usage in Small and Medium Sized New England Manufacturing Firms* (Washington, DC: Herner and Company, 1969).

J. C. Moody, G. Allen, and S. Herner. *A Compendium of Sources of Technical Information for New England Manufacturers* (Washington, DC: Herner and Company, 1969).

14. Mildred B. Parten, *Surveys, Polls, and Samples; Practical Procedures* (New York: Harper, 1950).

15. Saul Herner, "The Storage and Housing of Unpublished Research Reports," *American Documentation*, 3 (1952): 110-114.

Saul Herner, *The Establishment of Staff Requirements in a Small Research Library* (Chicago, 1952).

Saul Herner, "New Library Carrel: Librarians and Manufacturers Collaborate," *Special Libraries*, 46 (1955): 39-40.

Herner & Company, *A Recommended Design for the United States Medical Library and Information System* (Washington: Information Resources Press, 1966).

16. S. Herner, M. J. Vellucci, and E. Leyman. *National Inventory of Library Statistics Practices* (Washington, DC: Herner and Company, 1972).

17. Saul Herner, *The Establishment of Staff Requirements in a Small Research Library* (Chicago, 1952).

18. Saul Herner, "The Storage and Housing of Unpublished Research Reports," *American Documentation*, 3 (1952): 110-114.

19. Saul Herner. *A Pilot Study of the Use of the Stacks in the Library of Congress* (Washington, DC: 1960).

20. F. Wilfrid Lancaster, *Vocabulary Control for Information Retrieval* (Arlington, Virginia: Information Resources Press, 1986).

21. F. Wilfrid Lancaster, *The Measurement and Evaluation of Library Services* (Washington: Information Resources Press, 1977).

22. F. Wilfrid Lancaster, *If You Want to Evaluate Your Library—* (Champaign: University of Illinois, Graduate School of Library and Information Science, 1993).

23. Saul Herner, Gene P. Allen, and Nancy D. Wright. *A Brief Guide to Sources of Scientific and Technical Information* (Washington, DC: Information Resources Press, 1969).

24. Saul Herner, "Information-Gathering Habits of American Medial Scientists," in *International Congress on Scientific Information, 1958.* Area 1. (Washington, DC: NAS, 1958).

Saul Herner, "Subject Slanting in Scientific Abstracting Publications," in *International Congress on Scientific Information, 1958.* Area 2. (Washington, DC: NAS, 1958).

Saul Herner. *The Relationship in Information-Use Studies and the Design of Information Storage and Retrieval Systems* (Rome, NY: Grifiss AFB, 1958).

25. Claire K. Schultz, ed., *H.P. Luhn: Pioneer of information science, selected works* (New York: Spartan Books, 1968.)

26. Saul Herner, "Methods of Organizing Information for Storage and Searching," *American Documentation*, 13 (1962): 3-14.

27. Claude E. Shannon and Warren Weaver, *The Mathematical Theory of Communication* (Urbana: University of Illinois Press, 1949).

28. Cyril W. Cleverdon, *Aslib Cranfield Research Project: report on the testing and analysis of an investigation into the comparative efficiency of indexing systems* (Cranfield UK: College of Aeronautics, 1962.)

29. Charles Bourne, *Bibliography on the Mechanization of Information Retrieval* (Menlo Park, CA: Stanford Research Institute, 1958.

30. Eugene Garfield, "Origins of Current Contents, ISI, and Computer-Aided Information Retrieval. How It All Began at the Welch Medical Library Indexing Project," *Essays of an Inforrmation Scientist: Ghostwriting and Other Essays* (Philadelphia: ISI Press, 1986).

31. Saul Herner, "A Brief History of Information Science," *Journal of the American Society for Information Science*, 35 (1984).

32. Saul Herner, unpublished written appreciation of Robert A. Fairthorne. See Chemical Heritage Foundation Research File, No. 164.

33. Claire K. Schultz, "Punched cards in libraries," Presented to Sci-Tech Group, Special Libraries Council of Philadelphia, Sept. 25, 1951, *Bulletin of the Special Libraries Council of Philadelphia*, April 1952.

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