

DRAFT

Charlie Bourne Oral History Interview

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Interviewer for Amer. Soc. for Info. Sci. and
Technology
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File 1 Pre-History

CB: The recording system failed during our initial conversation, and I have no recollection of the specific questions raised, or the answers given. But I presume that the script had some questions regarding my earliest years before I got into what some people would call “real” work. Actually, I had some real work before my professional years. And I take great pleasure in recalling those early years; I didn’t ever really think of it as work – it was always an adventure, with something else just waiting to happen.

My mother was a young girl, recently graduated from high school in a small rural town in Montana who married a newspaper reporter from a big newspaper in flashy San Francisco. I was born soon after that, as Francis Xavier Percy, in San Francisco in 1931 at the height of the Great Depression. My father left us when I was a toddler. He did not check in or provide any support after that, so my mother was left to raise me by herself. As a single working mother with no special skills, this was difficult to do, especially during the depression.

As a result, at pre-school age, I was sent to live in a Catholic orphanage, St. Catherine’s Academy, in Benicia (CA). I was raised there until I was about six years old, continuing to have contact with my mother during that period, although somewhat infrequently. She worked as a telephone switchboard operator at a major bank during that time. But I do remember travelling several times, all by myself, on the ferry boat from Benicia to San Francisco, sometimes with a change of boats in Oakland. What an adventure for a 6 to 7-year old kid! Perhaps that’s when I started to develop a love of travelling and a sense of self-confidence.

My mother re-married in 1937. My step-father, Charles Percy Bourne, was a musician, playing in the official band for the 1939 World’s Fair at Treasure Island in San Francisco. In 1938 I went to live with the new couple in the Haight St. district in San Francisco, and started attending the public school there. What fun it was to explore by myself all the interesting things to see and do in Golden Gate Park; it was such a big place. My step-father had a college education, and in April 1939 he took a teaching job at Montezuma School for Boys, a private school in the hills above Los Gatos (CA). We lived there, and I went to school there.

In 1940, when I was in the 6th grade, we moved from the Montezuma School to a 22-acre ranch that we bought near Los Gatos (CA) and I started attending a public school there (Los Gatos). At about this time (around 1940) Charles Percy Bourne (CB Sr.) insisted that my name (Francis

Percy, or Frankie) be changed to his name, with a Jr. added (Charles Percy Bourne, Jr.). That was done informally, with no court action, but I continued to use the Frankie name for some time afterwards. This informal action caused some complications later when I needed to confirm my citizenship and authenticity in order to obtain security clearances. Pearl Harbor happened in December 1941, and we went to war. My step-father's age and medical condition kept him out of the draft, but he contributed by working at a nearby large Iron Works facility.

My first "real work" came in the summers of 1942 and 1943, picking prunes for the neighboring farmer. This was all-day work, picking prunes up from the ground after the trees were given a good shake.

In Mid-1944, my mother and I moved to Whitehorse, Yukon Territory. My step-father had moved up there some time before that, taking a job as a mechanic for the Army on a big construction project to build the ALCAN Highway and an associated pipeline. There was no family housing for that project, consequently arrangements were made for me to live in town (Whitehorse) with a local family (with a Canadian Mountie as head of the household). I attended the only public school in Whitehorse. It was a very small school; my June 1944 class picture contained 15 students in combined grades 9 – 12.

In the beginning of the summer of 1944, I worked as a cooks-helper at the local shipyard on the Yukon River, and was quickly promoted to work in the same capacity on a paddlewheel steamer running with passengers and freight on the Yukon River between Whitehorse, Y.T. and Dawson, Alaska. That was real work, but a great adventure for a 13-year old kid --- a little like Tom Sawyer or Huckleberry Finn. When we pulled over to the side of the river banks at the wood camps to pick up cord wood for the boat's boilers, it gave me a chance to barter with the Indians trading old apple pies as barter for bead work. Later that year, when my mother was working in the offices of Standard Oil in Whitehorse, one of the major contractors there for the pipeline and refinery projects, family housing became available there, and I moved there. I mention this because this was another job opportunity for me, working at the movie house (a Quonset hut) in the S.O. compound as a ticket taker and usher. This represented the first and only time that I was ever fired from a job; after taking all the tickets and ushering everybody to their seats, I sat down to watch the movie, and that was a No-No that nobody told me about.

In May 1945 I graduated from the 7th grade. Because of the influx of workers then for the new S.O. refinery and the ALCAN highway activities, the town had an increased population. My

April 1946 class picture in the same school shows that population growth, with 23 students now, including me, in combined grades 7 and 8.

With a change of posting, the family moved in 1945 to Anchorage, Alaska. That gave me my first airplane ride, from Whitehorse to Anchorage in an Army C-47 transport plane, and my first sample of life on a military base. We lived in family housing at Elmendorf Field. That gave me an ID card and free rein to roam around a very busy and interesting place during wartime. I also got into some interesting shows, such as a Joe Louis boxing demonstration. I had a part-time job selling newspapers at the Base theater before the evening shows. While I was there, I graduated from the 8th grade and entered Anchorage High School. In September 1945, Japan surrendered, the jobs were over, and in early 1946 we returned home to our Los Gatos farm.

In early 1946, I entered Los Gatos Union High School as a freshman. That summer, I worked again on fruit harvest projects, picking prunes and then apricots. Apricots were tougher because you had to carry a large 3-legged ladder up and down the hillside orchards.

In the summer of 1947, I again worked in the orchards, and also worked in a fruit dry-yard. I eventually attained a personal best of picking a ton of apricots or a ton of prunes per day. That was real work. My parents divorced that year.

During the summer of 1948, my parents defaulted on the farm payments and lost it (the farm). My step-father had simultaneously defaulted on the marriage, and left to take a teaching job in Guam, never to be seen or heard from again. My mother continued with her retail sales job in San Jose, and we moved to a small apartment in Los Gatos.

As soon as school closed for the summer, I rode with a school friend to Los Angeles where he had some family activities scheduled there for the summer. We spent several days there, attending radio shows and seeing the sights. When my money ran out, I hitch-hiked home (9 hrs., 11 rides). That was a hot ride through the Central Valley at that time of the year. For the rest of the summer of 1948, I again worked on the fruit harvest, this time as a warehouseman and freight-car loader at a major cannery in Sunnyvale (CA).

In early 1949, my mother moved to accept a sales position in an upscale ladies retail store in San Francisco. I stayed in Los Gatos at a friend's house so that I could complete high school there. After graduation in June, I went back to work as a warehouseman at the cannery, loading and unloading freight cars until November when the cannery closed. Then I moved up to San

Francisco to stay with my mother while I looked for work there. With the help of some friends and their contacts, I got a job there as an office boy at the San Francisco Chronicle newspaper. I had no college counseling at Los Gatos High, and no friends or acquaintances who could give me any clue about what the practice or procedures were, or even such things as the differences between community colleges, colleges, and universities. I only knew that I wanted to be a doctor of medicine, and that I had to earn and save a lot of money before I could consider it. I did apply for a Naval Reserve Officer Candidate Training Corps (NROTC) scholarship in January 1950. That was going to be my salvation – it would provide a 4-year scholarship to Cal Berkeley. I tested for it but was turned down because of my dental overbite (“As a naval aviator you’d have a problem using an oxygen face mask.”).

In March 1950, I was convinced by one of the Marine Corps veterans at the Chronicle that I should join the Marine Corps Reserve as a good way to earn a little extra money on the side, and have a interesting 2 – week summer vacation. He was in the Reserve, and as an officer he knew the procedures, and got me signed up in a hurry. I was now in the 12th Amphibious Tractor Battalion, with drill sessions held in the old Administration Building on Treasure Island in San Francisco Bay.

On June 25, 1950, North Korea invaded South Korea, unofficially starting the Korean War. My Marine Corps Reserve unit was soon called to active duty, and on July 31st I left on a troop train to go to southern California and my basic training.

During basic training, the Corps did some job placement testing to see what specialties I was most suited for. They showed me a list of those specialties and asked me to choose my preferences. Given my interest in a medical career, I looked for anything relevant to that, but the closest I could find was Chemical Warfare or Radiology, so I chose both of them. I didn’t know at the time that all the medical services for the Marines were supplied by the Navy and its Corpsmen. But the Corps, in its wisdom decided that my future lay in electronics, as a Radio or Radar Repairman. So after basic training I was sent to Electronics Technician School at Treasure Island in San Francisco; home again for ten weeks. Then I was sent to Radio Repair School back in San Diego. After that, the Corps apparently figured that I knew enough to go back to Electronics Technician School, but this time as an Instructor, and at the Great Lakes Naval Base. The Training Command there wisely figured that I needed some instruction in teaching

techniques before they'd turn me loose in a classroom, and that required another several-week Instructor Training course. Then I started my teaching duty.

While teaching at Great Lakes, two of my fellow teachers, long-time Navy salts, demonstrated their after-hours hobby of building hi-fi record player systems. Their resulting music was awe-inspiring and unlike anything I had ever heard before. After several more sessions of listening to the music coming out of their systems I had decided on a career change; now I wanted to be an engineer to design and build such systems. So much for the calling of the medical profession.

Following the truce in Korea, Reservists were gradually released from active duty, and in February 1952 I was released from active duty and returned to California. With a lead from one of my fellow Marine buddies, I interviewed and immediately went to work full-time in San Diego at Convair Aircraft's Guided Missile Manufacturing plant as a Special Courses Instructor. I taught Navy crews the operation and maintenance of the Navy's Terrier anti-aircraft missile being produced by Convair. While in San Diego, I also worked part-time for a local TV and maritime electronics repair shop in San Diego, modifying war surplus aircraft radio direction finders to work on tuna fishing boats. In March 1953, based on a Convair recommendation, and without any college education, I started concurrently teaching a Basic Electronics course at Chaffey Jr. College (at \$3.50/hour).

After a long courtship, starting in 1950 in San Francisco, I came up from Southern California, married my current wife in August, 1953, and started school the next month at Cal. Up until then, she had lived with her parents in San Francisco. Her dad was a cabinet maker with a successful business there, and fortunately provided some employment for me during some school holidays.

During my first undergraduate year there I worked during the beginning of the summer as a "lumper" out of the Teamsters Hiring Hall in San Francisco (to load and unload trucks or railroad freight cars, and to work for Bekins Moving Service when they needed help moving people into or out of 3-story walkups). The rest of that first summer was spent working as an electronics technician at Lenkurt Electric Co. in San Carlos, CA. For all my undergrad years I also worked for the Post Office during the Christmas Holidays.

My next undergraduate summer was spent working as an Electronics Technician for Sylvania Defense Lab in Mt. View, CA. My final summer job was at SRI in Menlo Park as an

Engineering Aide, working on system cooling and component temperature studies for a large experimental computer system then being designed and built there.

For all four undergraduate years I also worked for the Athletics Department at Cal, teaching all of the judo classes. (I had a black belt judo degree from the Kodokan Institute in Tokyo before I started school at Cal.) And then I graduated and started my professional career with its many twists and turns.

File 10 SRI Preamble

MB: Okay, it is January the 19th, a Thursday, 2012, and it's one-thirty p.m., Pacific time, and Charlie Bourne is going to tell us about his experience at SRI.

CB: Well it was an interesting ten years. This was my first professional job after graduating as an electrical engineer from UC Berkeley (UCB). At the time that I graduated from the School of Engineering, the Electrical Engineering Department had really just two options for specialties – one of which was power engineering, which had to do with large electrical motors and generators, and transmission power lines, and what you'd need to do to move power around the country or within a big facility. The other option was electronics, and that was for people who'd be working with tubes and other components to build pieces of equipment for radio, television, and broadcasting systems. In the couple of years that I was in that School, they had just introduced the computer option, so that if you wanted to, you could take the courses that would teach you how to build and use a computer, and program for it, generally using some very early pieces of computer equipment. That's the option that I took.

File 11 Working at Stanford Research Institute (SRI)

CB: So after graduating from Berkeley, my first task was to get a job, and fortunately, of some of the places I interviewed before graduating,... one of them was SRI, Stanford Research Institute (now Stanford Research International) in Menlo Park, California. Because of my somewhat unusual background in those days (i.e., having pursued this computer option and programmed both analog and digital computers in that option in 1957, and having worked for SRI as an Engineering Aide during the prior summer break, they hired me. Then they put me

onto a project that was building a special purpose computer for the Bank of America. This was a very large computer system called ERMA (Electronic Recording Machine Accounting), being built entirely one-of-a-kind, to handle all of the checks that their banks received in Northern California during the day, and maintain a current balance of all the customer accounts that went along with that. Well this was a big system with a lot of people working on it and a lot of things to do. Working on ERMA was one of my first tasks, but not particularly related to what turned out to be my major interest in information retrieval activities. But it took up some of my time as an initial project; there's probably a year's worth of activity associated with that.

Many other projects came along after that, and all of them had something to do with computers. But the activities that were most interesting to me in my early professional years were problems of information storage and retrieval. That interest was initially activated when I signed up for an "individual study project" with one of my engineering professors at Berkeley. His name was Doug Engelbart, now famous for his development of the mouse, text editing, and a number of other things. He introduced me to the notion of information retrieval, both the cataloging and indexing aspects of it (how to describe something), and how to implement a system to do that. For that student project, he assigned me the task of using an edge notch card system for the retrieval of engineering literature.

And so, one of my first projects in this field was to take a collection of printed abstracts of current electrical engineering literature, use that as the database, and then develop an edge notch card system as the retrieval mechanism. All of this was done in a very efficient manner in that the cards for the edge notch card system consisted of blank IBM cards. The coding apparatus was simply to take a batch of IBM cards, blank except for the punched top row, paste an abstract onto a card, assign some index terms to it, and then enter the indexing information in the card by use of an edge notch coding system. The punching for the card system was done with an edge-notcher that cut into the pre-punched hole; this was a very simple and cheap appliance – namely a hand-held hog ear notcher. The retrieval from the card deck was done with a knitting needle. So, the notion of using a deck of edge-notched cards and manually manipulating it to get the retrieval effect; that was the retrieval system. And this was done with a template so that you could just simply lay an individual blank IBM card onto a piece of cardboard that had the indexing terms or categories already marked on it as a template, mark off the terms or the lines (essentially, the code lines on the IBM card) to get what you want, punch it, and that would be it.

So this got me to thinking about how best to describe what's in the file. And that was because you generally didn't know until you had coded a whole bunch of cards, what the major terms were, empirically, and what the minor terms were, (and thus shouldn't be used in that particular coding scheme). So that was an interesting introduction to retrieval systems and that was a fun thing to do.

Well, after I was at SRI for a short period of time, Doug also came to work there (Oct. 1957) in the same Computer Lab. He got tasked to work on some specific hardware issues, namely to develop new computer components based solely on the use of magnetic devices. The objective was to find a combination of wiring of toroid magnetic core elements that could be used to make the equivalent of a vacuum tube computer or a solid-state computer. This would be a very "hard" system that could not easily be damaged or destroyed by electrical shock, blast damage or magnetic impulses of any sort. To a certain extent, these components were planned to be used for equipment that had to be very hardened, like a military application, or equipment that would be in a very hard zone to work in. So he worked on that quite successfully for a while. But, on Oct. 4th, 1957--along came the Soviet Sputnik.

Sputnik raised all kinds of issues. Questions were raised in lots of publications and public forums along the lines of, "How did the Russians get to do this before we did? We were supposed to be the first with a man in space, and with satellite technology." With this hue and cry some of the possible answers that were raised to that question were, "It's because the Soviets had a centralized sci-tech information system. All the journals came to one location, were in one database, there was information available for all their engineers, and we don't have anything like that. We have lots of fractured databases and files, and no single, consolidated source." So, we had this national technical information issue that somehow we (nationally) had to find solutions for. In talking to that issue, Doug and I started writing down some questions and issues along the lines of, "What should this country be doing with regard to a single, central source? Is it appropriate to have such a thing? Or are we better off having specialty information centers on different topics and some way of coordinating all of them?" At that time, this country already had many special libraries and information services such as the Chemical Abstracts Service and Engineering Index, and a number of special technical information services that focused on a specific topic, and were very well run. However, there still were calls to do more to improve access to those facilities.

Doug and I worked on this question to try to generate a think paper on how to approach these issues, and we eventually published an article on this topic in the *SRI journal*, the in-house magazine that SRI sent out then to public subscribers.¹ That was the first time that Doug and I had worked on such a project, and so I guess I would include that in the list of projects that I had worked on. That activity gave me a chance to look very closely at a number of special information services such as the major sci-tech indexing and abstracting services, and also the technical work that people were doing in retrieval systems to be able to fill the need for fast, mechanized systems to store and retrieve lots of information. This led to my studies of very special systems such as Western Reserve University's Searching Selector, and some other special systems, and got me an introduction to many people who were already established and working on information storage and retrieval problems. So that was one of the first parts of my introduction to this field of indexing and abstracting, and specialized search systems of different kinds. My introduction was further accelerated by my attendance at the 1958 International Conference on Scientific Information (ICSI) in Washington, D.C., where I got to see and meet many other people working in this field.

My initial interest in Information storage and retrieval (ISR) led me to do a lot of reading of the technical literature that was then being published on that topic. It also led to a growing personal file on that topic. After several requests, I started compiling a current awareness bibliography on that subject that was distributed by SRI from 1958 to 1962.²

This reviewing bug stuck with me, and I was soon asked to serve as Editor of a regular literature review section for the American Documentation Institute (ADI), in their regular publication, *American Documentation (AD)* (now the *Journal of the Association for Information Science and Technology*). That review section, called Literature Notes, ran for several years. I also served for a long time as a technical referee for *AD*. That was followed by 5 years' service as a reviewer for *Information Science Abstracts*, starting with the founding of the journal in 1966. My reviewing activities continued with my writing review papers on the general growth of

¹ Bourne, C. & Engelbart, D.C. (1958). Facets of the Technical Information Problem. *SRI Journal*. No.1, 2-8. (Also: *Datamation*. Sept.-Oct. 1958. 6-12.)

² CB. (1958 – 1962). "Bibliography on the Mechanization of Information Retrieval". SRI.

computer capabilities,³ the mechanization of information retrieval,⁴ the beginnings of automation of technical drafting, writing, and editing functions,⁵ the methodology of information systems design,⁶ a review paper for the Society for Industrial Microbiology presented at their special Conference on Problems and Prospects in Biological Communications in August 1962,⁷ and a survey of the utilization of mechanized image systems.⁸

I also served as a co-founder (with Carlos Cuadra and Pauline Atherton) of the *Annual Review of Information Science and Technology (ARIST)* and one of its first authors⁹ while also serving on the first ADI Advisory Committee for the Annual Review) I also found time to be the author or co-author of two professional review books that received professional recognition.^{10, 11}

My interest in trying to determine the extent of our national sci-tech information system and its issues led to a separate paper in 1960 that attempted to make a quantitative estimate of the

³ CB & Donald Ford. (May 1960). "The Historical Development, and Predicted State-of-the-Art of the General-Purpose Digital Computer". *Proceedings of the Western Joint Computer Conference*. Pp.1-21

⁴ CB. (April 1961). "The Historical Development and Present State of the Art of Mechanized Information Retrieval Systems". *American Documentation*. 12(2) 108-110.

⁵ CB. (1961). "The Beginnings of Automation of Technical Drafting, Writing, and Editing Functions". Proc. 8th Annual Convention of the Society of Technical Writers and Publishers. 57-65. Also available from NTIS as Report No. AD-166 530 and from NTIS as Report No. PB-166 530.

⁶ CB. (1962). "A Review of the Methodology of Information Systems Design". In *Information Systems Workshop: The Designer's Responsibility and His Methodology*. 11-35. Spartan Books.

⁷ CB. (Aug. 27-29, 1962). "Problems and Prospects in Biological Communications". Corvallis, Oregon. Unpublished.

⁸ CB. (1963). "Survey of the Utilization of Mechanized Image Systems". In *Proceedings of the 12th Annual Convention of the National Microfilm Association*. Vol. 12. 288-298.

⁹ CB. (1966). "Evaluation of Indexing Systems". *ARIST*. Vol.1. Chapt. 7. p.171-190.

¹⁰ CB. (1963). *Methods of Information Handling*. Wiley.

¹¹ CB & Trudi Bellardo Hahn. (2003). *A History of Online Information Services; 1963-1976*. MIT Press.

magnitude of the world's electronic and electrical engineering journal literature.¹² This paper was an early study that was submitted in April 1960. An expanded and updated version of this paper was published in 1962.¹³

MB: Was that done in parallel with working on the design of the computer for Bank of America?

CB: It turned out to be in parallel, yes, along with some other projects. In the 1959-60 period, I also worked on five Department of Defense (DOD) projects. The first was for the Air Force to look at several large microfilm searching systems to replace a searching system already in existence that was working with a library of some three million records used by 500 analysts, providing 40,000 documents a day output, and processing 5,000 input pages a day. This system wasn't working very well, and the Air Force wanted to replace it. At that time, anybody who was thinking seriously about retrieval equipment was thinking about microfilm, and microfilm-based systems, for the storage of the documents themselves. That was the only way that you could store a large file. You couldn't afford the storage in machine-readable form because it was just very, very expensive for any machine-readable record or any system based on a machine-readable record. So that was the first project that really that made use of my engineering background, with some smattering of knowledge of the microform and the indexing and classification schemes that might be used. And it was also a good introduction to a lot of equipment and a lot of the people who were doing work in this area. That was in 1959.

The second DOD project was a review for the Air Technical Intelligence Center of a major Air Force contract facility that operated (under the name of the STEP program) to collect, abstract, translate, and disseminate a significant segment of the open-source Soviet Bloc sci-tech literature that was relevant to Air Force interests. I was the principal investigator, with the task of preparing descriptive specifications for a semi-automated system for this activity.¹⁴

¹² CB. (August 1962). "Problems Posed by an Expanding Technical Literature." *IRE Transactions on Engineering Writing and Speech*. EWS-5(1) 2-8.

¹³ CB. (April 1962). The World's Technical Journal Literature: An Estimate of Volume, Origin, Language, Field, Indexing, and Abstracting. *American Documentation*. 13:2 159-168.

¹⁴ CB. (July 1959). "Technical Assistance in Implementation of the STEP Program – Trip Report – Project White Stork. June 9 – 12, 1959". Report No. QPR 3 Supp. SRI.

The third early DOD project was a study of the state-of-the-art of real-time wall-size computer-driven displays for military and other government organizations. A typical application then would be continuous real-time displays by NORAD (North American Air Defense) Command of all aircraft tracks on a projected map of the Arctic Circle. This seems so commonplace today, but it was cutting edge technology at that time.¹⁵ This NORAD project was particularly interesting to me, especially the project site visits to such places as the situation rooms at NORAD in Colorado and the Joint Chiefs' situation room in the Pentagon.

As the fourth, and my biggest and most responsible project of that early period, I served as the leader of a two-year project to choose the computer equipment, then develop and test a large and complete computer-based data handling and reduction system to process data obtained from airborne reconnaissance data collection systems to help establish and maintain Air Order of Battle plans for the Air Force. This was a large computer complex. The work was done at SRI as a subcontractor to Hoffman Electronics Corporation. This complete system of computer and associated software was subsequently delivered to the client as a complete operating system.^{16 17}

And finally, in 1960-64, there was an SRI project for the Rome Air Development Center (RADC) of the Air Force, to develop a machine-readable equivalent of a multiple instantaneous response file (MIRF). Up to that time, all computer searches were done in a serial mode. However, there were manual systems—and coding (e.g., a manual edge notch card system)—that would allow you to search a complete file, and get essentially an instantaneous response. And there were some instances where the same technique was used with an optical equivalent (an interior-punched card system). So these manual approaches were helpful as techniques, and as models, but they were cumbersome and awkward to use, particularly for large files. So RADC funded a project to see if there could be an electronic equivalent of searching a file simultaneously, and fast, for a number of separate items. I participated in the early planning of this system, but the real work was done by other members of the Computer Lab. A

¹⁵ Jack Bialik, CB & R. Heinz. (July 1960). “A Study of Display System Requirements for the DOD-DAC”. SRI.

¹⁶ CB. (Nov. 1959.) “Installation, Acceptance Testing, and Performance Record of the OA-2214 (XH-1)/GSQ-39.” Special Technical Report 12. SRI.

¹⁷ CB & Donald Ford. (April 1960). “Computer and Programming System for OA-2214 (XH-1)/GSQ-39”. Final Engineering Report. Computer Group. Vol.1. SRI.

demonstration machine was designed and delivered by SRI in 1964 that did this. It was constructed with magnetic core assemblies wound to represent the indexing associated with 1,000 documents. This experimental model was subsequently designated by the Air Force as the AN/GSQ-81 Document Data Indexing Set.¹⁸

Okay, there were also some other non-DOD projects done during this early period. The first was for the National Science Foundation, and it focused on requirements, criteria, and measures of performance of information storage and retrieval systems. The project involved personal interviews with 92 applied electronics researchers and 11 metallurgists, in an attempt to measure and rank several of their requirements for information. These personal interviews were along the lines of, “What’s important to you when you’re looking for information? Is response time important? How important is the age of the information to you? What were the things that were valuable as performance indicators of how well a service was working for you?” And so on. And this was one of the first studies that were done along the lines of trying to develop criteria for evaluating retrieval systems.¹⁹

The second was a more technical one done for The National Institutes of Health (NIH). This project investigated mechanisms for processing electrical signals from experimental laboratory animals for subsequent processing, storage, and analysis.²⁰

File 12 Working at SRI, CIA, Move to PSI/IGC

MB: We resume after another brief pause.

CB: Okay, come 1962, one of the things that SRI did at that time, were techno-economic studies-- a combination of technology and “Is there a market for it?” By that time, I had

¹⁸CB. (June 1960). “The Organization of a Memory System for Information Retrieval Applications”. Quarterly Report 2. Supplement A. SRI.

¹⁹ CB, G.D. Peterson, B. Lefkowitz, & Donald Ford. (Dec. 1961). “ Requirements, Criteria, and Measures of Performance of Information Storage and Retrieval Systems.” Final Report. SRI. Available from NTIS as Report No. AD-270 942. 132 pg.

²⁰ Ken Gardiner, E.C. Fraser & CB. (Dec. 1962). “Feasibility of Automatic Data Conversion for Health Research”. Final Report. SRI.

participated in several such studies. The first concerned MOBIDIC, a van-mounted computer system developed by Sylvania for use as an Army battlefield command and control system. It would have all the displays and maps and whatever information the regional commander would want to have close at hand.²¹

Another was for International Computers and Tabulators, Ltd. and their ICT-1301 and ICT-1400 computers for the commercial and industrial markets.²²

A third project was a study for Bell and Howell of market opportunities for new products based on their current R & D activities.²³

A fourth project, and one of the most interesting of these techno-economic projects was a team (Technical Assistants in the Evaluation of RCA Equipment) we put together for RCA. We reviewed and evaluated RCA's R & D program in information retrieval. This included their study of descriptors and list structures for library classification systems, and the development of an electronic retrieval system utilizing magnetic card equipment and cards with a capability for storing a million bits per card (with digital video or microfilm on each card). This was a system which was something like an IBM card except that their card had a gazillion times more storage capability than an IBM card. And they had retrieval equipment to read the cards, sort the cards, and process that material at high speed. As part of this project, a simulation was done of the operation of four proposed retrieval systems to determine the estimated range of operating costs of each of their systems and other current solutions.²⁴ The study also included a formulation of R & D plans for them for the next five years, and a preliminary definition of user requirements for information retrieval equipment. (CB Note: This description may be mixed up with the 1968-69 Magnavox project, but I can't find all the archive records that would resolve this issue.) This notion of doing a computer-assisted cost analysis of the operation of a particular system

²¹ Al Lee, W.A. Cubberly, & CB, (March 1959). "A Study of the Commercial Market for the MOBIDIC Computer". SRI. SRI Confidential. 76 pp.

²² D.M. Finnegan, CB, & L. Fein. (Dec. 1959). "An Assessment of the ICT Type 1301 and 1400 Computer Systems for Commercial and industrial Markets". SRI. SRI Confidential . 151 pg.

²³ CB & R.H. Randall. (Dec. 1960). "Opportunities for Bell and Howell in the Information Retrieval Market". Final Report. SRI. SRI Confidential. 34 pg.

²⁴ CB & D. Ford. (April 1964). "Cost Analysis and Simulation Procedures for the Evaluation of Large Information Systems". *American Documentation*. 15(2). 142-149.

turned out to be a technique, or a topic, or a skill set that I subsequently used later on the study of several other large systems.

I think my last techno-economic project was for the National Cash Register Company. These folks had a microform coating product, PCMI (Photo-Chromic Microform Image), which had the characteristics of the sunglasses that are on the market these days (well before the glasses came on the market) that changed their darkness depending on the amount of light that's thrown on them. It turned out that you could use this substance as a basis for switching a microform image from one state to another, and if you were storing bits on it, use it as a basis for computer storage, or information storage. So the question here was, "Could this material and the system that went with it, be used for general-purpose retrieval systems?" So we looked at the technology that was there, to what extent was it self-limited, and to what extent could it be used for retrieval systems?²⁵

MB: Charlie, a question. What do you recall of the conclusions of the RCA and the National Cash Register studies? Just descriptive?

CB: Well, in terms of utility and technology, they were interesting, but the simulation showed that the RCA systems were too expensive compared with competing systems and it would be hard to change them in such a way to make them competitive. So RCA management decided not to continue that project.

For the NCR project, we found that the PCMI material would not be suitable for a computer component such as a switching device because the compound simply degraded after a number of switching cycles, making it unsuitable for that application.

I just remembered another techno-economic project at SRI, "The Use of Brand X in Library Applications". This was a 2-week consultation by me in June 1967 on the potential application of Brand X in the library field. Brand X provided or proposed equipment with the capability of imprinting and reading a machine-readable mark on a range of colors and surface textures.²⁶

²⁵ A.W. Dana & CB. (March 1963). "Potential Markets for PCMI in Microform Publishing and Large File Applications." SRI. Client Confidential. 184 Pg.

²⁶ CB. (June 1967). "The Use of Brand X in Library Applications" Final Report. Programming Services, Inc.

Before I forget, there were three other DOD projects that I participated in during the 1960-62 time period. The first was a study of a particular radar system for the Army Rocket and Guided Missile Agency.²⁷

The second was a study for the Army Signal Supply Agency. In that study, I worked with others at SRI on basic image processing and shape recognition with a view (pardon the pun) to developing tools for such things as semi-automatic image processing of aerial images.²⁸

The third was a study for the Navy Electronics Laboratory. This was a study to develop ways to construct a database of received radio and radar signal characteristics (e.g., pulse width, frequency, repetition rate) that were associated with particular equipment types (e.g., missile homing radar, long range radar) along with a suggested threat level, to provide an operational real-time early warning capability for ship-board systems.²⁹

The next major bit of work was a study of communication (personal, not electrical) problems in biomedical research. I participated in a consulting capacity in support of a task force that was investigating the first comprehensive statement of the facts and problems with that issue. This was a study funded by the National Academy of Sciences, and the National Research Council. The National Federation of Abstracting and Indexing Services (NFAIS), a federation of professional societies in the biomedical research field, was the project leader. This was essentially a user study of the biomedical research community. What information did they need? What's the scale of the problem, in terms of volume of publications we're talking about? How many organizations are already there to supply that information, and what are some of the kinds of things that might be done in order to improve that service?³⁰

Another, and more direct user study was done in 1964 for the AEC. The objective of this study was to provide data to assist the AEC in determining the necessity for, and the feasibility

²⁷ CB with seven others. (Feb. 1961). "An Evaluation of a Proposed Acquisition Radar for Nike Zeus". Appendices to Tech. Report No. 1. SRI.

²⁸ A. Brain, CB, & others. (April 6 to Dec. 1961). "Graphical Data Processing Research Study and Experimental Investigation". Quarterly Progress Reports Nos. 1-6.

²⁹ CB, D.C. Condon & E.L. Younker. (June 1962). "Radar Signal Identification: Final Report". SRI. Available from NTIS as Report No. AD-330 070.

³⁰ R.H. Orr, G. Abdian, CB, E.B. Coyle, A.A. Leeds, & V.M. Pings, (1964). "The Biomedical Information Complex Viewed as a System." *Federation Proceedings*. 23(5), 1133-1145.

of, establishing an Atomic and Molecular Processes Information Center or Service. The study made use of 343 responses to a mail questionnaire sent to appropriate segments of the scientific community, interviews with about 200 scientists, compilation of presently federal-funded research efforts, and a determination of the annual rate of publication in selected pertinent fields.³¹

The end of 1963 saw a major project for me. It was working with Doug Engelbart on his ARPA-supported Augmented Human Intellect (AHI) project to develop ways to increase the productivity of intellectual workers such as computer programmers. My first task was to define the data elements for a searchable file of all documentation generated or used in this project (e.g., staff notes, correspondence, and reports). Citations and text were to be keyed into formatted punched paper tape records. The records were then to be used as input into a central project file of machine-readable records to be used by the project staff as part of their support system to improve their information handling capability.³²

My next AHI task was to compile a specific in-house bibliography of titles on the subject of user requirements for information. This was done as background and reference information for this project. This bibliography was also part of the database used for subsequent tests of an online text searching system I developed as part of this project.³³

My last, and most significant task on the AHI project was my effort as Project Leader to develop and demonstrate a computer-based interactive online text and bibliographic search system to be used as part of the tools to be available on the larger project. This project was concerned primarily with the design and development of an information management subsystem that would operate in the environment of a cooperative man/computer system to assist in the production of operating computer programs. In Air Force channels, the contract support was officially described as the RECAP Project (Research Aimed at Computer Augmentation of a Programmer).

³¹ C.J. Cook, O. Heinz, CB, & E.J. Feinler. "An Atomic and Molecular Processes Information Center: A Scoping Study. Feb. 3, 1964 – May 4, 1964" Final report. SRI.

³² CB. (May 1 – Sept. 30, 1963). Report MSR-1 through MSR-5.. SRI.

³³ CB. (Nov. 19, 1963). "Bibliography on User Requirements for Information". SRI/AHI internal memo. 7 pg.

The machine database that was used for this experiment contained all of the project records generated to date by the AHI group. The search system was designed by me to incorporate the best of the features of the many batch search systems then available at various research facilities (although not all of the proposed features were actually implemented), but it would make use of a remote computer in a feasibility test of that approach. The project made use of a small mini-computer at SRI (with CRT display and associated real-time input-output facilities) as the user terminal for input-output functions, and a large central computer (the AN/FSQ-32 Air Defense System computer) 400 miles away at System Development Corporation (SDC) in Santa Monica as the central search system. Search programs were written for this purpose at SRI and loaded onto that SDC computer for this test. As an ARPA objective, this configuration was coincidentally the first two nodes of ARPAnet, which subsequently began testing a packet-switched data communications network six years later, and was the predecessor to the Internet.

I brought to this project my years of experience and familiarity with essentially all of the batch-search computer systems demonstrated to date. It was therefore relatively easy to develop the specifications for the proposed online system. As part of this effort, features were studied and proposed, but not implemented, of methods to automatically determine alternate search formulations and display these to the searcher. The test online system worked, and feasibility was demonstrated, but this particular project was terminated for lack of further funding. The project, initiated and sponsored by J.C.R. Licklider of ARPA, ran during the period May through December 1963, with myself as the Project Leader, Len Chaitin as the programmer, and Doug Engelbart as the Project Supervisor.

This project was a very significant effort because it was the first implementation and demonstration of an online text and bibliographic search system, using a computer terminal and communication lines to a remote computer that stored the search programs and database.³⁴

I'll jump in here just to mention another Engelbart story, one that involves my ADI involvement in making arrangements and inviting Doug to make his "Mother of all

³⁴ CB. (Nov. 1963). "Research on Computer Augmented Information Management." (Published as an Air Force report: U.S.A.F. Systems Command. Electronic Systems Div., Technical Documentary Report No. ESD-TDR-64-177. SRI project 4506. Also available as DDC report No. AD-432 098.

Demonstrations” at the 1968 WJCC in San Francisco. That’s included in File 20 because it’s part of my story of ADI activities.

1964 saw the start of my affiliation with the Central Intelligence Agency (the Agency), which continued until June 1967. My participation was as a consultant to a major project at the Agency – an internal project to develop and implement a computer-based system to replace an existing searchable IBM punched card file of 50 million cards, complemented with a 16 – mm microfilm aperture card file system for on-demand document reproduction service, all of which evolved from a pioneering system in 1947. With this system, over 5 million cards were processed annually to keep the system up to date. This was a centralized intelligence document retrieval and reference support service for CIA and other government personnel. The CIA had been working since 1962 on the development of a computer-based central reference capability known as CHIVE, and CHIVE was the system that I worked on for the next several years.

From an engineering point of view, this project was significant because of the scale and performance measures placed upon the system. For example, the maintenance of an existing collection of 17 million personal name file references, one million still photos, and 11 million intelligence documents in a variety of forms. And the timely indexing and input of 1.1 million documents per year, with at least 60% requiring some degree of content analysis; an online remote query capability for 400 requests per day for document bibliographies and 1,000 requests per day for specific fact information—with bibliographies getting 4-hour service for routine, and 30-minute service for priority listings, and 10-minute over-the-counter document copy service, and with fact retrieval service getting 2-hour service for routine, and 2-minute service for priority requests. As one indication of the scope and magnitude of the CHIVE project, the CHIVE Task Force at one time had a head count allocation of 75 people.

My projects during that 1964-67 time period included the following:

A Comparative Analysis of Document Delivery Systems for Large and Active Files.

I started a study effort in May 1964 to do the initial planning and design of the CHIVE document delivery system to handle an initial input load of 100,000 documents/yr. and an output load of 500 requests/day, with an eventual input capacity of 1 million documents/yr. and an output load of 5,000 requests/day. A long range design goal was a repository volume of 10 million documents. The review and analysis of any proposed and competing system was to be done in

the context of cost, staff, space, and the degree of match with the proposed system objectives and specifications.

The study described 20 suggested designs, and summarized the results of their comparative evaluations. In addition to the evaluations by the initial measures, additional evaluations were made for copy quality, reliability, and response time. Simulation software was also used to estimate the processing rates and queues at various input and demand levels. Attention was directed primarily to equipment that was commercially available and had already been demonstrated through working models and actual installations. This study led to the selection of two candidate systems that were analyzed in considerable detail, with particular attention to cost, performance, floor space, and required staffing.^{35, 36}

This was perhaps the first time, other than my 1962 effort for RCA, that a time and cost analysis of a major information system, namely a large document delivery system, had been done using standard industrial engineering analytical procedures and modelling.

Indexing Time and Cost Experiment and Analysis of New Indexing System. This 1964-1965 project was an effort to obtain real empirical data on the use of a new indexing system for the handling of a very large text and image database that included a wide variety of types of input material. This experiment included the development of a large test file with the new system in order to bring the indexers up to a proficient working rate sufficient to form the basis for both a meaningful estimate of indexing rates and an identification of any problems experienced with the new indexing system (the “CHIVE indexing system”).

This was an important trial because of the expected scale of the eventual project—an estimated 1.1 million input records/year in a wide variety of forms (e.g., reports, cables) that were currently being handled in an essentially manual system.³⁷

³⁵ CB, Paul Murray & John Souders. (March 1, 1965). “A Comparative Cost, Staff, and Space Analysis of Document Delivery Systems for Large and Active Files”. Report CHIVE/R-1-65. CIA. Office of Computer Services. Directorate of Science and Technology.

³⁶ CIA. Office of Computer Services. Directorate of Science and Technology. (March 1, 1965). “Project CHIVE. Phase 2 Final Report. Vol. 6. Document Delivery System.” Report No. CHIVE/R-3-65. 226 pp.

³⁷ CB served as a consultant to this experiment, but did not participate in any reports.

Comparative Analysis of Input Transcription Techniques. One of the major problems expected for the new CHIVE system was that of entering the new (expanded) indexing records and other data into the computer system for subsequent processing. This project was designed to identify the best ways to do that. Four categories of commercially available systems were evaluated for this application: IBM punched cards, punched paper tape, cathode ray tube/keyboard equipment, and page-reading units. The study considered the cost, usefulness, flexibility, adaptability, speed, dependability, and other aspects of these four approaches. The study found that for the expected relatively large production volumes, the percentage differences in the projected costs of the various systems were not large. This allowed the system selection to be made primarily on the basis of operational considerations.

I made a preliminary presentation of the results of this study to CHIVE staff members in November 1964. Immediately following that presentation, a decision was made to plan on the use of the page-reading system, and in an online, multi-font basis. This was relatively new technology at that time, with few systems actually installed and used in a production capacity. Page-reading operations of this type had been demonstrated at that time with equipment that had been produced and delivered to customers by one manufacturer, and other manufacturers reported that they would have the capability to produce the required equipment by the planned procurement date (June 1966) for CHIVE operation.

The staffing and salary costs associated with the transcription, proofing, and correction of the anticipated large numbers of indexing records were expected to be very significant. In-house tests on some actual records to improve the confidence factor and/or accuracy of the numbers used in the evaluations of this system were suggested. Recommendations were also made to explore possible methods of improving the efficiency of the indexing transcription operations so that costs and manpower requirements could be further minimized.^{38, 39}

³⁸ CB & Howard Zeidler. (March 1, 1965). "Comparative Analysis of Input Transcription Techniques." CIA. Office of Computer Services. Directorate of Science and Technology. Report No. CHIVE/ R – 2 – 65.

³⁹ CIA. Directorate of Science and Technology. Office of Computer Services. (March 1, 1965). "Project CHIVE. Phase II Final Report. Vol. 7. EDP System. Appendix 7.B. Input Transcription Study." Report No. CHIVE/R-3-65.

CIA Advisory Panel. In November 1965, I was invited by the Director of the CIA to participate as a member of its Advisory Panel on Information Science.

Computer-based Editing of *FBIS* Records. This study was concerned with the possibility of doing some computer processing of English-language Teletype paper tape records then being received with text that described current overseas local public broadcasts of information of interest to the U.S. government and the public. This was a large volume of punched paper tape records that were received from many listening stations throughout the world. With the then current system, printouts from the paper tape were manually edited and then manually typed onto printing mats. The resulting mats were printed and distributed as a series of publications to many government agencies and to selected non-government libraries as the print product *Foreign Broadcast Information Service (FBIS)* series. At that time, I did some preliminary work and gave some attention to this project, and then because of the press of other work, suggested that it be pursued further at SRI with the staff and computer support that was well-positioned to carry this initial study to its next stage. This was then done at SRI from Oct. 1965 through June 1966; it was done as an experimental study of the feasibility of computer processing to remove many of the teletype codes, and put the text into a more readable form. That study demonstrated that feasibility.⁴⁰

This may have been one of the first times that computer processing had been demonstrated as feasible for the pre-processing of a continuous feed of text transmissions in order to prepare a more useful computer-readable database.

Evaluation of the Automatic Language Processor (ALP) System for FDD Report Production. During the Cold War, the U.S. was extremely interested in all manner of Soviet-language publications (e.g., technical and news publications, technical manuals, books). In 1966, for example, following the receipt and screening of approximately 39 million pages of foreign-language material, the Agency published 400,000 pages of translated, abstracted, or summarized information. Its Foreign Documents Division (FDD) produced many regular daily report series (e.g., *Survey of Soviet Press*, *Economic Report on Communist China*, *East European Press Report*, and *Latin America Report*).

⁴⁰ Elmer B. Shapiro. (June 30, 1966). "An Evaluation of Computers in Text Editing". SRI. Menlo Park, CA. June 30, 1966.

Traditional channels for manual translation of these materials were somewhat limited, and with a slower than desired turnaround time. The Agency, as one of many organizations with this interest, used in-house and external translators, but continuously looked for ways to improve its performance in this area. The Agency's interest in machine translation (MT), the computer-based translation from one language to another, dated back to 1951. They supported early R & D efforts at several university campuses for several years (1956 to 1962), but stopped its direct support in 1963 in deference to the coordinated support efforts of NSF and DOD.

During this time, IBM pursued its own internally-supported R & D effort in MT. As part of this effort, they developed a special-purpose computer system and an associated large-capacity photo-disc memory that was used to store the dictionaries and computer programs. IBM called this the Automatic Language Processor (ALP) system. However, by this time, the concept had shifted to machine-assisted-translation (MAT), recognizing that the practical experience obtained to date showed that the MT product was not yet clean enough for a finished product without some editorial post-translation intervention.

IBM proposed the use of this equipment at CIA for a one-year experiment, and the Agency agreed to such an effort. A positive result from this experiment was not an unrealistic expectation. In 1965, the Air Force's Foreign Technology Division (FTD) was producing and distributing post-edited MTs of Russian scientific text material such as that published in Soviet technical journals. IBM's proposal also included the means for ALP to read Stenotype fan-fold paper tape, and produce printed English text output. IBM's proposal had a significant cost associated with it (e.g., direct costs for the ALP, photo-disc, IBM 1401 computer, and other equipment), and a significant staffing requirement.

This one-year pilot operation was planned to test the suitability of the ALP system as a means for providing both the machine translation of Russian-language material and the conversion of Stenotype records to printed English text. FDD was then planning to provide up to 20 million Russian words for translation, and 100,000 pages of transcription each year that might be appropriate for ALP processing.

Before the equipment was installed, I was asked to evaluate the relative performance of the ALP system in comparison to the existing system of manual translations by external contract translators. My study was initiated in August, 1965, and concentrated at that time on developing the methodology that would be employed, and to determine what data would need to be collected

both before and during the test period. A draft report was prepared to serve as a focal point for discussion on that topic.⁴¹

The ALP system was installed at the Agency in September 1965. It consisted of the special-purpose ALP hardware connected to an IBM 360/65 computer. Its two modes of operation were to be:

1) to provide rudimentary translation of Russian, where the input would be paper tape punched with Cyrillic text, and the machine output would be English text put into publishable form by editing after machine translation (The basic purpose of the ALP system was to improve at least one of the three facets of the cost/speed/quality cluster without downgrading the other two.), and

2) transcription of text to English from recordings produced by Stenotype machine operators. These Stenotype operators would key the material directly from English language audio tapes produced by translators from many foreign-language texts (except Russian). The Stenotype product was a fan-fold paper tape that could be read by the ALP equipment. The ALP output would be mat-ready for printing after manual proof-reading and corrections.⁴²

In both transcription approaches, the mats were returned to the originators for editing/proofreading and subsequent correction.

The first serious ALP production work for FDD began in November 1965 for the Stenotype production of the *Latin America Report*, and for machine translation of selected Russian text material.

In order to rigorously test the utility of this pilot system for full scale and permanent operation after the test period, appropriate operating statistics were collected for both the conventional and the ALP system during the period of pilot operation. In addition, some reports were processed in parallel through both systems in order to make a more direct comparison. Data

⁴¹ CB. (Nov. 1, 1965). "A Preliminary Analysis of the Relative Economics of the ALP and Conventional Translation Systems for FDD". Unpublished draft.

⁴² CIA. Directorate of Science and Technology. Office of Computer Services. (March 1, 1965). "Vol.1. Project CHIVE. System Description – Summary." Pp 91 – 92. Report CHIVE/R – 3 – 65.

was collected from November 1965 to July 1966 for hours/page for transcription, proofing, and correction, respectively. The study was completed in September 1966.

The report from this test described the measurable results of that test period and provided estimates of the relative cost, speed (i.e., turnaround time to receive finished translations) and manpower requirements of the conventional and the ALP system.

The study conclusion was that under the then existing circumstances, the ALP system could not be justified. The system was rejected in Oct. 1966, and the special-purpose equipment was returned to IBM at the end of the test period.

This study was significant because it was probably the first meaningful evaluation of a MT or MAT system in a production environment. The study results were distributed to the relevant government agencies that had an interest in this subject.⁴³

The Use of On-line Computer and CRT Display Stations for Reference Tool

Lookups. Results of earlier (1965) studies that I did of various lookup mechanisms suggested that CRT display stations connected to an online computer system might be used to good advantage as a reference tool lookup device.⁴⁴ A separate study was then initiated to explore this idea further, and obtain some empirical data with an actual test use of the computer and display facilities at SRI. (The use of computer terminals for lookup operations was not commonplace at that time.) The test methodology was simply the timed lookup of lists of randomly chosen place names from the *NIS China Gazetteer*. In this study, two different typists were used as test subjects on their searches of a list of place names in a gazetteer stored on an in-house computer. One of the typists was also tested with a 5-finger keyset. One test subject manually searched a printed gazetteer. For all the searches, the place name search resulted in the retrieval of the associated province name which was then hand-written on an output record.

The online lookup procedure was about 2.53 times faster than the manual method for the fastest typist, and the slower typist was 1.82 times faster than the manual method. The report also

⁴³ CB. (Sept. 1966). "Evaluation of the Automatic Language Processor (ALP) System for FDD Report Production." Final Report. PSI. Palo Alto, CA.

⁴⁴ CB. (1965). "Relative Comparison of Various Types of Reference Lookup Devices". Report No. CHIVE/W-5-65). This document and the rest of this citation are missing from my archives.

provided an estimate of the computer system costs at the Agency to provide the necessary capability with its computer configuration.⁴⁵

Study of Potential Records Retention Criteria. I did a study of the file maintenance or record retirement problems that would be faced by the new CHIVE system with its large file and great variety of record types. I made suggestions regarding several mechanisms that might be used to help with this problem.⁴⁶

Cost Models of SKAN (Subject Keyword ANnouncement); A Computer Produced Keyword Index. In 1965, over 800,000 incoming reports per year were received (92% from outside the Agency) and matched to known user office/subject/area interests, and 14 million copies of those reports distributed to the interested parties. This was all done manually. The one-to two-day distribution of this large volume represented the fastest dissemination system in the intelligence community. In addition, an IBM punched card system was used to prepare a printed title word, and some indexing, of these receipts as an announcement bulletin; this announcement bulletin was named SKAN (Subject Keyword ANnouncement).

SKAN was a weekly printed current awareness bulletin produced in-house for staff analysts, using IBM punched card equipment. It provided shallow indexing of a large volume of printed incoming documents. In mid-1965, a decision was made to produce a printed Keyword-In-Context (KWIC) (later changed to a Keyword-Out-of-Context (KWOC)) listing of all current collateral documents on a specific geographic subset of all Agency receipts, for distribution to relevant production and research analysts working on that geographic area. This new product was to be prepared by new programs to run on an IBM 360/30. The CDC-915 optical character page reader was new technology to be used at the Agency for this system input, and was the first use of such equipment in the Agency.

I provided consulting help, and developed a cost model for both the existing EAM and proposed page reader system. The study began in late 1966, and was completed in October 1967 after operational data had been collected for the page reader system. The new system was judged

⁴⁵ CB. (Feb. 21, 1966). "The Use of On-Line Computer and CRT Display Stations for Reference Tool Lookups." CIA. Directorate of Intelligence. Office of Central Reference. Report No. CHIVE/W- 4-66.

⁴⁶ CB. (June 1, 1966). "Study of Potential Records Retention Criteria". CIA. Directorate of Intelligence. Office of Central Reference. Report No. CHIVE W – 19 – 66.

to be more efficient and timely (listings were provided no older than 8 days from receipt of the document), and the page reader system was continued in regular production operation.

This work was significant because it provided good estimates of the operational cost, staff, and space requirements, as well as achievable response time for an operation for which no comparable data was available at that time. Because of the scale of this process, data with this precision was needed for in-house management efforts.⁴⁷

That was the end of my CIA project activity.

During the time that I was working for the Agency, I was also working on other projects. I also held the post of Lecturer at the UC Berkeley School of Librarianship in 1963-1966, teaching courses that I developed (“Introduction to System Design” and “Introduction to Library Automation”), and serving on the Advisory Board for Information Sciences for the publisher John Wiley & Sons. I also continued to respond to requests for review papers or presentations on the subject of library evaluation practices.^{48, 49, 50}

The next study in this time span was close to home; it was a 1964 cost and utilization study of the Stanford University Library System. Now this was an unusual study; I hadn’t seen anything like this done before, in which the objective was to determine what fraction of the total cost of the Stanford Library System could properly be charged to each of four major user groups: undergraduate students, graduate students, faculty and staff, and non-Stanford users. It was important for the University to find out what fraction of actual library costs should be allocated for each of these user groups. That charging back, or determining what user group is receiving what percent of the resources provided --- that was kind of different.

⁴⁷ CB. (Oct. 26, 1967). “Cost Models of SKAN (Subject Keyword ANnouncement); a Computer Produced Keyword Index.” Final report. PSI. Palo Alto, CA.

⁴⁸ CB. (Dec. 1963). “An Approach toward Developing Methods of Library Evaluation”. Unpublished presentation at a joint SLA and CLA meeting.

⁴⁹ CB. (1964) “Review of the Criteria and Techniques Used or Suggested for the Evaluation of Reference Retrieval Systems”. An unpublished paper written for an Oct.1964 NSF conference.

⁵⁰ CB. (1964). “Some User Requirements Stated Quantitatively in Terms of the 90% Library”. Presented at a conference in 1964. In Kent and Taulbee. Electronic Information Handling. Spartan Books. 93-110. Proceedings of the Conference on Electronic Information Handling.1965.

The management of the Stanford Libraries was familiar with the work that we'd done at SRI, and they wanted something of that type done for them. Stanford had a lot of government research work going on in their laboratories throughout the campus, and the faculty and staff on those projects made significant use of Stanford's library resources. And Stanford was running into arguments with the government auditors with regard to the overhead rate that was being charged to their government projects to cover such costs. So Stanford management needed a justification to say "Yes, this cost is really correct." Library costs were a major cost for the projects, and Stanford felt that they had to be compensated accordingly; that had been the prevailing practice. But now they were being told by the federal auditors to put up and show that that was really the case. So, a project was needed that would look at the total use of the libraries on campus (major libraries, 6 sub-libraries, and many other departmental division libraries), to look at the total cost for all these library activities and then peel out the costs for separate sub-groups. They needed to identify the costs that were associated with just the faculty, staff, and graduate assistant library support, and be able to justify that as the true costs of library services for that particular population. That was the user group that was mostly associated with government contract research work.

Well, that was a very complicated project because it posed such issues, for example, as "Let's look at the circulation of library materials, and of all the circulation that takes place, (by looking at all the library circulation cards) determine what fraction of those are for faculty, staff, and graduate and research assistants." That was a way to allocate part of your library budget's acquisition materials costs by user group, and a certain fraction of the associated staff cost for that, as well. The same approach was true for all of the other library functions such as circulation. Some metric had to be established and counted in order to be able to carve out what fraction of the activity and associated costs that fraction was going to be.

So that took a team of a CPA cost accountant and me to complete that effort over a seven-month period. This study was notable because it was probably the first instance in which library costs were identified and allocated for each of several sub-populations of a large multi-branch, multi-library academic library system.⁵¹

⁵¹ Glen Densmore & CB. (Feb. 1965). "A Cost Analysis and Utilization Study of the Stanford University Library System". Memorandum Report. SRI. Available from the ERIC Document Delivery Service as Report No. ED-026 080. 38 pg.

We did one other cost study for Stanford in 1969 to provide a detailed plan for the data collection and analysis of the costs of various parts and activities of the Stanford Library complex. The objective of this preliminary planning effort were to: 1) identify the boundaries of topics and areas appropriate for in-depth cost studies; 2) develop a framework for an initial cost model for the acquisition/cataloging process that would yield a unit cost for this operation; 3) develop preliminary plans for data collection and analysis of this cost model; 4) provide an estimated time and effort to do this data collection and analysis; 5) identify other methods or measures by which cost/benefit or relative cost factors could be derived. ⁵²

I provided consulting assistance to the US Patent Office in 1965-1966 for their evaluation of proposals for equipment and services from several contractors, including Recordak, Kodak, and 3M, for a system to mechanize their file of approximately 3 million paper patents for storage, retrieval, duplication and display. This was interesting because they had such a primitive system in effect at that time. All 3 million US patents were stored as paper copies in what looked like cardboard shoeboxes (boxes you'd get when you bought a pair of shoes) labelled by subject. This system had been operating for years and years, and served the examiners fairly well, although they had to essentially re-shuffle the contents of the boxes every year or so to keep up with technology changes and the accompanying group description and box name changes. So this project was to look at several alternative systems--all microfilm systems; again, nobody was in a position yet to suggest the use of a file of electronic records. That came years later.

I left SRI in March, 1966 to join a startup with a friend, Don Ford, who had worked with me at SRI on several projects. His company was called Programming Services, Inc. (PSI), later renamed Information General Corp. (IGC), and it was based in the Los Angeles area. PSI was a research and programming firm, with Don as the President. I headed up the northern California Division, and I carried some of my CIA work with me, along with several other prospects.

One of my prospects was the Library of Congress (LC). I provided consulting assistance to them over a six-month period in 1967 for their pilot MARC (MACHINE Readable Cataloging)

⁵² CB & Jeanne B. North. (Oct. 15, 1969). "Preliminary Cost Analysis of Selected Library Functions at Stanford University. Vol. 1 "General Cost Models and Plans for Data Collection." 35pg. Vol. 2. "Preliminary Cost Analysis of Acquisition Functions, Using Presently Available Data." 32 pg. Vol. 3. Preliminary Cost Analysis of Cataloging Functions". 34pg. IGC.

project. This was when LC, in a pilot program, supplied computer tapes of English-language cataloging records to a number of participating libraries. I developed a cost model of the MARC catalog record production process, and my project team did interviews with all of the participating libraries. This was pre-production MARC, when a trial run of the MARC cataloging records was done with some participating libraries to get an idea of the cost to LC to provide these tapes, and to find out whether the tapes were of any value to the participating libraries, and what changes ought to be made from that experience.⁵³

But to get back to your question about the value of SRI as such. It was a great place to learn the craft of doing what amounted to contract research, or simply acquiring a project idea or being contacted by somebody who wanted some work done. SRI had a great reputation at that time, of doing contract work for clients, on very specific engineering topics, like Xerox printing in unusual ways (e.g., Xerox printing on a fried egg). It was a place to learn the craft of doing research projects from lots of old hands who had been doing this for years. You learned how to identify and describe a project and its tasks and what had to be done, and then do the project, and finally to describe the project results in intermediate and final reports, project demonstrations or presentations to the sponsors.

It was the policy of SRI to provide interim and final reports to the clients and sponsors. SRI insisted on quality workmanship when they issued a report, and to that end they assigned professional editors to each project so that every report would be written by the researcher who did the work, but then perhaps some copy editing and suggestions would be made by the editors. The editors did a final review of your report and went over the report with you to clarify issues, or choose better wording or better organization of material in the report. So I had essentially ten years of mentoring in project descriptions and professional writing of proposals, reports, and articles. It was a marvelous learning experience, and lessons that I use to this very day, and I was happy to receive that training.

It was during this time at SRI that I started to get involved in the professional societies, particularly ADI, which at that time was probably the core vehicle by which I got and kept myself up to date on evolving techniques, equipment, and services. SRI was very supportive of my work in the professional societies in those early years as I worked my way up through their

⁵³ CB. (1967). Cost Models of the Pilot MARC System. PSI Final Technical Report.

ranks. I had done several years of book reviews or abstracts as an editor for a section of *AD*, and that got me in contact with a lot of people outside my normal contacts. It also got me to a lot of conferences and meetings with many people who were helpful to me in my professional development during those years. I was elected to be one of the ADI Council members for the years 1969-71, and then to President-Elect, at a time when I was pretty well established at SRI. So I felt comfortable taking the assignment of being the Chair of the 1969 annual convention meeting in San Francisco. And then I served as President for 1970 (of ASIS, after a name change from ADI).

MB: Well, two things: one is, your list of projects doesn't mention the first remote searching.

CB: That's right. (CB note: that was fixed in later editing)

MB: And the other is, I wonder if you could say a little more about daily life working at SRI. How was the work structured? Was it 9 to 5, or was it all hours? And a little bit about who you worked most closely with, or who supervised you, or who influenced you? There are several names of co-authors here, for example.

CB: Yes. I'll use that as a guide. Actually, my first professional work happened while I was still a senior engineering student at Berkeley, working with Professor Cyril Atkinson of the Mechanical Engineering Dept. on the solution of a mechanical engineering question regarding harmonic oscillations in a forced pendulum system. I programmed analog and digital computers to find an approximate solution to this problem. That was the only time that we worked together.⁵⁴

My next mentor, while I was at Berkeley, and later on joint projects at SRI was Doug Engelbart.

MB: You must've gotten to know him fairly well.

CB: Yes, yes.

MB: What was it like, collaborating with him or working with him?

⁵⁴ C.P. Atkinson & C.P. Bourne. (June 1958). "The Solution of Duffing's Equation for the Softening Spring System Using the Ritz-Galerkin Method with a Three-term Approximation." In *Proc. 3rd U.S. National Congress of Applied Mechanics, held at Brown Univ., Rhode Island. June 1958.*

CB: He was a fun guy to be with, and very inventive. But there were times and topics when it was hard for me to speak in the same language, or train of thought. He would talk in terms of developing systems, “So that I can jump on my informationmobile and fly through information space to get the information that I’m after; that’s what I want to implement.” And that would be the task description. And that’s sometimes about as specific as you could get.

MB: Not the way you’ve learned to think and talk.

CB: Right. It’s just a different language. That’s how it was with Doug. But he was always approachable, and had time for you. I remember the time, as one of his students, when he invited me over to his house to meet his wife and young children, and to see the gas tube shift registers that he was developing in his basement with private sponsorship. No other faculty member ever extended me such comradeship.

Another person that I worked closely with was Donald Ford. Don worked for me on the ground-based intelligence data handling system I mentioned earlier, and we did several fun studies with the SRI computers. As I mentioned earlier, he later left SRI to start up his own personal programming-for-sale business. I eventually left SRI and joined him as part of his start-up, and worked for a couple of years with him until that company folded.

MB: Programming Services, Inc.

CB: Yes. That’s right, PSI. And he and I, because we had a joint interest in working with the computer, we did several fun studies. There was always time for a little fun with discretionary time on the SRI computers for personal interests such as compiling English subject word statistics.⁵⁵ We did this just because we were curious, and because we had the computer. This was followed by a study of methods for systematically abbreviating English words and names.⁵⁶ It was felt that this data might be helpful in the establishment of library filing systems or shelving distributions in new libraries.

He and I then did a statistical study, again because we were interested and had the computer and could now do some special things with it because it had a digital plotter. We

⁵⁵ CB & Donald Ford.(March 1961). “A Study of the Statistics of Letters in English Words”. *Information and Control*. 4(1) 48-67.

⁵⁶ CB & Donald Ford. (Oct. 1961). “A Study of Methods for Systematically Abbreviating English Words and Names”. *Journal of the Association for Computing Machinery*. 8(4) 538-552. Paper received Jan. 1961.

looked at a printed publication of NTIS which gave us the description of every digital computer system that had been built and described to date. We took pieces of that information, such as the main storage capacity for each computer that was described, and plotted it in the starting date ordinate, to show the historical trend in the growth of memory size. We did the same with speed, and other features, to try to project out into the future where this was going, how fast is the equipment getting along, and so on.⁵⁷ So that was just a fun thing we did.

I did another study at SRI with Ted Brain and others to look at ways of analyzing things in graphic images to facilitate the automatic processing or high speed analysis of, or automatic recognition of features from satellite or airplane camera images. The objective was to be able to identify such things as complete cloud cover, or identify anything that had straight lines or straight features that might identify some buildings or other man-made structures, and speed up the processing of aerial reconnaissance stuff.⁵⁸

MB: I wondered if it might make sense to treat the Programming Services/Information General, period, as a separate topic on a separate day.

CB: Sure.

MB: Just as today we've been focused on SRI, primarily. I think that might give the optimal result.

CB: Sure, we can do that. Okay.

MB: You obviously became well-connected during this period, in terms of getting to know who was active in the field, and getting to know a lot of them personally. Who really stood out at that time, in your view?

CB: Well, I should mention the main figures at several of the Washington agencies who were very much involved in funding research in information retrieval. There was Helen Brownson and Gene Pronko at the National Science Foundation. There was Verner Clapp at the Council on Library Resources. There was also Jacques Tocatlian at UNESCO in Paris.

MB: He (Verner Clapp) was a pretty sharp guy, I thought. I met him once.

⁵⁷ CB & Donald Ford. (May 1960). "The Historical Development, and Predicted State-of-the-Art of the General-Purpose Digital Computer". *Proceedings of the Western Joint Computer Conference*. Pg. 1-21.

⁵⁸ A.E. Brain, CB, & 4 others. (Nov. 1960). "Graphical Data Processing Research Study and Experimental Investigation". 1July to 30Sept. 1960. SRI. NTIS Report No. PB-155 367.

CB: Yes he was, and pleasant, and good to know. The same was true for Jacques Tocatlian. These were people to know because they, by virtue of their position, were in contact with a whole lot of people who were doing things like you wanted to do yourself. And another person was J.C.R. Licklider, project sponsor for ARPA's projects: early computer networking, early Engelbart support, graphic processing, -- he was supporting all of that. I didn't know him personally that well, but he was an important person in the field at that time. At the Library of Congress there was Henriette Avram, and several other people. These were all important people who, in one way or another, helped me at different times.

Pauline Atherton (now Cochrane), who was working then at the American Institute of Physics, was very helpful to me. I met her at one of the early ADI meetings, and she was very helpful in tutoring me on indexing, classification, and the LC systems – things that a dumb engineer like me were ignorant of. She also did me a great service by reviewing and critiquing early draft chapters of my first book (*Methods of Information Handling*) as I wrote them; she gave me some extremely important feedback, and prevented me from making a number of mistakes in my early work. We also worked together on ADI activities when her ADI Presidency immediately followed mine (in 1970). In return for all of this, I helped tutor her in the computer-based aspects of information retrieval, provided the means for her to establish a DIALOG-based online lab for her faculty position at Syracuse University, and gave her an early introduction to people in my field like Doug Engelbart.

MB: I knew there was a connection you had with her, but I didn't know the origin of it.

CB: She was also very helpful in introducing me to a number of the people that turned out to be helpful with my work later on. She was the one that I turned to when I had questions of information structuring, and she was the one who introduced me to Ranganathan and his work, and some of the earlier pioneers such as Robert Fairthorne, Brian Vickery, and Neelameghan.

MB: Now, a number of the people I associate with that period, but I don't know, maybe they weren't that early, would be Harold Borko, Robert Hayes, Joseph Becker, and Donald Swanson.

CB: Yes. Borko I knew from early days. He was interesting, but I never really worked with him on anything.

I'll add another name to your list: Carlos Cuadra. We worked together in 1965 on the development of the *ASIS Annual Review*. He and I, and Pauline Atherton decided that we needed

better coverage of the literature for people in our organization. So the three of us, using the model of the *Annual Review* series in the life sciences, started the *Annual Review of Information Science and Technology (ARIST)*. We wanted it to be seen from the beginning as an ADI publication, and so there'd be some proprietary worth there, as well. The first volume was published in 1966 with Carlos as the founding Editor, and continuing as Editor through the 1975 edition. And for starters, each of the three of us wrote one of the review articles in Volume 1. That was really interesting. I continued to serve on the *ARIST* Advisory Board (initially with Ruth Davis, Art Elias, Robert Fairthorne, and John Markus) for a few years after that. After a 45-year run, the *ARIST* publication stopped with its 2011 edition.

Carlos was a longtime SDC (System Development Corp.) employee, and later the head of his own firm, Cuadra Associates. He was a very fun person to work with. We worked in a very collegial manner on ADI and other professional society matters, but also met in a very adversarial but professional competition when he was heading up the ORBIT Search Service at SDC in Santa Monica and I was working as a member of the senior management team for the DIALOG online search service. DIALOG and SDC Orbit Search Service were the major, and pioneering online search services of that period. We were in a friendly but earnest competition for databases and clients/customers. At DIALOG, to avoid any hint of collusion, all the staff that had any contact with database suppliers or customers, were instructed to avoid any meetings (social or otherwise) with representatives of other search services. Consequently, that limited the time that we could have spent together on other tasks. Carlos was a strong and inventive competitor when I was at DIALOG; it was DIALOG versus SDC.

I didn't really know Don Swanson. But the earlier people that you described (Borko, Hayes, Becker) were good friends, and we were always seeing each other at the ADI meetings and such.

Bob Hayes was a very sharp, very smart individual. In his earlier days, before he joined UCLA, I had known him when he had worked with an engineering firm on some of the pioneering magnetic card retrieval systems. In 1964 he and I were on the ADI Council together. And finally, I believe that when he was at UCLA, he was also helpful in my getting my eventual position at Berkeley. I think he suggested to me that I give it a try, and he may have been more directly supportive than I'm aware of.

MB: Did you know Joe Becker in those days?

CB: Indeed I did. I first met Joe at SRI when he came to talk to a group of us about what we were doing at SRI, and then to talk about some interesting stuff that he had been working on. He was working in a senior position at CIA (the Agency) at that time, and was responsible for lots of computer-based stuff. He was good, and it was a pleasure to work with him. Joe had lots of contacts in the government world and the computer world, and made a number of useful contacts for me. He and Bob Hayes was instrumental in my getting connected with the publisher Wiley and Sons, and that led to my first book contract (*Methods of Information Handling*) and then a position on one of the Wiley Advisory Boards. He was responsible for my coming to work for the Agency for several years of very interesting and significant work.

MB: What about Western Reserve, and the people there?

CB: I knew, or I met--was knowledgeable of Perry, Berry and Kent. It sounds like a law firm or something.

MB: It sounds like a limerick ending.

CB: Yes, quoting a limerick of the time, "I don't know where he went, but it wasn't with Perry, Berry and Kent!" Yes, they were interesting because when I first started out, it was their information retrieval system, the Western Reserve Searching Selector, that got a whole lot of press, and it was their system that was being advocated for a national system, and they eventually did get a prime position in the metallurgy field to be a specialty service there.

MB: Did you meet or know Jesse Shera at all?

CB: I met him one time, shook his hand, and that was about it. Hard to talk to, because he had vision problems.

MB: Yes, yes. In my opinion, he was more about writing and talking than doing. So, it would be more reasonable for you to know Perry, Berry and Kent.

CB: True. Yes. They had a great PR system working for them, publishing at every opportunity, and receiving a lot of visitors, and they were a force in getting support into the field.

MB: What about the UK? Was there anything in the UK that you were aware of, or had any contact with, that early on?

CB: Yes. And it was not in any major systems at that time, but it was all intellectual, in terms of evaluation of indexing structures. Cleverdon, is that a name you remember?

MB: Brian Vickery was active then, and Robert Fairthorne.

CB: Fairthorne, now there was an interesting guy who was never at a loss for words. I can remember him in a group meeting, when the session chairman was getting comments from the audience... and Fairthorne put up his hand and got recognized and stood up to speak, and as soon as he stood up, he started looking at the ceiling, and he turned off his hearing aid and then went into a long, rambling discussion about whatever the topic was, and there was no way that the session chairman could get his attention or turn him off! So, people I talked to later said they would hesitate to ever ask him to speak or comment or whatever, because you could never turn him off. That much I remember of him.

MB: I discovered recently that he is known in other circles as a pioneer of experimental, avant garde, abstract movies.

CB: Really. I didn't see any sign of that. No other names come to mind...

MB: We should make a pause there.

CB: Yes.

File 13 Working at SRI, PSI/IGC

MB: It is Thursday, January the 27th, 2012, and it's one-twenty-six p.m., and Charlie Bourne is going to talk about the transition from working at SRI to Programming Services, Inc. and beyond. So, over to Charlie.

CB: It was March, 1966 when I left SRI to join a private sector practice with a small startup group headed up by Don Ford, one of the people who worked with me at SRI. He was the president of this new firm, Programming Services, Inc. (PSI), based in the Los Angeles area. Don had worked with me at SRI on a ground-based reconnaissance data handling systems that we were building for the Air Force); We had worked closely together on this several-year project to develop the data processing techniques and system to handle a lot of data that was being acquired from airborne recorders. As mentioned earlier, we had gotten used to working together and thought we could probably make a go of it on the outside. He was very much the entrepreneur, and I was inclined to be more of a follower. He lined up all the support before he was ready to leave SRI, and soon after his new firm was up and running, he asked me to go with him. This was something that was difficult for me to do because I had never been such a daredevil before, and to jump out there after 10 years of steady, interesting work and security at

SRI...Wow! But I knew it was the wish of every young American to go out on their own and do something to build their own empire. So I thought I had to do this, to give it a try, or get it out of my system, and so I did. He and his group were in the Los Angeles area concentrating on doing programming work, mostly control systems programming for oil fields and other simulations that involved pretty experienced programmers.

I was to be in charge of the division up in the Palo Alto area, and my activities were going to be mostly paper studies of one kind or another, not necessarily programming. So that's the route that I took, and that was the beginning of PSI as we always called ourselves. I'd been very fortunate to have the experience of SRI behind me, and I knew the ins and outs of contracting. I knew what federal procurement regulations were and how to work within them. I also knew how to get projects, execute projects within time and money boundaries, and always paying attention to the old Chinese proverb of "always plenty project left when money run out." So, I started our Division's activity in Palo Alto, not too far from my home, and went through several years of project activity with what we could find in the way of support for information retrieval type jobs. We got most of our work from Washington, D.C., from the federal government, different agencies, and not a lot from locals except a little bit from Stanford University. During the end of my tour at SRI, I was doing some work for the CIA. When I moved to PSI, I continued the consulting activities that I had been doing for the Agency. I did not carry any other SRI work with me to PSI.

The work at PSI continued on with some other projects, and some new types of projects. But this startup business was a different kind of a ballgame, and a new learning experience for me because some of the people that I hired at PSI had resumes that were inflated and were not the solid researchers that I would have liked to have had on my staff. I was very fortunate at SRI because there was a personnel department that had a really good staff, that really screened people, and did all that work for me. And when I got to PSI, it was a different game; now when I was looking to hire some people to help me with my work, I had to do all this interviewing, consulting, and reference-checking by myself. This was something that was brand new to me, so I fumbled a bit in this area and came up short with some of the staff members I hired. But, several very good people joined my group, and worked for me for the several years when we did stay active. Jeanne B. North (later Reddy Dively) was one of those really helpful people with a library background.

At this point most of our work turned out to be for federal agencies because there was a lot of federal support available. There used to be a joke about, “While you’re up, get me a grant.” So grants were available on lots of different projects related to the library field, and also regarding national information projects, systems or concerns. Technical information work of one kind or another to improve libraries or improve new systems for libraries was also supported. We had several of these projects, but this work started to peter out, and we started to see some dry spells coming ahead, and that’s when we got to a point where we had a name change to reflect some of the change in work that we were doing. When I left SRI and helped start up PSI, there was support for a lot of studies, mostly on national information systems. This was the time of Perry, Berry and Kent, and lots of special libraries starting in the technical fields on behalf of metallurgy or other special technical interests. So there were a number of things that came up for work along that line.

One of our first PSI projects was an evaluation study funded by NLM. It was an evaluation of *Drug Digests*, an experimental publication prepared in Israel with NLM support. It provided English-language digests of selected articles from European-language publications. It had been made available to U.S. scientists for about 2 years when NLM asked PSI to do a study, “... to determine (its) intrinsic quality, and identify the potential audience required for (it) to serve its objectives: to make more readily available to U.S. scientists and physicians important information on drugs published in the foreign literature.”

Fundamental data about the publication’s coverage was obtained by building a computer database for all of the citations for the 926 digests produced to date. The processing of those digests provided statistical data about such things as the journal source, time lag of coverage, publication date, and source language. An overlap study, by journals covered, and by individual citations, was also conducted with other secondary publications. The overlap study also recorded the subject headings used for individual articles by other secondary services. This part of the study identified the extent to which *Drug Digests* provided unique coverage.

The evaluation of the basic accuracy and editorial quality of the individual digests was done by closely comparing a number of digests against the original foreign-language articles. The evaluation and grading of each of these digests was done by a physician with European-

language skills. All of this work was done in a six-week time period, starting in April, 1967, and provided the template for many of the overlap studies that I subsequently did.⁵⁹

Another 1967 project was work that we did for the National Advisory Commission on Libraries. I was the project leader on a supporting study at PSI for use by this Commission. The project's objective was to analyze all operating factors in the relationship between libraries and industry that were relative to the effectiveness of each other. An investigation was made of unsatisfactory situations adversely affecting either library service to industry or industry service to libraries.⁶⁰

A final 1967 project was for the National Academy of Sciences (NAS) on the topic of "The Application of Copyright on Computer Usage." I was the Executive Director, and participated as a member of a NAS Panel on the Application of Copyright on Computer Usage, reviewing the proposed Copyright Revision Bill as it related to current trends and issues with computerized information processing.⁶¹

One new line of work for me was in the preparation of machine-readable databases. The earliest of them came about while working with J.W. Stacey Inc. (Stacey's) in Palo Alto, a large bookstore specializing in science and technology books. Brett Butler was the individual at Stacey's, one of the owners, who was very energetic and imaginative in the way that he would sell books to Stacey's institutional customers. For the most part, these were large university libraries; and he had an idea of a different sales approach for them, namely, in this new age of computers, he would prepare machine-readable catalog records to correspond with the technical books that the libraries bought from Stacey's. This also included the provision of tens of thousands of associated catalog cards. This would be done in a coordinated way so that they would ship the library catalog cards, and even the machine-readable records, with the books. This was new; this had not been done before. This was done at about the same time that LC started their pilot MARC tape distribution service. This was done even before all of the data

⁵⁹ CB & Ann Raphael. (June 1967). "An Evaluation of *Drug Digests*: Final Report. Vol. I-III." PSI. ___Pg.

⁶⁰ J. North, CB, & 4 others. (August 31, 1967). "Libraries and Industry". PSI. Final Report. 152 pg.

⁶¹ National Academy of Sciences. (Dec. 1, 1967). "Report on the Application of Copyright on Computer Usage."

elements of the catalog records were identified and agreed upon by the library community for different kinds of material.

The first project with Stacey's was for the preparation of 2,475 machine-readable bibliographic records for issues of Stacey's *Off-the-Press (OTP)* magazine that included brief descriptions of new books. The project objective was to prepare high quality records of brief catalog data for new technical books. The citations in each of 10 issues (Jan. to Oct. 1967) were each annotated with a unique serial number and a publisher ID code. The printed product *OTP* and the machine database were to be used to assist in book ordering and processing procedures, and to form the basis for a more complete bibliographic file, with additional information (e.g., a corresponding LC MARC record) to be added at a later date. This database was built by keypunching IBM cards for use with CDC-INFOL software on a CDC-3800 computer at the local CDC Service Bureau. This pioneering work was done over a seven month period, beginning in May 1967.⁶²

The second Stacey's project was a library catalog conversion done for McMasters University in late 1967. My archives have only a little information to describe this project.

The third Stacey's project started in November 1967 and was a five month project to convert catalog data from *Books for College Libraries*. The objective was to produce a high quality machine record, superior to Stacey's *OTP* product. Complete data from each of 2,759 title entries from classes B, G, H, and Q-Z were transcribed onto formatted data sheets and then keypunched and processed with CDC-INFOL software as described above.⁶³

The last Stacey's project started in 1968 and was aimed at supporting an opening-day library collection for a new collective of 20 college libraries. This project, the Ontario Union Catalog, for the new College Bibliocentre in the Toronto, Canada area represented a high quality computer tape file of 5,915 catalog card records to represent their Stacey's purchases and the joint holdings of 22 libraries of the Ontario Technical Colleges.⁶⁴ Eventually, Stacey's work got

⁶² CB. (Sept. 1968). "Preparation of Machine Bibliographic Records. Case Study: 2,475 Citations from Stacey's Off-the-Press". IGC. PSI Internal Use. 24 pg.

⁶³ CB. "Preparation of Machine Bibliographic Records from *Books for College Libraries*. PSI. undated draft 19 pg.

⁶⁴ CB. (est. June 1968). "Preparation of Machine Bibliographic Records: Ontario Union Catalog. A Case Study." Unpublished draft report. 31 pg.

caught up in competition with LC's MARC activities, and Stacey's stopped doing it because they just couldn't begin to compete against LC and the big PR campaign that they had going for them.

We did some other kinds of database building. One of the more specialized (for us) was with chemical compound indexing. This was a trial study to see what it would cost, and what would be involved in coding and keyboarding a large number of chemical compounds from *Index Chemicus*, and to prepare a high-quality machine language file of that information. That study was done for Gene Garfield and his *Index Chemicus*. The coding was to be done by the manual assignment of Wiswesser codes by a chemist trained in that coding system, to a large number of compounds (7,624) over a 3-month period beginning in January 1968. In addition to the database of coded compounds, cost and timing data were also reported to the sponsor.⁶⁵

We also did a comparative cost study of the keyboarding of 1,000 ERIC (Educational Resources Information Center) bibliographic records by batch and by online methods. There were lots of people then looking at, "What's the best way to go about building our own machine records." Nobody had much experience in this. This study was sponsored by the Stanford ERIC Center on behalf of the indexing of ERIC documents at the various ERIC centers throughout the country. We did this by creating 500 machine records by each of two methods: 1) batch processing by using a local system; and 2) online terminal input using a Stanford online system. There wasn't much experience locally or nationally with either of these kinds of systems, so it was useful information to have if you were thinking about doing something along this line. The batch processing approach used IBM punched cards and CDC-INFOL processing at the local CDC Service Bureau. The online approach used the Stanford Spires system. The study was done over a 7-month period.⁶⁶

The National Agricultural Library (NAL) was a major sponsor of IGC work from 1968 – 71. As the publisher of the *Bibliography of Agriculture (BofA)*, a periodic bibliography with worldwide coverage of over 100,000 citations per year, they were always in somewhat of a race

⁶⁵ CB. (April 1968). "Preparation of Machine Records of Wiswesser Notations for Chemical Compounds. Case Study: 7,624 Compounds from *Index Chemicus*". PSI. PSI Internal Use Only. 17 pg.

⁶⁶ CB. (Sept. 1968). "Preparation of Machine Bibliographic Records. Case Study: 1,000 Records from Stanford ERIC—Batch and Online". PSI. PSI Internal Use Only. 30 pg.

and competition with the *Chemical Abstracts (CA)* and *Biological Abstracts (BA)* publications. NAL management knew they had some overlap in coverage with those services, and thought maybe there was something that they could do to take advantage of each other's basic input. There was always talk in the Washington area about "let's share our resources". And so this was one of those opportunities. "Can I get tapes from *Biological Abstracts* and from *Chemical Abstracts*, use that source material as additional material for NAL? And what's the difference in indexing for these services, and what's the degree of overlap, and what problems would there be, and who's fastest at getting the same citation, and can we augment the *BofA* tapes or do an online search of *CA* and *BA* records on their computer systems? How can we work with the other two libraries to make use of their data and vice versa? We ought to be able to share some of this!" So this led to some really interesting studies, such as, to what extent is there overlap between these three major international databases, and what does the indexing look like when viewed from the three different services? To what extent is there any kind of useful overlap, or is there completely different data for each file? This was really interesting kind of stuff that I don't think had been done before. And studies for all of these questions were done by PSI which at that time was changing its name to Information General Corp. (IGC) to reflect our interest in things more than programming.

The first of the PSI/IGC projects was to look at the extent to which NAL could make use of the *CA* and *BA* databases for reference purposes, including the augmentation of the *BofA* tapes.⁶⁷

The second project actually consisted of three related studies, all making use of data assembled by the first of the three studies which started in July 1968. This first study determined the extent and characteristics of coverage of the agricultural literature by the *BofA*. Statistical details regarding the language, national origin, form of publication, and subject coverage were drawn from a sample of over 5,000 citations we copied from the printed 1967 issues. This citation data was keypunched into IBM cards for use with CDC-INFOL software at the local CDC Service Bureau. That software provided a statistical analysis of that citation sample.

⁶⁷ CB. (April 27, 1968). "Preliminary Assessment of the Utility and Feasibility of NAL Use of Bibliographic Data Banks". PSI. 11 pg.

The completeness of *BofA* coverage was determined by finding the extent to which relevant publications listed in three annual review books were cited by *BofA*. That number was obtained by searching the citations in those review books against *BofA*.

The nominal time lag from stated primary publication date into *BofA* coverage was also determined from the citation samples.

A determination was also made of the relative time lag of coverage of the same citations by *BofA* and 15 other secondary services (abstracting or indexing services) in the same subject areas. This type of study had been done before, usually by the secondary service itself, but not to the same scope and degree of detail.⁶⁸

For the second study, we used the sample of 5,000 *BofA* citations as the source material, and conducted literature searches in 15 other secondary services (abstracting and indexing services) that were agreed in advance to be services with significant overlap with *BofA*. One of the major findings was that 54% of the sample *BofA* citations were not covered by any of the other 15 services. And the material covered uniquely by *BofA* was not significantly different in national or linguistic origin or form of publication from the *BofA* material that was overlapped by the other services. No *BofA* citation was covered by more than six of the 15 services, with no single service overlapping more than 20% of the *BofA* sample. This appears to be a type of study that had been done before, but not to this scope and degree of detail.⁶⁹

For the third study, and again, using the same sample of 5,000 *BofA* citations, a study was made to compare *BofA* indexing to the indexing by 15 other secondary services of citations that they all covered in common. The initial study had already determined which of the *BofA* sample citations was also covered by another secondary service. Now the issue was to copy out the corresponding subject indexing terms from each secondary service, and develop a meaningful way to describe the similarities and differences of the assigned index terms, and report the

⁶⁸ CB. (June 1969). "Characteristics of Coverage by the *Bibliography of Agriculture* of the Literature Relating to Agricultural Research and Development". IGC. 72 pg.

⁶⁹ CB. (June 1969). "Overlapping Coverage of the *Bibliography of Agriculture* by 15 Other Secondary Services". IGC. 92 pg. NTIS Report No. PB-185 069.

differences. This appears to be a type of empirical study that had not been done before, at least not to this scale.⁷⁰

The third and fourth NAL projects were user studies for NAL. The third, starting in late 1969, was a direct study of the users and potential users of NAL products and services. I conducted personal, in-depth interviews with agricultural researchers in four different agricultural research facilities (USDA Agricultural Research Service Labs at Albany and Salinas, California; UC Davis; and Chevron Chemical Co. / Ortho Dept.).⁷¹

The fourth project was a series of personal interviews I did in 1971 of University of Georgia staff members regarding their computer searching of various bibliographic databases. This was particularly with regard to the NAL database, as well as their general information needs and use patterns.⁷²

Okay then, continuing on with PSI, we had a project in 1968 for the Magnavox Research Labs that was an examination of a high-tech search system that Magnavox had developed. It was brand new equipment of their own design, and it used small, miniature versions of IBM cards, only they were Mylar, had a magnetic coating on them, and they would whiz around in special equipment at very high speeds. This allowed them to be sorted and selected; you could search on these card decks, and it would give you a mechanism for updating lots of images into your file on a weekly basis with a high-volume output capacity. Hundreds or more queries per day could be put into this machine file, and reports printed out in response to them. My evaluation included a comparative cost analysis of the proposed Magnavox system and another more conventional system for a single benchmark problem.⁷³

⁷⁰ CB, M.S. Kasson & J.B. North. (June 1969). "Study and Comparison of the Indexing of the *Bibliography of Agriculture* in Relation to the Indexing of 15 Other Secondary Services". IGC. 99 pg.

⁷¹ No formal report was prepared, but individual transcripts were prepared and delivered to NAL.

⁷² No formal report was prepared, but individual transcripts were prepared and delivered to NAL.

⁷³ CB. (Nov. 25, 1968). "Cost Analysis of Magnavox Image Storage and Retrieval System." PSI. Unpublished. 23 pg.

In 1969 I did a brief analysis of the estimated operating cost of a specific microfiche production system planned by Magnavox in response to a specific proposal request from the Defense Documentation Center.⁷⁴

In 1969, we did a major study for the National Academy of Sciences (NAS). NAS established a Committee on Scientific and Technical Communication, otherwise known as SATCOM, with a large group of individuals familiar with current issues of scientific and technical communications. The Committee was established with a 3-year term in response to an October 1965 NSF request. I was privileged in 1968 to serve as a Consulting Correspondent and contract staff member from IGC to support the Academy on this project. The Academy's task was to investigate the present status and future requirements of the scientific and engineering communities with respect to the flow and transfer of technical information. My staff and I did extensive background work and preparation of draft text material for the SATCOM final report.^{75, 76}

In 1969 I did a project for the Council on Library Resources (CLR) to review and develop standard cost data for selected library technical processing functions. I wanted to see if there wasn't some kind of normalized range or clustering, or some gathering of cost data, so that you could see what it would cost and the time it would take, for example, to catalogue an English-language work of fiction, or something of that order, or to do indexing of a particular complexity. Or any of the other library technical processes. As people started to develop new libraries--special libraries and new technology--there ought to be some guidelines or some data developed which says, "This is the order of magnitude or a range of costs you could expect to do that. Furthermore, you shouldn't expect any cataloger working on these machine systems to achieve a rate of more than n items per day.

⁷⁴ CB. (Feb. 5, 1969). "Cost Analysis of Magnavox Microfiche Production System for DDC". PSI. Unpublished. 10 pg.

⁷⁵ "SATCOM Final Report. Section III. Aids to Literature Access and Use".

⁷⁶ "Section IV. Incentives and Constraints: Draft No. 1". June 1968. Not for publication. This text now appears in parts of Chapters 4,5,6,7 of the Final NAS report (Ref. "Scientific and Technical Communications: A Pressing National Problem and Recommendations for the Solution". NAS/NAE. 1969. LCCN: 76-601241.)

And so I attempted to do a number of standardized cost studies. This was a throwback to my old training, as a time and motion studies expert, kind of coming back to bite me. We did this for a number of libraries, but I don't believe it ever came to anything meaningful. Our CLR project was the careful preparation of a collection of normalized standard times and costs for repeatable library activities, documented in a form that would permit extrapolation to a variety of real library operations. The major objectives were to: 1) review/analyze/summarize the readily available cost data; 2) provide best estimates of standard costs from this data; and 3) develop a methodology and reporting format to permit others to report their data in a more consistent and useful way. This study focused its attention on two areas of library activity: 1) conversion of catalog records to a machine language form; and 2) serials processing.^{77, 78}

To follow our CLR study of library costs for file conversion and serials processing, another library cost study was done in 1970, this time for the U.S. Office of Education, and this time on "Data Collection and Cost Modeling for Library Circulation Systems". And this time it was for my own consulting organization, Charles Bourne and Associates (CBA). A general cost model was prepared for seven different kinds of library circulation systems (e.g., manual, IBM card, computer processing) and a bibliography of 304 publications was compiled that had something to say about that topic from 1960 to 1970. Cost data from these publications was extracted, and grouped in three different lists (university, public library, and public library system) by date.⁷⁹

We did a project in 1970 for the ERIC Clearinghouse on Library and Information Resources to survey all the readily available literature with regard to abstracting and indexing rates and costs, because this was something they needed to know. We did a literature search from 1950 to date, for whatever publications we could find on abstracting and indexing rates and costs, then plotted and described them, and looked for patterns. We also normalized the reported

⁷⁷ CB & M.S. Kasson. (Nov. 4, 1969). "Preliminary Report on the Review and Development of Standard Cost Data for Selected Library Technical Processing Functions". IGC 70 pg.

⁷⁸ CB & M.S. Kasson. (Dec.18, 1969). "Final Report on the Review and Development of Standard Cost Data for Selected Library Technical Processing Functions". IGC. 70 pg.

⁷⁹ CB. (Nov. 4, 1970). "Data Collection and Cost Modeling for Library Circulation Systems." CBA. ERIC Report No. ED-046 445. 95 pg.

costs to 1968 dollar values, and published that information as a resource for people to look at. That work was done at PSI.⁸⁰

The last of my library cost studies was work I did at CBA. In early 1971, I worked with the staff of the San Jose Public Library to perform an analysis of the costs experienced by that library during calendar year 1970 for its acquisition and cataloging processes for all types of material. Invoices and other purchase records were reviewed to determine the amount of money spent on materials and equipment. With the exception of employee benefits, the analysis considered only the direct costs associated with these processes, and did not include any general overhead costs such as space, or general office supplies and furniture.⁸¹

We did a major project at IGC for the federal Committee on Scientific and Technical Information (COSATI), at a time in 1969 when there were protestations of “Everybody’s duplicating the work that’s going on,” or “There’s too many people doing the same thing,” and “What we need is a directory of all the research in the field of information sciences.” And so we worked to prepare the third *COSATI Inventory of Current R&D in the Information Sciences*. This involved looking at the research that was currently being sponsored by the many federal agencies that had something to do with this subject field. From those agencies we obtained over 20,000 current descriptions of projects that they were currently supporting as R&D in the information sciences. These descriptions were supplied to us on paper forms in a standard format produced in compliance with a mandated federal reporting requirement. And then with a little bit of review and selection work to extract the relevant items, and some copy editing work to normalize much of this data, we assembled this inventory of over 2,500 descriptions of current and relevant R&D. Then we did some taxonomy work on this material to put it into a useful order for a printed directory.

Using the IBM Datatext system, the project descriptions were entered into a computer database for searching and photocomposition, and then published both as a microfiche handbook of all the current R&D projects in the information sciences, and made available as a test database

⁸⁰ CB, J.B. North & M.S. Kasson. (May 1970). “Abstracting and Indexing Rates and Costs: A Literature Review”. ERIC Clearinghouse on Library and Information Science. Review Series No. 5. Library School. Univ. of Minn. 47 pg. ERIC Report No. ED-043 798.

⁸¹CB. (1970). “Cost Analysis of 1970 Acquisition and Cataloging Processes at San Jose Public Library.” A draft report was prepared, but not published. 18 pg.

for demonstration searching on new search systems. So if you were looking for a research topic for your information science doctoral students, here was a great source to point to and say, “Well, here’s a starting point, look at all of these things and see if you can’t get some ideas from what these people have tried.” If you ever wanted to be in a position in which you knew what was going on, this was the place to be, because you could then be in contact with many organizations that were doing information sciences R&D work. This would’ve included the development of speech-recognition or page-scanners and printed material recognition, indexing and abstracting techniques, artificial intelligence work, lots of leading-edge kinds of things you would want to know about. It’d be just the kind of directory you’d like to have in a library school library, to say to all your doctoral students, “If you want to look for research topics, sources of funding, or where this kind of work is going on and who’s doing it, and where you might get a job later on because of what you’re doing now, this is the kind of directory you’d like to have.”^{82, 83}

And that brings us about to the end of the PSI/IGC period. I think at this point I’ll take questions.

MB: You mentioned time and motion studies. That’s the first time you’ve mentioned that. Was this something you picked up in your graduate Master’s degree at Stanford, or where did you encounter that?

CB: When I worked at SRI, I participated in their Work/Study program with Stanford, taking one course per quarter. When I finally got my Master’s there in industrial engineering (MSIE) in 1963, it included time and motion studies, and engineering cost accounting. Those were just some of the fundamentals that were a given then in that profession. But it also included the application of computers to solve industrial and business problems. I didn’t make a lot of use of the time and motion studies except for the cost analysis and simulation work that I did later when I was costing out all these new systems and trying to see roughly how many units per hour I could get through them.

MB: What else do you remember being in the Master’s degree, industrial engineering?

⁸² CB. (May 1969). “COSATI Inventory of Information Sciences Technology. Reports of Federally-Funded R & D Projects in the Information Sciences, FY1968”. IGC. 671 pg. NTIS Report No. PB-188 880.

⁸³ CB (1969). “Preparation of Machine Records and Printed Directory for a Major Inventory of R & D Projects : A Case Study”. IGC. 23 pg. unpublished Internal Use Only.

CB: The other main part of the core curriculum that I was most interested in was the use of computers to solve industrial problems, for example, how to improve or speed up the work of the individual by making use of the computer. We were introduced to the standard kinds of problems we could expect to see, such as the “travelling salesman” problem. That is, if you’ve got to make a visit to every state capital in the country, what does your trip look like? How do you schedule and arrange the trip so that you get minimum time or minimum mileage or minimum cost? This is simply an optimization of a real problem. Or how do I schedule airline flight and ground crews with all of their limits on how many sequential hours they can work and fly and things like that? So a lot of our work as students was on using computers to solve problems of this kind. That’s what was new to the whole idea of a core curriculum of time and motion studies as it used to be in the old days.

I also remember some of the individual study work I did then, trying to do time and motion studies for intellectual efforts, rather than for working with the hands. That is, working with the head. There were only a certain number of tasks at a time, or per hour that a person could do, of a mental type, whether they’re simultaneously doing arithmetic or another task. Today we call that multi-tasking. That’s the kind of issue coming up now with regard to “distracted driving” (i.e., driving a vehicle while simultaneously texting, talking on the phone, consulting a map, or doing some other mental task).

MB: Later on, industrial engineering got very mathematical. Was there much mathematics then, optimization techniques and so on?

CB: No, at least it wasn’t provided to us in large amounts. We didn’t see too much of the “Operations Research” work which was more leading edge and mathematical in nature. That got to be used for example, when the Internet activity started coming along; then there were issues of, “If you’re going to break information up in packets, how do you switch it around the country in a way to minimize errors or transit time, or something like that.” That was going on when I was at SRI, but I didn’t get much of that as a student.

MB: What kind of overlap was there between what you’d done in your electrical engineering at Berkeley and at Stanford, were they really quite disjointed or complementary?

CB: Complementary. Very little overlap in terms of what was covered. In Berkeley it was strictly learning the fundamentals of waves and motion, and, “What are the equations of motion of electrons and waves in the air?” and things like that. It was a tube culture at that time

rather than the beginning of the transistor and solid state culture, and so you were learning how to shape and design the specific insides of the tubes, or you were learning about motors, machinery, generators, power, and national power transmission systems. It was quite a bit different at that time since Berkeley was just getting into the computer technology when I got there. In 1957, in my senior year, they started to offer the computer option, where before that there had been just power or electronics as the two electrical engineering specialty fields. I chose the computer option. As a result of that, one of my instructors was Harry Huskey, who was one of the pioneering computer people. And that led to some unusual instruction activities in his logic and programming class. He did some consulting for Bendix outside of his regular faculty work. Bendix at that time was producing a computer (Bendix G-15) that was about the size of a refrigerator, a large standing refrigerator. This was small in comparison to the large IBM machines we used in the campus computer center (IBM-701, I believe). Students in his class were given programming problems, and after writing our programs we would take them up to his house and run them on his Bendix computer. So I always look back to that exercise in 1957 as the first time that I used a personal computer. And there aren't many people who can top that early PC usage.

MB: Now, you've touched on several different projects today; you've made this list. Would you care to add a few comments on which ones you remember as being either remarkably original or remarkably interesting, or something that you really got excited about?

CB: I could do that, and I thought about doing that, but I thought I'd better think about it some more before I really do it. I'll make that a piece of homework for me. But not today.

MB: Is this a good time to pause?

CB: Sure.

File 14 Working at CBA, ILR, Overseas NGO work, UC Extension

MB: It is February the 2nd, a Thursday, and I've come down to talk with Charlie Bourne, and the present time is 1:42 pm.

CB: Let me talk about my introduction into UC's Institute of Library Research (ILR). It was a wild kind of a time. I worked there, but I don't remember exactly how I got on to ILR, as possible employment. I don't remember exactly how that happened, but I'm sure glad it did.

From April 1970 I had been working with my own consulting organization, Charles Bourne and Associates (CBA) in Menlo Park. In mid-1971 I got a phone call from Prof. Charles Susskind of the Electrical Engineering Dept. in Berkeley, asking me if I would be interested in discussing a position at ILR. I said that I was, and he said that he'd like to meet with me to discuss it, but he was travelling with a very busy schedule, and that the only time he could meet with me in the near future would be for dinner at the Los Angeles airport sometime in the next few days.

I did meet him and had dinner with him there. It was a good meeting. I found out that it was to be a joint appointment as Director of ILR, a university-wide Institute, and Professor-in-residence at the UCB School of Librarianship. He seemed to indicate that things would move along fairly quickly. But they never did. He went away for the summer, and nobody ever told me whether I got the job or not. And so that was kind of a pins and needles summer; is it going to be a deal or not? Do I need to get a new outfit for the summer, or do I need just a pair of Levi's? What's the dress code there, how do people handle this place? And maybe I don't even have a job. So, finally, I think after school started or sometime very close to the time I was supposed to start anyway, which was the end of the summer, I still hadn't received a reply.

When I finally called Susskind and said, "Look, you still haven't told me whether I've got the job or not. I need to get that issue cleared up and get that clutter out of the way, if it is in the way." And he replied, "Oh, no, you have been hired." And I replied with something like, "Well, that's good to know. Is there something I'm supposed to do, go somewhere and do something, or do I just show up?" Well, it turned out that I should just show up. And so I drove onto the Berkeley campus that day, or the next. I was actually a day early, but I did want to indicate some interest in the job, and wanted to see what things were like. My records show that it was actually Dec. 1, 1971. I went to the ILR office on campus that day, asked to see the person in charge, and introduced myself as the new Director. This was the location where the large ILR staff was working on the production of the world's largest computer-produced book-form catalog: *UCUCS (University of California Union Catalog Supplement)*.⁸⁴ Well, it turned out that there were some big issues there when I arrived. It turned out that Ralph Shoffner who

⁸⁴ . ILR. (1972). *University of California Union Catalog of Monographs Cataloged by the Nine Campuses from 1963 through 1967*.UCB.

was nominally in charge of that activity had that ILR Director position in mind for himself, and this was the first that he had heard about my appointment.

So I walked in that very first day and introduced myself to Ralph, and he said to me, “Well, let me just tell you what the story is here. I wanted that job (Director), and I was getting my degree because that position is supposed to have a Ph.D. degree; you don’t have that degree. So I’m going to quit, and I’ll do this very quickly, and it may be a little messy, or whatever, but I was operating under one assumption, and you were operating under another.” I had no reason to operate under any assumption, but there it was, and so the ILR camp split wide open, with Ralph and I trying to be kind of pleasant about the whole thing, this whole stiff upper lip stuff, certainly not getting into any shouting match; we didn’t need that. But that’s what greeted me coming in, and there for a long time was the old ILR and the new ILR, and different interests and kinds of projects we might want to work on.

I was not that anxious to work on their great big book catalog (I’m sure that UC still hasn’t gotten all their money back yet from their advance funding for that project.). So I wasn’t about to commit to whatever it was that was being put out there, as a product that wasn’t going over too well. So that was the beginning... that was not a very happy beginning. Furthermore, there wasn’t really much to speak of in terms of the faculty welcoming me into the arms of their organization. It just seemed like it was a different operation, that I was not being viewed or welcomed the same as a regular faculty or staff person, for some reason. Maybe it was because ILR was the practical part of the Library School complex, producing a real product. So anyhow, we (ILR) kept going our own way, doing our own work, trying to get that *UCUCS* project, that big book catalog out of the way, so we could do really useful things other than just being a great big body shop to keyboard a million strokes of one kind or another.

Finally, the last copies got printed and sent off, to wherever they got sent, to the UC campuses and then to something like six customers, or whatever number there were of them. When we got the number of bodies down (all these people who were keyboarding, programming, or building the database) then you could begin to think of doing some kind of work that was more worthwhile and not just this keyboarding. So my work went very slowly to begin with, because I wasn’t sure what projects would be appropriate, or who on the faculty might want to be involved in some kind of projects with ILR. I never did get a strong rise on that issue; nobody on the faculty seemed to want to do any work that took any extra resources, which was fine, that

had been their way to do it. I could never get anybody on the faculty interested in looking for external grant or contract support for doing some kind of scholarly work of interest to them. I got the feeling that if there was another 20 years I probably would, but that didn't happen. The closest I came to it was to get one of the faculty members to participate to a small extent in one of ILR's federal studies, and to get him some expense money to go to a particular conference that he was interested in; I helped him in that way, but that was about all it looked like he was going to do with us. I can't think of anybody else that we worked with, with regard to jointly finding research support for their pet projects.

I, on the other hand, looked at specific kinds of projects that seemed worth doing just because they were there and nobody had looked at them. There were, for example, issues and opportunities having to do with library performance measures and UC's computer-produced SDI (Selective Dissemination of Information) service. There were things like this that I could see that we could start working on as new tools to improve service, and performance measures for the libraries. Then there were little things that came up.

In the early 1970s, as I recall, some California court rulings came down that dictated that the state prison inmates had rights to reasonable prison library services and facilities to help them with their legal work. This immediately released some state funds to study this problem and prepare some model libraries and collections. Through some contacts by an interested Library School student, funds came to ILR in 1973 to do some of that study work.^{85 86 87 88 89}

⁸⁵ Marjorie LeDonne. (Winter/Spring 1973). "Summary of Court Decisions Relating to the Provision of Library Services in Correctional Institutions." *Association of Hospital and Institution Libraries Quarterly*. 9pp.

⁸⁶ Marjorie LeDonne. (Jan. 1974) "Findings and Recommendations". Vol. I. Survey of Library and Information Problems in Correctional Institutions. 88 pg. ERIC Report No. ED-095 842.

⁸⁷ Marjorie LeDonne. (January 1974). "Access to Legal Reference Materials in Correctional Institutions. " Vol. II. Survey of Library and Information Problems in Correctional Institutions. 89Pp. ERIC No. ED-095 843.

⁸⁸ Marjorie LeDonne, D. Christiano & J. Scantlebury. (January 1974). "Current Practices in Correctional Library Services: State Profiles. Vol. III. Survey of Library and Information Problems in Correctional Institutions. 68Pp. ERIC No. ED-095 844.

Some early work was also done by other Library School students and UC Library staff interests.^{90 91 92 93 94 95 96}

MB: There was one on studying errors in keying or spelling wasn't there?

CB: In data entry. There were a lot of data entry trial exercises because that's what people were doing these days. There wasn't a lot of keyboarding that had been done for library collections. There were cost studies; I think I told you that once that, "if you can't think of a good research topic, then count something, because you can always find something to count." We did a lot of that in the beginning; it was just finishing up some work I had been doing by myself, to do some library cost work – the cost of file conversion, acquisition, cataloging, and circulation control, et cetera. And there were models that I had developed for these processes, and I thought if I got enough people participating, then we would have major parts of some

⁸⁹ Marjorie LeDonne, David Christiano & Joan Stout. (January 1974). "Bibliography". Vol. IV. Survey of Library and Information Problems in Correctional Institutions. 28Pp. ERIC No. ED-095 845.

⁹⁰ Ken Weeks. (August 1973). "Proposal for a University of California/California State University and Colleges Inter-Segmental Machine Readable Library Patron Card." 21 Pp. ERIC No. 082 777.

⁹¹ Borut Dekleva. (October 1973). "Uniform Slavic Transliteration Alphabet (USTA)" 82 Pp. ERIC No. ED-086 164.

⁹² Barbara Nozik. (March, 1974). "The Use Status of Books Requested from the University of California, Berkeley, Inter-Library Loan". 11Pp. ERIC No. ED-104 411.

⁹³ William S. Cooper, Donald T. Thompson & Kenneth R. Weeks. (October, 1974). "The Duplication of Monograph Holdings in the University of California Library System". 32 Pp. ERIC No. ED-097 883.

⁹⁴ Charles R. Martell, Jr. (January 1975). "Interlibrary Loan Turnaround Time: A Study of Performance Characteristics of the University of California, Berkeley, Interlibrary Loan Lending Operation." 34 Pp. ERIC No. ED-104 413.

⁹⁵ Charles R. Martell, Jr. (July 1975). "Document Availability and Use Patterns at the University of California, Berkeley, Library: A Comparison with California State University, Sacramento." 34 Pp. ERIC No. ED-112 931.

⁹⁶ Barbara E. Anderson. (1977). "Urban Studies; A Study of Bibliographic Access and Control." 73 Pp.

pieces of cost figures built up and composed of the same pieces as the components of another system somewhere else. And I thought, sooner or later over the whole spectrum we'll be able to assemble a whole bunch of time and cost studies that anybody could use, depending on what kind of system they were working on.

So I think that some of my initial look-see around was with the idea that we're going to build up this collection of time and cost studies and that'll help with a lot of the guessing that people were doing with different systems. So that's where I started out, and I don't remember the exact progression of data collection from 1959, '60, '61 and so on. Some of that was SRI work scoping out systems for different people. A patent office needs to convert patent files. Well what's it going to cost to make the conversion? All kinds of stuff like that. One of my last ILR reviews was a summary collection of 63 plots of time and cost data from 300 publications that were found to contain some report of a library tech processing unit time or cost, with each data point normalized to constant 1967 dollars. This probably included most of the published English language library cost data up to the early 1970's.⁹⁷

I'm not sure that the Library School faculty ever really needed a research facility like ILR. I don't know who would need to have that structure in order to get that done, because in fact all of the people who were inclined to do it did not need the kind of big structure and overhead, and involvement, and lots of people. It's not like they're going out to dig up old mastodons or whatever; those research people really need a whole support structure with people and trucks and trains. But you did need an ILR to do R&D projects on behalf of the entire UC Library system.

MB: What can you say about your relationship with the University Librarians of the nine campuses?

CB: I got along very well with some of them. And maybe I'm just naive, or whatever. But I knew I was a different kid in town, from their point of view. I didn't have a traditional library background at all. Some of them I felt were probably very devious. I just didn't like the smiling cat approach of always hearing, at Library Council meetings... 'We've got some things to work out here, and we'll be meeting here for another hour or so, can you come back then?' I had a few meetings like that. I went to many UC Library Council meetings (of which the ILR

⁹⁷ CB. (June 1967) "Summary Cost Data from 300 Reports of Library Technical Processing Activities." ILR. 63 Pg. Report No. ILR-7702. Available from ERIC Report No. ED-140 871.

Director was a de facto member) and I thought they were very interesting, very informed meetings. But I didn't find out until years later that the real meetings took place the night before the scheduled meeting, and that hadn't been made known to me. Or if it did, it slipped up on me.

I started with a situation in which I inherited a facility at UC Santa Barbara and a facility at UCLA with staffs but no continuing budget authorization. And those had to be cleared up and tucked away because no faculty person at either location was interested in working with ILR to get any sponsorship for their research projects.

MB: The Institute for Library Research was originally headquartered at UCLA with a branch at Berkeley. And then eventually, all but an SDI service (which remained at UCLA), was abandoned at UCLA, effectively leaving the Berkeley subsidiary (the sole part) standing, more or less. But I don't know how that happened or why that happened except that I assume that Bob Hayes (the Director at that time) chose to focus on other things.

CB: Yes. He had a team of people at UCLA, and he had a team of people at Santa Barbara, and also at Berkeley on the UCUCS project. And I don't know why he started in all these places at the same time. He had a library project going on at Santa Barbara, under the direction of a man by the name of Fred Bellomy. But it was part of a large library system design, and he just never got the support to go any further with it.

MB: Alan Veaner was associated with Santa Barbara, but I think that was later on. He had been working on at the Ballots Project at Stanford.

CB: Yes. I remember him from Stanford.

MB: Probably at the time you were talking about.

CB: Yes. I was doing cost studies and other things for them including a project to dig out credible cost and overhead rates...

MB: Right; you mentioned this last time.

CB: So that's how I got to know Alan Veaner at Stanford. Okay, so anyhow, the two projects and their sponsors wound down at UCLA and UCSB, and then there were only the offices and staffs there by themselves. And then that disappeared into nothingness, as a vapor in the air. And there was no particular reason for ILR to be trying to get people to get projects going at Santa Barbara; and we couldn't keep Berkeley busy. Then gradually, little by little, projects came up and were do-able, and we got support from some Washington agencies, the federal agencies, CLR, NSF, and others. It gradually looked like we could manage, and could get

along. But after a few years it was clear that the writing was on the wall regarding the continuation of ILR as an organization. It was clear that the Berkeley administration had no interest in going alone in supporting the overhead and space on campus to keep this little Institute going. A committee was established by the UCB administration to look at ILR, and its conclusion was simply that there weren't that many faculty members using ILR as a base for their research, consequently, there was no need for the campus to support a place to serve as a host for library research projects; they could save the budget expense and regain the office space for other activities if they terminated ILR. It seemed clear after a while that there was going to be no way out of this, because there was just going to be a slow, quiet drop in the support that was needed to allow ILR to continue.

MB: This must have been around 1975 or so, because I think this happened before I got there in '76.

CB: Oh, you were there. As a matter of fact, I delivered my School of Librarianship faculty resignation letter to your office after the last Faculty Meeting of the semester. You then came storming into my ILR office to talk it over. But my mind was made up. It had been a good run, and a very delightful, rewarding 6 ½ years with a lot of good research, but I had decided that I should leave. I joined Lockheed Missiles and Space Co. Research Labs in Palo Alto as a Consulting Scientist on the development of their new online search service. That was in May 1977.

MB: Well, I came while ILR was still there. But my recollection is that the writing was on the wall before I got there.

CB: Probably so. There was well over a year advance notice that this kind of thing was going to happen.

MB: Actually, I tried to intervene, and was told by George Maslach, the Provost, that it was too late.

CB: You might have been too late coming in. But anyhow, that's the toss of the die, and sometimes it works and sometimes it doesn't work.

MB: Can you say something about the relationship between what was called ULAP, the University Library Automation Program, and ILR?

CB: Yes. But there's some pre-ULAP history that needs to be mentioned first. As I mentioned earlier, in addition to the establishment of ILR at UCB with the UCUCS book catalog

project, there was also a Library Systems Development Program (LSDP) Office established by the President's Office with an office and eight or so staff members at the UCSB campus under the direction of Fred Bellomy. At that office, the feasibility of undertaking a major University-wide LSDP was studied from July 1970 to March 1971. It was a given at that time that the librarians at all campuses wished to automate their operations in order to, "...1) improve the quality of library service provided to patrons; 2) to increase the productivity of the library work force; and 3) to substitute a centrally managed, nine-campus cooperative mechanization effort for the nine independent and often duplicate efforts".⁹⁸

The Final report of that feasibility phase noted that a significant investment, with a long break-even period, would be required to implement a proposed centralized computer system for the UC libraries, and that there was some push-back by campus librarians. It may have been that the President's Office decided then to postpone any such implementation, and stopped the funding of LSDP and its UCSB office. The UC Library Council apparently kept the concept alive, and convinced the President's Office about five years later to bring the project back to life, with the establishment of the University-wide Library Automation Project (ULAP), based off-campus in Berkeley.

ULAP was the real, live program that Bob Hayes had in mind when he first pushed to establish such a centralized system for the UC library system. It was to be a real, live operational program where they were going to throw tapes around, and do real production work on behalf of all the campus libraries, in a way that would make sense. It would be a well-designed centralized University library automation, top-drawer kind of a project. So when it was eventually approved, it had a big budget and it was going to live in the new online world. There was no possible way it could be economically justified in the beginning, but you just had to take it on faith that eventually this is the kind of price you're going to have to pay to play in this game (with the full on-line interactive access from all campuses and all that kind of new technology). And I expected that the University would hang in long enough so that it gradually paid for the cost of doing it the way in which it had been proposed, which was all on-line, and interactive, and costs be damned; it's just something you have to do. So, that's what ULAP was. Because the campus libraries wanted a solution to their problems, in terms of acquisition and cataloging

⁹⁸ Fred L. Bellomy. (April 2, 1971). "Final Report of the Findings of the Feasibility Phase". LSDP. UCSB. 95 pg. Report No. LSD 71-23A.

and getting things out on the shelf, plus circulation control, it just had to kind of go this way. It was an article of faith, I think, for many people to accept that. I don't know how many people ended up in that great big ULAP department by the time they finished putting it all together in a fully operational sense, or if it ever reached break-even. It must have been that all of the University Librarians and campus library systems people were now marching to this new tune. Clearly it got up and running after a while, and there was no going back. The campus online search services are very popular now.

Now let me move to another part of my ILR experience. In the summertime the campus kind of died down, and much of the rest of the ILR activity kind of died down with it. I had a UC appointment that permitted me to go away for the summer. I essentially had the summer off--so I took the time off to take some fun trips to work on some projects in Southeast Asia and Africa (East Africa, West Africa, and North Africa). My summers were all pretty busy.

MB: Tell me about those--or some of them. How they came up, what you did, what relationship there was between what you expected and what you found, and so on.

CB: Gee, lots of trips and potential trips. And this was all done at the invitation and with the support of national and international agencies. The first trip was to Indonesia in the summer of 1973. That's the one where I had the least idea of what to expect, what it's going to be like when you get there, and what you are going to be expected to do. It was different; it was different from what anybody had led me to expect to believe. You had to be careful with your water, and what you ate, and so on. I'd always seen Indonesia in the movies, in some British films, in which the British couple was always having drinks on the patio, and everybody's wearing dinner whites, and white shoes, and a coat and a tie, and that's the way I sort of expected it to be. And it didn't go that way. I received some valuable travel advice in advance from people who traveled to Java before me, and that helped tremendously, and prevented several major missteps. For example, when staying at country locations that used external wash rooms for personal bathing, do not get into the large cisterns that look like Japanese communal baths - - instead, use a bowl to scoop the water out of the cistern and pour it over yourself. And don't plan to wear a white suit and white shoes - - which is the way I had always seen people shown in the movies that were supposedly shot on location in the tropics in those days.

Indonesia was a memorable trip for me. It was my first overseas adventure, actually working in another country where English was a second language, with a decidedly different culture, and so

much to see and learn. And then there was the trip itself. Fly on Pan Am from SFO to Tokyo. Stay overnight there, then off the next day on Japan Airlines to Jakarta, Indonesia. The return home, roughly 2 months later, was by way of Singapore to Paris, for debriefing at UNESCO. I benefitted from a trip around the world that left me with a very good feeling to pave over any rough spots in the assignment itself.⁹⁹

The UNESCO staff who had invited me and had sponsored this trip, had planned support for three different courses there, each with a different type of audience – medical librarians, some regular librarians, and I forget the other group, but anyhow, three courses at about a month each, something like that. And, it was supposed to include all kinds of data processing, systems analysis, and new age kind of course content. The plan was to train these students to do some of these forward-looking tasks. And, oh, did I mention that the two instructors who were assigned to give these courses (myself and another fellow from Europe) had not met yet, and the courses were supposed to start in two days, or four days after we got there, half-way around the world. Then top that with the fact that after we got there our local host told us, “Gee, maybe we’re going to have to modify something”, and, “Oh, and while we’re at it, let’s do some extra lectures for some more medical librarians because they’re here and they’ll want to find out what’s new over the pond. And let’s have some more lectures for the people down at the embassies, because they all like an evening crowd, even if it’s about library automation or whatever. Maybe show them the wonderful things they can do; it’ll be an evening’s entertainment for them.” So some extra work was being dumped on us, and that’s what that place was like.

MB: Who was the other instructor?

CB: A fellow named Ivan Mistrik from the Max Planck Institute for Astronomy in Heidelberg. Fortunately, he spoke enough English that we got by; we could talk to each other, and if somebody gave us just two days to pull together some kind of a curriculum for the month, teaching all day for a month, essentially..., well, I guess we were macho enough to feel we could do it. Or maybe we each didn’t want to admit to the other person that we didn’t think we could do it.

MB: Who were the people being taught?

⁹⁹ No papers were written for this activity.

CB: The students of the National Library, National Lending Library, and the University Libraries, and some other special libraries in town. So it was really a “special library” crowd. But, were we going to teach computer-based circulation systems? Not much point to that, given their libraries’ very strict controls on releasing the actual library materials. How about on-line, should we teach on-line? No, because they didn’t have the equipment or communication systems to demonstrate or support any of that activity. And we didn’t have exactly complementary backgrounds, the two instructors, me and Ivan. But, we had to do something, and we worked rather miraculously at nighttime to actually write lectures. But because we didn’t know what lectures we were actually going to give until we got to Indonesia, we didn’t bring along any teaching aids or anything like that. That was hard to handle. It was a difficult position. But, it was extremely interesting in terms of what to see there and what life was like there. So I got hooked on it, and decided that there are lots of places around the world that I still want to see, and that started another five or six years of the same kinds of activities. They were really interesting trips and projects, in that time, and in those places of the world where things were kind of waking up.

MB: That would’ve been sometime around 1970...?

CB: Yes, The summer of 1973.

MB: Where did you go after Indonesia? What was next?

CB: It was Tanzania for the summer of 1974. Then Egypt and Ghana (1976), and many other countries (e.g., Morocco in 1985). China and Japan were visited later when I was working for DIALOG. There was some work in India, as well.

MB: Were these all UNESCO, or were there other sponsors?

CB: Different agencies. It started with UNESCO for Indonesia, then UNESCO again for Tanzania, NSF for Egypt, the National Academy of Science for Ghana, the Ranganathan Endowment for my week of lectures in India, and UNESCO and the Arab League for Morocco.

For my Tanzania assignment, I went in September 1974 as an individual consultant while employed at ILR, and in consultation with the Tanzania National Scientific Research Council. I visited Tanzania and advised on the establishment of a National Center of Scientific and Technical Documentation. This included giving recommendations concerning the required infrastructure, and advising on the requirements for equipment, accommodations, and manpower

as well as advising on a mechanism for cooperation with existing services such as the Tanganyika Library Service and the University of Dar as Salaam.¹⁰⁰

The next overseas activity was in 1976, and this was for Gene Pronko at the National Science Foundation. He arranged this project which started very soon after the end of one of the Middle East conflicts. As a matter of policy, the U.S. had decided to support the Egyptians with all kinds of foreign aid, and give them all kinds of technical aid from the U.S. I participated as part of a team to start this technology transfer process. Half a dozen of us were brought over twice to Cairo by the NSF to give a series of presentations. On each trip we had a week full of meetings with our technical counterparts where we in a sense said, “Here’s some good stuff we thought we’d share with you right away. There’s computer searching, data communications, and searching files remotely over long distances. We can also do a computer-based selective dissemination of information (SDI) service; we can do lots of good things here, and we’ll just show you a lot of this stuff while we’re here.” I also volunteered, on behalf of DIALOG, “If you give me some subject interest profiles... if you sit down with me while we’re here, I can write up some SDI profiles for you and we’ll run them at our place and send all that resulting stuff back over, and I think you’ll like it.” So we had that kind of technology transfer activity and that was most of it. That was good for a couple of trips over there, to try to lay the groundwork for some of the folks coming back to take our places, and see what else could be done. I also got very sick over there with dysentery on two trips; and once is enough; but anybody who went over there at that time ran the risk of catching something.

I was invited by the National Academy of Sciences to participate in a survey group for Ghana, as a spokesman of the non-Ghanaian members of the group, for a one-month survey in June 1976 of the information infrastructure of that country. This was to examine the existing information institutions and mechanisms, with particular attention to those serving health, agriculture, industry, and the sociotechnical requirements of Ghanaian users. The group was also charged with identifying the missing elements and requirements of a comprehensive information system that could reasonably be created and installed in Ghana, and would meet the needs of the

¹⁰⁰ CB. (Sept. 1974). “Planning for a National Research Information Centre”. Paris. UNESCO. 23 pg.

country.¹⁰¹ I wasn't able to find any of my Ghana documents for this interview except the invitation letter to do the project. I unfortunately had a water leak at home several years ago that destroyed about 20 boxes of my archive records.

MB: What do you remember about the results of that study? That reminds me of a study done of library automation in India where a consultant came back and said their manual typewriters need an upgrade.

CB: I can understand that. I've made several trips to India and I've seen what they have to work with, but I also know that they have their own NASA, and they have very advanced libraries in some places, but very simple ones in others. True enough. They also have a history of very advanced library and information theorists such as Ranganathan, and a very keen interest in these topics.

I was honored to be chosen to be the Ranganathan Lecturer in Bangalore, India in 1978. I had seen Ranganathan from a distance when he was here in 1958 to attend the International Conference on Scientific Information in Washington, D.C., but I had never met him personally. I knew of his international stature as a library theorist and practitioner (e.g., his "Five Laws"), and knew that he had passed away recently. So when I was invited to go I knew that this was an important thing to do, so I did it. After I got over there, I was very politely told that I was expected to produce a book while I was there; ("Everybody does it; didn't anybody tell you?") and that comment was followed by, ... "Oh, and I wish, I hope you'll be able to talk to the American Club in Bombay, and I hope we can arrange to take you around to three or four or twenty other places to have you say some words, lay some words on the people, while you're here, and also, yes, we'll be looking for this small volume, it needn't be a big volume." I planned to be there perhaps three weeks, and, so I started to work right away. I knew nobody could do this for me; they're not asking anybody else to do it. "So I'll do it." And I did. I wrote five lectures, and gave them during the week. They subsequently arranged to have them keyboarded and then kept on through their production process to turn them out as a publication

¹⁰¹ No formal publications were prepared by CB for this activity.

of the Sarada Ranganathan Endowment for Library Science. That's how that turned out.¹⁰²
These are things that can chew up your own personal time in a powerful way.

MB: I want to go back to ILR, and what happened to it, what happened to you, what led you to move on, and so on.

CB: I'd be happy to. At the time that I could see that all the pieces were going into place to close ILR down, I found out that a committee on campus was looking at the feasibility of continuing it (ILR), for whatever reason, and I met with the Chairman of that committee. I couldn't see any real support for ILR coming out of that review, so it was clear to me that ILR was going to wind down, and I would have to look for another job. And that's what I did. I looked at what was closest to home in terms of work that was interesting to me. And that would be Lockheed, as a possibility – either SRI or Lockheed, to go to either of those two activities. They were both within a couple of miles of my home in Menlo Park. That then allowed me the luxury of saying to Cal, "It looks like we're finished with each other. You're finished with me, so I'm finished with you, and we'll go our merry way." And that's what happened.

I made inquiries about DIALOG, and it was at an even more primitive stage than I remembered it, or thought of it. It turned out to be just a project going on at that time, at the Lockheed Research Lab in Palo Alto. This was not a big online search service as such; it was just a project that was being run for a couple of federal organizations, NASA and the U.S. Dept. of Education. Lockheed was running a project to spin databases to permit online searches by these clients, on the computer search system that Roger Summit had established at the Research Lab. He was continuing to find funding for it, and continuing to find clients who wanted to run searches on their own tapes. He was running the NASA tapes (the two sets of databases for NASA – one for the report literature, and the other for the journal literature), and they were getting a fair bit of activity from the NASA librarians. He was doing the same for the U.S. Office of Education database and the ERIC (Educational Resources Information Center) librarians.

Roger grew this little seed within the Lab, which continued to support it and help it grow, getting his own cost center established within the Lab, and building the software that they needed

¹⁰² CB. (1980). *Technology in Support of Library Science and Information Service: with Particular Emphasis on Computer-Assisted Reference Service*. Sarada Ranganathan Endowment for Library Science. Bangalore. 78 Pg.

to run all the fringe parts of it. For example, they had to have software to compute how much to charge and bill the people who would use this service, and that issue led to a whole suite of accounting software that they had to put together. This meant password control, charging by connect hour and by printout, for people who wanted information from these databases. I'd worked with Roger Summit recently on an ILR project, but also some years previously on different professional society things and other activities, and "just being in the neighborhood" I told him that I was tired of commuting to Berkeley, and I inquired about the possibility of a position in his new organization. I got a positive response, and that took care of my next 15 years of employment.

I've been back to Berkeley a couple of times since, but nothing draws me the way it used to. I think that's just part of the crowd that's there, and the difficulty parking, and all that stuff. You can't park on campus anymore, can you?

MB: No. There's very little on the campus, and it's a pain around the campus. Tell me a little more about the teaching you did. Because you taught classes and workshops. I was thinking in terms of teaching at Berkeley, and then also your sessions at Santa Cruz. Talk a little about the need, how you met it, who took them, and so on.

CB: In 1963 I was invited to teach a course in Berkeley by UCB Extension Services; I was the sole instructor. In 1971 I planned and coordinated a workshop at UC Santa Cruz which then grew to series of 15 summer workshops there from 1971 -1973. I also taught several of the classes in most of those workshops. Workshop topics included:

- Mechanization of Library Technical Processes
- Computer-based Library Circulation Systems
- Computer-based Library Serials Systems
- Computer-based Library Book Catalogs and Bibliographic Databases
- Cost Analysis of Library Operations
- Library Cost Analysis and Fiscal Management
- Library Management
- Contemporary Management Issues in Academic Libraries
- Library and Information Services for Prison Populations
- Serving the Unserved.

People who taught with me for my UC Extension classes were all friends of mine that I knew to be very knowledgeable in their specialty fields and also good teachers. I assembled and prepared all of my course content and teaching material. I tried to do everything with a Kodak Carousel slide projector, because that was the easiest way to arrange and display good material. This of course was well before the age of the PCs, tablets, or computer projector mechanisms. It was an advanced approach for its time; it was even difficult to find suitable arrangements in the Berkeley classrooms to use this equipment (e.g., is there something to put the slide projector on, how close is the nearest power plug, what wall to use for the screen). I always took my teaching seriously. I did not want to be sloppy about my work, so I always prepared good material and kept it up to date. Whenever I saw something that made the point better, I'd change that as well. So I had a continuous change of content in terms of how I could be sharper, better, or make the point better. I'd always enjoyed teaching. I had in fact already been a teacher during my military service, and that required me to complete a formal several-week Navy class in teaching techniques. I just enjoyed sharing my knowledge with other people. I even taught a Basic Electronics course at a Southern California Community College at age 22 with only my high school credential. If I were to count my time teaching all of the judo classes in Cal's Athletic Department for the four years that I was an undergraduate student there, I've probably done more than 11 years of formal teaching. So, teaching was something that I took pride in. And then it was over. But I don't particularly miss it now. Okay, what else?

MB: You had some interaction with doctoral students. I assume that was mainly as employees, keying or proofing, or whatever.

CB: Mainly as research assistants.

MB: Yes. And some of those were working on dissertations, and probably benefited from your experience in some cases. What do you remember or can say about any of that?

CB: Almost nothing, in the sense that there were only a few people who seemed to have enough smarts to do some of these research projects, and be a real help in that regard. Barbara Anderson and Jo Maxon Dadd (now Jo Maxon. Jo Maxon was her first married name, and Dadd was the name of her second husband, I believe) were spectacular research assistants, and they both came to join me for many years at DIALOG. Marcia Bates was another great research assistant. Other good RAs were Judy Todd, Dale Reed, Margaret Buss, and Larry Legard. MB: There was somebody called Jo Robinson. Is that the same...(?)

CB: Jo [?]. Yes. Her name was Jo Robinson at that time. (?)

MB: Okay. I remember Barbara Anderson. I knew her better.

CB: She later became the editor for all DIALOG publications—a major job, considering all of the user manuals and search aids for hundreds of databases.

I was never asked to supervise any dissertation projects. This also contributed to my feeling that I was never a part of the “real” faculty.

File 15 Working at DIALOG

MB: It's February the 2nd, 2012, and it's 2:55pm, and so this is our second recording of the day, and Charlie Bourne is going to talk about how he came to be at DIALOG--Lockheed Dialog--and what he did, and so forth.

CB: Okay. Well, I went to DIALOG because I ran out of things to do at ILR at UC Berkeley; i.e., ILR ran out of campus funding and support. And that turned out to be a good move for me; I formally retired 15 years later from DIALOG. DIALOG was a good place for me. It had a great combination of challenging marketing and licensing issues, and technical issues; we were always trying to solve some puzzle. For example, as a growing organization, we were always just running out of something, like running out of a pool of customer passwords. You'd think that you wouldn't run out of some stuff like that, but you did. To begin with, we only had a small number of customer passwords stored in our programs, and we never thought that there was going to be so much use of DIALOG that we'd need more. After all, it started as a really special service for half a dozen people in the libraries of the Office of Education and NASA, but DIALOG staff kept making the service better, and allowing things to be done that couldn't be done otherwise, and they kept moving productively in several directions. When the DIALOG online service started, it was up for online searching only two hours a day, and then it was four hours a day, and then eight, and sixteen, and pretty soon it was just about twenty-four hours a day that they were available for online searching. It had to be available for those hours if it was to provide international service. But in those days it also had to be down for a few hours per day to do file maintenance work. And then the number of simultaneous users (and need for different passwords) kept increasing, getting larger and larger. And the number of files and required file storage space, index space, and user working space started getting larger and larger.

The accounting software also went through some changes, going from a few big customers with a small number of users, to adding a large number of small customers, each with a small number of users.

MB: There must've been relatively little prior experience in a service of this kind, anywhere.

CB: Yes. But what can you do? For potential database suppliers, and that was my primary area of responsibility, there was a lot of, "Well, I don't know, we can certainly put your file up so that you and your branch offices can search it. And maybe we'll sell you six hours a month, or some number, whatever you want. We'll just price it on the basis of so much per connect hour. And since you're giving us the file to put up for your use, we shouldn't have to pay you any royalty for its use; it's for your service; but maybe you'd like to let some other people use that file, as long as it's there. I mean, you're already paying for it for your own use, so you could make a lot of people happy, and provide a public benefit, if you let other people search your database. That would please a lot of people." And they'd often answer, "Sure, okay." And I'd typically answer, "So why don't we work up some figures and a license agreement, and see what we can do?" And that's how the service started; it just started as a particular online searching service for a couple of government agencies and their databases. It's not really a big job these days to search a database online, but it is if you try to do it for a lot of people all at the same time, and provide any necessary accounting records for user billing and license royalty accounting, then you have some work to do.

Well, I joined DIALOG and Roger immediately started me out as the Vice President of something. I think he just said Project Planning, and then that started a big food fight with two other fellows there who then in charge of particular subject area databases. So now there were the three of us, with just the three of us in charge of all the files on DIALOG, and that continued for the next 15 years before I retired. We each were individually responsible for acquiring, licensing, loading, developing user documentation, and maintaining all the databases in our self-defined topical areas. One of us had chemistry and allied areas, the other had the business sector, and I had all the rest (science and technology other than chemistry, social sciences etc.). My sector was the largest and most profitable of the three sectors. It was fun, but at times it could be hectic. Imagine having update or license renewal meetings with all those suppliers, as well as planning the file treatment and maintenance of all those databases.

The DIALOG service started with two databases, and grew as fast as it could, in all our separate product areas, and pretty soon we had hundreds of files. And it just got bigger and bigger and bigger. Technology changes forced some in-house competition and consideration of changes beyond the simple online model, particularly because of the eventual availability of databases on CD-ROMs and PC searching on the web. Now our database suppliers had the option to provide their databases on CD-ROMs and essentially go into competition with us because we didn't have any CD-ROM licenses or capability. Consequently, we built up our technical capability to get into the CD-ROM business. The consequence of that new capability was that we could now publish CDs and their updates, and it's not just online searching anymore, it's also publishing. But that complicated the process of such things a licensing, file treatment, marketing, and support to the database supplier. When Lockheed, DIALOG's parent organization, saw that DIALOG was now looking like a profitable subsidiary, they hired a Wall Street firm to look for a suitable buyer, and after a number of interviews they sold us off to the highest bidder, Knight-Ridder, the newspaper firm (publisher of the San Jose Mercury).

That was the first purchase, and then DIALOG was sold again over the course of several years. This was an interesting world now, because now we were becoming a world-wide name, we did business world-wide, and we eventually had field offices in Germany, England, Hong Kong, and Japan. So we were moving right along, with some independence from the tight controls of Lockheed, and things looked more and more interesting every year.

But "interesting" also included running into several competitive low-cost, online services, and they made life difficult for us, for several years, particularly in the medical field. (There are parallels here with the low-cost airline industry.) The medical market was a very difficult market for us to sell into. The National Library of Medicine (NLM), with their own online service and database, was using all their tools and techniques to keep a tight hold on their own users in competition with the commercial search services. There was always the question of whose users were they? NLM made life difficult for us by initially making their online service free or low-cost to medical libraries, and refusing to make their database available to DIALOG or to the SDC ORBIT search service. They rejected our arguments that in the public interest, they should provide us with a royalty-free license so that as a public benefit we could expand the total world-wide availability of their information at a low cost to the users. They also rejected our argument

that they shouldn't be in a subsidized competition with the private sector; they had strong allies in Congress and they rejected that argument as well.

When we were eventually able to license their database, it's terms were such that it made their own online service available at a user price much lower than DIALOG could afford to match. But because pharmaceutical companies were a big user base of ours for other relevant databases, we really needed to provide the NLM database as part of our core package to them. Also, as a condition of the license agreement, NLM required us to do an annual reload of the entire database in order to incorporate some indexing changes that they would make annually to their retrospective indexing – a very computer-intensive process for us.

But again, this life at DIALOG was clearly very interesting. This story may be out of sequence, but I'll tell it just to make the point, and to describe some of the primitive technology of the time. In 1976 I was the first person ever to do an online search in Cairo. As I mentioned earlier, I happened to be there on an NSF assignment, a member of a U.S. – Egyptian Task Force on Technical Information Problems, to discuss new technology with a group of Egyptian officials. While there, I was asked if I could demonstrate online searching to the head of the *Al-Ahram* newspaper so that they could see some of these cutting edge things that were really happening. As an aside, for this trip I had been tasked to tell people about some of the new things that were possible, but not necessarily to show them anything. I told the *Al-Ahram* people that I would do it if they provided the data communications equipment and someone to operate it; they agreed, and I agreed. It was to be done with the Telex lines (at 15 char. /sec) out of the *Al-Ahram* main office to connect to DIALOG in Palo Alto, CA. Faster speeds were simply not possible there in those days. This was difficult to do. We had to use Telex lines to get out of Cairo, but this was shortly after one of the Middle-East conflicts, and there were only two lines leaving Cairo for anyplace around the world that you might want to go to. And so as soon as you'd dial into your Telex machine to get a line out of the city and out of the country, you'd get a busy signal because many other people were trying to get on those two lines. So you'd have to keep dialing non-stop to finally get past a busy signal. It took about a day and a half to finally get a line and get the search done, and it made a picture story in that paper.

A related issue was that a hoarding culture soon developed in which as soon as a Telex line was captured, the person using the Telex tried to keep the line intact, and to continue to use it for a series of tasks before the line somehow got pulled or dropped. So keeping

communication lines on and being able to keep the line productive (I'm rambling on but I'm remembering these things as I go along), you'd like to be able to make sure that once you started searching, you kept searching, and didn't lose anything, like a line coming down. In later years, it got to be a given that, "Hey, it's no problem, we've got your telex, we've got your lines, whatever you want; you shouldn't have any problem getting any searching done." But that was a big issue for many customers in many parts of the world, "I'd like to get more lines, but all we can do is just work with these three that we've got right now."

Time just flew by. I would go to London every Christmastime for the International Online Information Meeting, one of the trade shows held every year in downtown London. DIALOG helped get that trade show established. Because I was in charge of so many of the databases, and I had to negotiate and re-negotiate the database licenses with many database suppliers, or just meet-and-greet with my suppliers, that was always a busy time for me. For me, it would be a circus, with perhaps 30 overseas suppliers that I should see at the meetings there. I didn't often have a chance to meet them except at this meeting because they were overseas, but I had to keep up with those contacts and loyalties.

Negotiating the database licenses was always a game, a battle, to keep the database costs down for the users, because some of the database suppliers really did jack up the prices every year, and you're always wondering how far this can go. We see this today with the TV networks having to battle the ever-increasing license charges for the football and baseball games. There would always be somebody with a very popular database who wanted to increase their royalty rates, and that was a problem: to negotiate the increases downward to keep those new rates in hand and approved by my management. With a short turnaround time we then had to prepare new price sheets and newsletter text to coordinate with the dates of the effective royalty increases. New DIALOG prices came out every year after the London conferences. Anyhow, London was always a good time. I don't know where the DIALOG service is these days.

MB: One hears a lot less about it.

CB: One certainly does.

MB: In your day, it was all over the place. Were your competitors SDC, and/or Battelle, or were they not really competitors, or what?

CB: It was Battelle in the beginning, but then it wasn't. It turned out that the terms of the will that established that research institute (Battelle Memorial Institute) and its very significant

funding (from the basic Xerox patents) didn't permit them to be a commercial organization or compete against the commercial sector. So they never really turned out any kind of pricing or searching package that made sense. They were always trying to work on a barter system - - working to solicit gifts or grants in return for search time. And so whenever they were sort of getting away from the terms of their enabling will, some of the will-watchers would run some numbers on them and they'd have to give up their offering, whatever it was.

So it was really just SDC to start with. And very good competitors they were. Very good, very strong, very straight competitors. And then a third service, BRS (Bibliographic Research Service), joined this cat and mouse game with the National Library of Medicine. As mentioned earlier, for several years, NLM refused to make their databases available to DIALOG or SDC, even though SDC had already loaded those files and provided the initial NLM online search service. BRS was a kind of a renegade outfit running in competition with everybody - and they just low-balled the price and made it difficult for other organizations to run the NLM tapes as a search service.

BRS was incorporated in January, 1977, with an office in Scotia, New York, owned entirely by two individuals, with no venture capital, just the advance subscription fees of their initial 150 customers. It was an outgrowth of the SUNY Biomedical Communication Network (BCN), a commercial spinoff of a non-profit academic network that was facing an uncertain future. It started as a commercial venture by two people from that academic system, but positioned itself and branded itself as if it was the good non-profit going against the ugly commercial firms (DIALOG, SDC). That was a misrepresentation because they were definitely not a non-profit organization. That approach resonated with their inherited academic librarians and medical librarians. They leased computer time from a manufacturing organization in their area, and obtained the NLM database on what appeared to be an exclusive and royalty-free license with NLM. BRS was eventually acquired by a major European company with deep pockets, Thyssen-Bornemisza, that then helped transform BRS into a major competitor.

To go back to the annual London conference for a minute -- I was thinking every year that I'd go back to that conference and everything would be pretty much the same, except growing--business was always growing--and then finally I got tired of scratching around and doing the same old thing and I just simply retired. There were no loud cheers or fireworks or anything like that, it was just simply time to get out, and that's when I got out.

MB: Do you recall what year that was?

CB: 1992.

MB: But you didn't stop when you simply retired.

CB: No, I didn't stop. I started doing things that I wanted to do. I had gotten interested in doing more of things having to do with my city of Menlo Park, so I got myself on the Transportation Commission, and all of a sudden started reviewing and voting on projects and Environmental Impact Reports (EIRs), and things of that nature. And I became fairly adept at reading EIRs, and critiquing them. I became an engineer again. I did that for six years. And then I worked as a local resident to battle some of the plans of the city

MB: You've also been active in your church too?

CB: No, not at all. Not for many years.

MB: So that almost brings us up to date.

CB: You could say that. Probably so. There's a lot more of the overseas work for UNESCO and all; I've got to dig that up for you.

MB: We've also regrettably... it would be nice to go back to the beginning with the tape recorder working.

CB: That would help. (CB later added a preamble section with some early bio information.)

MB: We're in some danger of knowing how to work it, now.

CB: [laugh] Okay. I'll take that as a given. That may be about all we can do for today.

MB: Yes.

File 20 American Documentation Institute (ADI)

MB: It is February the ninth, Thursday, 2012, and it's 1:33pm, and Charlie Bourne is going to talk about ADI and other matters.

CB: A professional society is an interesting thing; when you start out in a profession you may not really know which professional society is appropriate, or best for you or good for you. I guess for some people in a profession it's clear that you want to belong to the AMA, or you want to belong to the American Chemical Society, or whatever. But for me, it wasn't always that clear, and I had changing interests. I was working in electronics in 1952 (on Terrier guided

missiles for Convair, and radio direction finders for tuna boats in San Diego), but without any college work yet, so I joined the Institute of Radio Engineers. Then, in 1958, after graduation from UCB, I advanced to the grade of Member in that organization. In 1966 I was advanced to the grade of Senior Member in the Institute of Electrical and Electronics Engineers (formerly the IRE). In those days I was reading the papers of that profession, and kind of pretending that I was, in fact, working as a traditional electrical engineer. But after UCB graduation I also belonged to the Association for Computing Machinery (ACM), because I was involved with computers, and doing computer work. And a couple of years later I belonged to the National Microfilm Association (NMA) because I did work in that field. I had split issues with regard to training and professional allegiance...where should I really focus my energies? Split loyalties were nothing new to me; as part of my pre-professional working history, I had been a member of the Teamsters Union, The San Francisco Newspaper Guild, and the International Brotherhood of Electrical Workers!

In my early years at SRI I heard about, and started attending some local meetings of the American Documentation Institute (ADI), and that led me to many new local contacts. But it wasn't until years later that I really got involved and went to a national meeting of ADI.

Initially, I got involved with ADI because they had planned to hold their annual meeting in Berkeley in 1962. So we, as the closest local chapter, had the responsibility of putting the program together. I think I had the responsibility for the technical program at that time, but I don't have any documents to support that.

MB: Do you recall what year that was?

CB: I believe it was 1962. Bob Hayes was President in 1962, and Pete Luhn was President-Elect for 1963 and responsible for the 1963 annual meeting. Unfortunately, Pete died the following year during his term as ADI President.

So that's how I got more involved with ADI, helping with the technical program for a conference. And that was kind of fun, and I got to know some nice people during that activity, and so I thought, "I'm going to stick with this group, because they happen to be involved in some of the issues that I'm interested in, and it's a nice bunch of people, so I'll just continue with this group and see where that leads me." Well that led me to a number of things. It kept me moving in those circles, locally, that had some of these people, but it also got me involved and interested with a number of other people at the national level. And one of the things that ADI did very well

for me was to facilitate contacts with a lot of very interesting, very sharp people throughout the years.

Pete Luhn of IBM was one of the most interesting persons that I met through ADI. Pete was an interesting character all by himself, in the sense that he was a German engineer who had come out of the traditional school of inventing and developing things; he developed gasoline pump gauges and weaving machinery. He developed some tools for different kinds of counting, and he was moving into digital techniques all that time. At IBM he invented some equipment to do some searching of IBM punched cards in unusual ways, like the IBM 101 Rapid Selector. That was the name of one specific piece of equipment of his. Anyhow, he got quite a bit of press for himself and IBM for some novel, one-of-a-kind pieces of IBM card searching equipment. This was equipment that he designed to operate in a way that was quite different from the normal IBM card equipment; he was looking for different combinations of punches in the card rather than the traditional IBM coding. At that time he was famous for being the person at IBM with the most personal patents. He also introduced some ground-breaking papers on automatic abstracting and computer-produced indexes.

Well, anyhow, when I worked as a member of the Publications Committee for Pre-prints and Proceedings for the 1963 Annual Meeting we had this annual discussion, I forget exactly how it went, but it was always along the lines of, "Why can't we print the proceedings in advance of the meeting? Why do we always have to wait until afterwards?" And so, because Pete was responsible for this conference, he started working on this issue, and what he eventually ended up doing was computer-based photocomposition - - generating computer tapes to do photocomposition and type-setting of the annual proceedings before the conference. This was done by keypunching from the manuscripts, processing on an IBM 1620 computer, and typesetting on a Linotype machine. The computer tape was then made available to any interested searchers. In so doing, he produced the first set of computer-produced conference proceedings that ADI had ever put together, and probably the first of any other organization. I'm not sure what the claims could be for that. This was done as an ADI Development Project with some NSF support. Pete, unfortunately, passed away the next year; the Proceedings for the next year (1964) paid homage to him, were partially computer-composed, and began the series of ADI conference proceedings as Volume 1.

Anyhow, here I was working with people who were putting out their first of a planned annual review publication (which continued with a 45-year run until its 2011 edition) and a group who were doing a pioneering computer-based photocomposition project for our proceedings. That was a pretty interesting group of people to work with.

I started doing more volunteer work for ADI, and that was very interesting. I served as the Editor of Literature Notes, an abstract journal in the back of ADI's *American Documentation* publication. It was my job then to monitor the journal and report literature, and books being published. At that time that I was working on a number of major projects at SRI having to do with large information handling systems, national information handling systems, and new technology for searching information, and I was able to put a lot of this encountered report literature into the back pages of *American Documentation*. And it was kind of interesting to have all these new books sent to you from the publishers. That went on from April 1964 through April 1965 when I transferred this responsibility to Burt Lamkin of IBM. That exposed me to a lot of activities, a lot more people, and a lot of publishers.

In November 1968 I was elected President-Elect of ADI for 1969; that position made me responsible for the 1969 annual meeting in San Francisco, also moved me automatically to President for 1970, and Past-President for 1971.

In mid-1969, Joe Becker, the President before me, thought that there were a lot of things alike with ADI and the Special Library Association (SLA), consequently we probably ought to merge the two organizations, because there would be something to benefit both parties by doing that. So, he decided that it was going to be my job to somehow pull this merger off. I made many trips to the east, and had many meetings, and many discussions, but eventually nothing came of it. We polled both memberships and it looked like the groups just didn't want to merge together. But that was an interesting exercise.

We also worked around that time to hire a full-time Executive Director for ADI, to replace the practice then of working on a contract with an individual who served as Executive Director of two or three separate organizations, operating out of the same office but simultaneously serving as the Executive Director of multiple organizations. We thought it was time to break the umbilical and leave that one-out-of-three situation and establish our own salaried Executive Director who would be working full-time on behalf of ADI. That was a major leap of faith (financially). That person and a new staff would be doing more of the work of the

annual conventions: organizing the sale of booth space, handling attendee registration, and all those kinds of things. That turned out to be a good decision.

MB: Do you recall the name of the first Executive Director?

CB: The first one on salary... I do, it was Herb Koller, serving as Executive Director, starting in October 1970; that choice and transition effort also happened on my watch as President. He was followed by Josh Smith in 1973. And we also worked at that time to provide a Group Life Insurance Plan for our members.

MB: It was just the right organization for you at just the right time. And you for it.

CB: Absolutely. A lot of things worked to my benefit because of ADI. And I continued serving the organization in a number of ways.

I must share with you one more ADI story, about when I went back to the 1965 annual meeting in Washington, D.C., on some ADI business. I got in really early and had some time to kill, and so I went to look at the exhibits, and there I saw in one of the exhibit cases the bowl that you see on my bookshelf-- it was sitting in the display case with my name on it. And I thought, "This must be something interesting. I'd better walk around then come back and look at it and see if it's still got my name on it." And it did. It was the ADI Annual Award for Outstanding Contributions to the Profession. I was flabbergasted. Absolutely Gob-smacked. It turned out that nobody had thought to call me ahead of time and see if I was going to be there, or tell me that this was coming and that I should be available, or stick around for the dinner meeting, because there might be some value to it.

MB: They might've known you'd registered.

CB: Yes, they may have known that, but they didn't know if I was going to leave early or not, or go out for dinner somewhere else. So, that was one of the fun things that came along with ADI and my early work. The fact that I was the first living person to get it (the Award of Merit) made it even more interesting. All the prior recipients had received it posthumously. And that's what happened.

Okay, maybe one last thing about ADI. The computer field used to have its own national conference activity, located in some cities on the west coast and some on the east coast, (the West and the East coast Joint Computer Conferences (WJCC) and EJCC), also known as the Spring and Fall Computer Conferences (SJCC, FJCC), respectively, both for the computer folks and the engineer folks. The technical program on the west coast, and I assume also for the east

coast, was put together, and shared, in terms of support and activity, by several professional organizations. The umbrella organization was the American Federation of Information Processing Societies (AFIPS), with several institutional members. ADI was one of the members, the IEEE--the engineers--was another one, and the Association for Computing Machinery was the third one. There might have been a fourth, but these are the ones that I remember. I was designated to be the ADI rep for working with the representatives of the other organizations to coordinate the planning of the technical program for the 1968 WJCC in San Francisco. A group of four of us locally, one from each of these organizations, gathered together at SRI to plan the technical program for the west coast—the Western Joint Computer Conference. And one of the things that I had to contribute was to say that (because I had recently left SRI, and I had recently worked with Doug Engelbart)--I said, “I can arrange to get Doug Engelbart to give his demo of his text editing program, and all the useful gadgets he has, like the mouse and the right- and left-hand stenotype input and control devices, and show all the attendees how we can do all these wonderful things remotely, at the conference, by teleconferencing to SRI in Menlo Park. It makes a great demonstration.” And they said, “Okay,” and I got Doug to commit to do that. I served as the chairperson for that session, for the 1968 WJCC conference that was held in San Francisco. And it just made a whiz-bang show, as widely quoted later, as the “Mother of All Demonstrations”, with Doug receiving a standing ovation for what he did there.

MB: It's historic.

CB: Yes, it is. And there's video out there of him doing that session, and it's remarkable with all of the things that he was able to do for that group. But to do that, he had to park two AT&T or Pac Bell antenna trucks up at the top of the Skyline Highway and then beam signals from SRI to Skyline and from Skyline down to San Francisco to the conference location. And he had to get an NSF grant just for that data communications segment of the demonstration. And he used a special large wall-sized display screen to show his real-time images. This was the state of how things were at that time. That was some more people-meeting activity on my part that revolved around my professional society activity. That was good, and that's maybe the last thing I've got to say about my ADI/ASIS connection except to say that they never really took hold here in the San Francisco Bay Area after that, with regard to chapters. There was always a kind of unmet need. L.A. had chapter meetings and was busy, but the Bay Area could never muster together anything like that.

MB: There was an ASIS&T meeting, I believe, an annual meeting, national meeting, in '69, in San Francisco (CB Note: True.), and I think that may have been where I first actually met you, at a chapter meeting in Oakland or somewhere.

CB: That was probably Berkeley, in 1962 at the Claremont Hotel.

MB: Okay, yes.

CB: It had a theme of paper monkeys or something...

MB: I went to a chapter meeting at which Hal Borko for sure, and maybe you, I think, were talking about plans for a forthcoming ASIS&T annual meeting to be held in San Francisco.

CB: Okay. That would have been plans for 1969. Hal was President in 1966.

MB: That's about all I remember about it, actually, I don't know whether I was a speaker or what, and I was all jet-lagged... The room had a grand piano in it.

CB: I remember that. Were you hamming it up on the piano?

MB: No. But I do remember that. It's funny the things you remember.

CB: Anyhow, that's about it. Except that one other connection I had with Doug, I think I mentioned this in one of the earlier sessions, is that as part of his Augmented Human Intellect Program, one of the other things we did was to develop, and demonstrate the first online search system. And that's a significant event, but he never made much fuss of that. And SRI never mentioned it, I suspect because it was overshadowed at that time by his other AHI tools. But it's a historical thing that should be noted somewhere, besides in here. Okay, now I think that probably does it for the ADI stuff that comes to mind.

File 21 Fun Projects

MB: It is February the 9th, Thursday, it's 2:05pm, and Charlie is going to resume after we've just finished a break.

CB: You asked for examples of a fun kind of project. The following examples were fun projects and of major interest to me. The first was a series of National Agricultural Library (NAL) studies. I did research work for each of the national libraries, but NAL was the funnest. In this case the NAL management wanted to know how its major publication, the *Bibliography of Agriculture (BofA)*, was doing. As I mentioned earlier, *BofA* is a major periodic bibliography (no abstracts) providing worldwide coverage of the field of agricultural R&D, which has been

going on for many, many years. The Head of NAL at this time wanted to know how their publication was doing.

MB: Do you remember the name of the Head?

CB: John Sherrod was the Director of NAL from 1968-1973.

I recall now that this is redundant with a conversation we had in File 13. But to recap briefly, what we did was to draw a sample of over 5,000 printed citations from the *BofA*'s 1967 issues, and convert them into a computer database. We determined the time lag of coverage by the *BofA* from that sample of *BofA* citations. We determined how complete *BofA* was, by independently taking separate secondary review publications for the same time period, and presumably relevant to the *BofA* coverage, and looking to see the extent to which the citations in those separate, independently-compiled review publications were in fact covered by the *BofA*. To determine the *BofA*'s overlapping coverage with other secondary services, we looked to see how many of those 5,000 citations were covered in 15 other major secondary services. And we found that some of the sample citations were covered by two services, some by three, four, five, or six services; and so we soon had an estimate of the relative coverage of *BofA* and the other services. Then we did a study to compare the indexing of the *BofA* sample citations to the indexing of all matching citations in 15 other secondary services. Using these identified duplicate coverage citations, we now had some specific information with regard to what the indexing statement was for the same original article from different services; that is, what did the indexing look like for the same original article from the up to six different services that reported it? And that was kind of interesting, something that we hadn't seen before this study. And then we did a similar kind of study to see what kinds of areas these 15 other secondary services covered, in common with *BofA*.

So those were three studies of this major indexing service, and this was something that I wanted to do more of. I was thinking in terms of regular analysis and reporting in the national interest in obtaining improved coverage and operating efficiencies, at least for the federally-funded secondary services. I had in mind trying to do this kind of thing for all the major secondary services, and developing and maintaining a continuing reporting of the state-of-art of the major secondary services in the sci-tech field – kind of like the Nielson reporting service for the TV and advertising industries.

MB: There are interesting methodological problems involved in doing that. I was doing very much the same a year or two later in England, looking at library collections, and how far they acquired the same stuff. Structurally, it's very much the same problem. An overlap.

CB: Agreed. And we tried to do the same thing at ILR for some of the UC libraries, and wanted to do more of that. That was good.

The next project that comes to mind is the National Drug Code Directory. The FDA came to us in 1968 because at that time they did not have any central database that had all the information of the drug product package inserts then in general circulation with the drug products - the little wads of paper that get shoved into each of the paper cartons with prescription drugs - the FDA didn't have a readily available file of those consumer notices, and they didn't know what they looked like for all of the drugs that they approved. They didn't have ready access to this information throughout the headquarters and branch offices for staff members. And so we made this database of package inserts for them to publish as the *National Drug Code Directory*. That was another one of our database production jobs.

There were six years, '73 to '78 when I worked with the Hawaii State Library, doing consulting work for their State Library Information System, and giving library automation workshops for the State Library System staff. We were putting a motorized microform catalog system in place for use by staff and patrons in the State's far-flung multi-island public library system. This was before computer-based systems were feasible for public libraries. That got me personally involved in the operation of a major library system that was going through a catalog file conversion effort to produce and maintain a large microfilm library catalog.¹⁰³

I had some UNESCO work in '73 - '74, and then 1985. Those were all fun projects. We discussed Indonesia during one of the last times we talked (File 14). It was a great project, some great travel, and it was my first overseas adventure, actually working in another country where English was a second language. There was definitely a different culture, so much to see and learn, and then the trip itself - fly on Pan Am from San Francisco, stay overnight in Tokyo, then off the next day on Japan Airlines to Jakarta. And then fly home by way of Paris! So I had a

¹⁰³ Masae Gotanda & CB. (April 1976). "BIBLIO Hawaii" Hawaii State Dept. of Education. Office of Library Services. 42 Pp. Report TAC-76-1261. ERIC Report No. ED-125 547.

round-the-world trip for my summer vacation...what a tale I could tell about “What I did on my summer vacation!”

Okay, we mentioned this one briefly in File 14. Before I joined ILR, UCLA was already running a computer-based SDI service and a batch search service for the entire UC system. That SDI service had the raw ingredients and provided the opportunity for running some experiments on things that hadn't really been checked out yet, anywhere. One of the eternal issues was, ‘How well does your library support your faculty or your staff, and how can you unobtrusively quantify such a measure?’ Well, I felt that I could look at some users' SDI profiles and resulting search output products, and then, find out for each of the SDI profiles that had been run, how many of those retrieved and printed citations were for publications that in fact were in your library. Because, with a large enough sample of SDI users, that would give you a fair and relatively unobtrusive measure of the extent to which your clients' library concerns were being handled by that library. It was as simple as that. If we duplicated all the output citations from the SDI current awareness runs that were currently being processed, and looked to see what fraction of the furnished citations were in fact for material in the users' libraries, or even had the potential for being found with your library network -- that would tell you something about your library service for that particular user or user group and subject specialty. Of course, the measures would be more accurate if done with the users' and library's participation.

We were interested in developing and testing this approach as a performance test tool, and so in 1973, ILR actually did such a study, using the search printouts from real production SDI profiles as a way of checking the performance of a library's document delivery system. We did this for SDI searches being run at UCLA for UCB clients, and had copies of the citation printouts delivered to the Berkeley ILR offices for study to test this new methodology. The identity of the database chosen by the client could be presumed to represent the patron's current research interests, and this could be done for any database used with the SDI system. So this was a relatively unobtrusive way of measuring the performance of a library's document delivery service. This project was more along the lines of what I thought ILR should be doing, using some industrial engineering techniques to establish performance measures in order to measure and to improve library system performance. I must admit that the results of some of these studies could be embarrassing for some libraries; and a problem for ILR if they were regularly carried

out without the users' and library staff's knowledge and participation ahead of time. At ILR, we were mostly interested in testing this technique, which we felt was quite innovative and useful.¹⁰⁴

A later (1975) ILR study, also involved the University's SDI system. For several years, the UC system had been providing computer-based SDI service to faculty and staff on all nine campuses from a central computer system on the UCLA campus. As of April 1975 it was providing SDI service with over 3500 standing search requests for nearly 1300 unique users, and searching 5 different bibliographic databases (ERIC, CA Condensates, BIOSIS, SSCI, and CAIN). This ILR project, with my oversight and direction, developed and implemented a post-processing means to annotate (from the *UC Union List of Serials*) individual SDI output citations with local library location and Call Number information for each user's SDI output citations. This was a major user service enhancement. Preliminary indications were that a significant amount of time was saved for users and staff by eliminating the need for them to make a visit to various library catalogs to obtain that information. This feature could also have been coupled with a retrospective search system as well as an SDI system. This post-processing could also have been expanded to work with regional or partnered/cooperative serials databases for serials that were not held locally. Again, this was the kind of project that ILR should have done more of. I believe that this was the first time that this kind of service had been implemented anywhere on a computer-based system.¹⁰⁵

Those were all fun projects.

ILR did a study in 1972 for the National Commission on Libraries and Information Science (NCLIS). The project was to identify population groups with information needs that differed from the information needs of the general population, to define those needs, and formulate post-1975 specs for them. Groups identified with needs different from the general population were identified by the following groupings: 1) Age; 2) Vocational and related groups;

¹⁰⁴ CB & Jo Robinson. (July 1973). "SDI Citation Checking as a Measure of the Performance of Library Document Delivery Systems". ILR Report ILR-73-002. Included as Appendix D in an undated Quarterly Progress Report for 1April – 31Dec1973. Center for Information Services (for the Campus Computer Network and the University Library). UCLA.

¹⁰⁵ CB. (Feb. 1976). "Improvements in the Coupling of SDI System Output with Document Delivery Systems". *J. Chemical Information and Computer Sciences*. 16 (1) 27-30. The manuscript was sent to the journal in Sept. 1975.

3) Minorities and socio-economic categories; 4) Handicapped and institutionalized. Specific subgroups were discussed for each general group (e.g., Prisoners as a subgroup of Institutionalized).

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An ILR study in 1974 reviewed several techniques that had been used, or were of potential use in a rational selection of health science serial titles for cancelation. The context of the proposed methodology was a network or multi-campus environment, rather than an individual library. It was tested with a specific body of health sciences serial titles in the UC library system and in Region XI of NLM's Biomedical Communication Network. As a test of the proposed methodology, background data was collected on about 600 current foreign-language serial titles included in the SERLINE database, and held by at least one of the libraries in the networks of interest. For each of the titles, data was collected regarding price, major secondary service coverage, the productivity/impact factor for those services, extent of holdings in the libraries studied, and average number of recorded circulations per year in several of the libraries in the network. Employing several decision rules, estimates were made of the subscription cost savings that might be realized in the network. It seemed feasible to extend this methodology to titles in other subject areas. This type of study had been done before, but not with the same large-scale test and participation, and degree of attention to details.^{107, 108}

And then there was work for Lockheed's Palo Alto Research Lab, specifically to do an analysis of the DIALOG online search system, particularly their ERIC online file searching procedures and guidelines for searching. Since 1969, Lockheed's Palo Alto Research Lab had offered an online computer searching service with the ERIC (Educational Resources Information Center) database. For the next several years, a growing number of organizations were conducting

¹⁰⁶ CB, Victor Rosenberg, Marcia Bates & Gilda Perolman, (Feb. 1973). "Preliminary Investigation of Present and Potential Library and Information Service Needs." Final Report. ILR. ___ Pg.

¹⁰⁷ Dorothy Gregor. (Feb. 1974). "Feasibility of Cooperative Collecting of Exotic Foreign Language Serial Titles Among Health Sciences Libraries in California." 44Pp. ERIC Report No. ED-104 407.

¹⁰⁸ CB & Dorothy Gregor. Jan. 1975. "Methodology and Background Information to Assist the Planning of Serials Cancellations and Cooperative Serials Collection in the Health Sciences". ILR. 60 Pp. ERIC Report No. ED-104 413. An article based on this report was published with the same authors and title in the *Medical Library Assoc. Bull.* 63(4). 366-377. Oct. 1975.

online searches using terminal equipment linked via telephone lines to the Lockheed computer facilities in Palo Alto, CA. Several installations had been heavy users for long periods of time.

In studying the search activity of various clients, it had been observed that wide variations existed among installations with respect to the average number of ERIC searches processed per unit of terminal time. The primary objective of the initial ILR study, starting in August 1973 was to identify and explain the reasons for the differences in average online search rates, given that the technology of the day dictated the same ERIC database, with essentially the same use of terminal equipment, similar instruction, and searching be done by the same central computer facility. The study was funded by the National Institute of Education, in cooperation with Lockheed DIALOG, with the work done by ILR. It started with a literature search and some site visits, and then proceeded to a detailed analysis of timing data and the detailed analysis of specific searches.¹⁰⁹ Detailed examinations were made of such aspects as the DIALOG system response time as a function of the time of day or day of the week; the search commands and logic used by each of the terminal installations for their operations; the mix of complex, medium or simple questions processed at each terminal location; and the extent and impact of the variant forms of descriptors in the file (e.g., singular and plural forms of the same term). Guidelines were prepared for the searchers to consider for pre-search and terminal activities. Timing studies were performed to suggest some terminal procedures that could increase average online search speeds.¹¹⁰

In Oct. 9, 1975, this detailed study then grew into an exploration of issues associated with developing and offering a lab course in computer searching of bibliographic files. No such lab course had been developed yet anywhere in the world. Questions covered such ground as what databases would be most appropriate for training, how much computer time and other resources would be required, how would costs and lab fees be handled, and how passwords would be

¹⁰⁹ Allan J. Humphrey. (June 1973). "Survey of Selected Installations Actively Searching the ERIC Magnetic Tape Data Base in Batch Modes. Vol. I. 86 Pp. ERIC Report No. ED-096 982. Vol. II. June 1973. 268 Pp. ERIC Report No. ED-096 983.

¹¹⁰ CB, Jo Robinson & Judy Todd. . (Nov. 1974). "Analysis of ERIC On-Line File Searching Procedures and Guidelines for Searching." ILR. Final Report ILR Report No. ILR-74-005. 77Pp.

handled. This brief study and its resulting report provided answers to such questions.¹¹¹ All of this activity was a way for us at ILR to learn more about online searching services, which at that time was still an infant technology and industry, and how that could be improved.

One outgrowth of the development of this lab activity was the development of a student lab workbook to be used as instructional material. I wrote this lab workbook for a lab that would use the DIALOG online search system.¹¹² This workbook was intended primarily for use by graduate library school students in a supervised laboratory setting as an adjunct to a formal course on computer-based reference services. In that context the students were expected to have prior knowledge and understanding of printed reference tools and the concept of reference service. They were also expected to have a lecture on the DIALOG online search system before the exercises were to be started.

The exercises were intended to be done with a trained Laboratory Assistant in attendance to help with any problems that came up during the exercises. Students were expected to prepare themselves for the lab sessions by reviewing the material in advance. They were also required to do the associated homework exercises after the lab sessions. The workbook was not intended to be used by itself in a self-instructional mode. For planning purposes, student timing data for several different classes was collected for each exercise, and included as background information with each exercise. This timing data was collected under circumstances in which each student, or team of up to two students was told in advance that they would have a total personal budget of about 3 1/2 hours of online time available to them for the entire set of exercises, and that they should use their time effectively. This time budget turned out to be an almost realizable goal, in fact, an average of about 3.6 hours (self-reported) was required to complete the full set of 10 exercises. The point of this time budget was to ensure that the reported times reflected rates achieved by students working under some time pressure. Emphasis on the lab work was to develop a personal high-speed operating capability in the event that the student was later placed in a job environment where that was important. The exercises used 30 characters per second

¹¹¹ CB & Barbara Anderson. (Jan. 1976). "Observations on the Use of the Lockheed DIALOG System for Laboratory Work in a Fall 1975 Course on Computer-Based Reference Services at the UCB School of Librarianship." ILR. 18 Pg. Working Notes Only.

¹¹² CB. (June 1976). "DIALOG Lab Workbook: Training Exercises for the Lockheed DIALOG Information Retrieval Service". ILR. 100 Pg.; Oct. 1976 and 128Pg.

thermal and impact printers. That's the fastest printer speeds that were generally available at that time.

All of the material in this workbook was prepared with the very able assistance of Jo Robinson and Barbara Anderson. The workbook and exercises were also tested by Prof. Pauline Atherton and her classes at Syracuse University Library School. Hers was the 2nd school worldwide to provide an online lab for computer searching of library material.

This was a pioneering effort. This was the first instance, worldwide, of a laboratory established and used in an academic setting on a regular basis for instruction regarding online database searching. This lab workbook was subsequently adopted and modified as necessary and reprinted by the DIALOG organization and used for several years with its commercial training of users for its system.^{113, 114}

In an effort to avoid any ILR bias toward the DIALOG service, a parallel workbook was prepared for the SDC Orbit search system. It followed the pattern of the DIALOG lab workbook, and it was developed by the same staff that developed the DIALOG workbook. After their review, SDC staff thanked us, but decided not to make use of it.¹¹⁵

On the other hand, John Christensen, a former Library School student at UCB in 1975 who was introduced to the DIALOG Lab Workbook there when he took our Dialog online searching course there from Jo Robinson and Barbara Anderson, was assigned to create a LEXIS online tutorial guidebook in 1978 for law school students at the Tarlton Law Library at the University of Texas while giving full credit to the UCB activity, and subsequently worked with LEXIS to produce such an introductory text for LEXIS online searching.¹¹⁶

Products from this early lab activity included the development of graphic representations of three basic online search strategies ("Building Blocks, Successive Fractions (A.K.A. Divide

¹¹³ DIALOG. (January 1981). "DIALOG Lab Workbook: Training Exercises for the DIALOG Information Retrieval Service". 3rd Ed. 132 Pg.

¹¹⁴ DIALOG Information Services, Inc. (Sept. 1986). "Lab Workbook and Reference Manual". Includes an acknowledgement that subsequent editions of the initial 1981 edition were based on CB's initial edition.

¹¹⁵ CB. (June, 1977) . "ORBIT Lab Workbook; Training Exercises for the System Development Corporation ORBIT System". ILR. 60 Pg.

¹¹⁶ Ref. John E. Christensen. (1981) "LEXIS: An Introduction for Law Students". Mead Data Central. 83pg.

and Conquer), and Citation Pearl Growing”) that were developed in 1975 by me, Barbara Anderson, and Jo Robinson during our planning and teaching of this subject.¹¹⁷ Pauline Atherton and Bob Buntrock;¹¹⁸ and Karen Markey (later Drabenstott) and Bob Wagers¹¹⁹ later wrote articles that further articulated those strategies and made them part of the everyday life of intermediary online searchers. In 1984, Jo Robinson (then Jo Maxon-Dadd) used these graphic aids in the DOE/RECON videotape series prepared in conjunction with the DOE Technical Information Center and Oak Ridge National Laboratory to illustrate searching the Energy Database on the DOE/RECON online database. Jo developed and added another model, “Bead Stringing” to that group of illustrations.

The next to last spinoff from the Lockheed project was a set of saved building block searches for the DIALOG ERIC database. In order to obtain precision for searching, the database indexing had been defined at school grade level (i.e., search for Grades1 plus Grades 2,..., Grades 8 instead of elementary school) and so it was possible to search precisely for what grade levels were of interest. There were in fact 73 different grade/academic levels defined in the ERIC Thesaurus of Indexing Terms at that time. That’s why it was helpful to have them drawn up ahead of time in advance of search time. We drew up search terms for expressions that would be frequently used, and time-saving for the searchers. Examples of groups of compiled search expressions that were assembled and freely distributed for use by others included: school grade level, population groups, library types, and geographic area. Based on actual search times, estimated costs could be provided for each of the 33 subroutines that were provided.¹²⁰

The final spinoff from this DIALOG activity was the development of another online training tool, the “ONTAP ERIC Database”. The “ONTAP” name was used by DIALOG to mean “Online Training And Practice”, and was used as a mechanism to provide relatively small

¹¹⁷ Robert Buntrock. (Oct. 1979). “The Effect of the Searching Environment on Search Performance”. *Online*. 3(4). 10-13.

¹¹⁸ Don Hawkins & Bob Wagers. (May 1982) “_____”. *Online*. pp. 12-19.

¹¹⁹ Karen M. Drabenstott. (July/August 2001). “Web Search Strategy Development”. *Online*. 25(4). 18-26.

¹²⁰ CB, Barbara Anderson & Jo Robinson. (March 1977). “Selected Search Subroutines for Searching the ERIC Database with the Lockheed DIALOG Information Retrieval Service.” ILR. 63 Pg. ERIC Report No. ED-140 870.

and low cost training and practice files (representative of the complete file of the same name) for novice searchers. I developed this training tool after I moved from ILR to DIALOG. The ONTAP ERIC file was a static subset of the ERIC database made available as a publically available numbered DIALOG file. What made this file special was that it included some specific search questions for student use with that file. And because this was a limited and static file, it was possible for my staff to exhaustively search it before the file was made public, and find and store essentially all of the relevant answers (as represented by the DIALOG Record Numbers) to each of these test questions. With that information, it was then possible to compute and provide a recall score for each of the proposed questions searched by the student, along with a display of the retrieved citations, the correct (for recall) answer, and their associated index terms. This was judged to be the first time such a searcher performance score feature was implemented anywhere. DIALOG had several ONTAP files, but no others had this performance scoring feature.

And then there was another ILR study in 1975 that measured the extent of bibliographic access to the UC library resources at Berkeley and Los Angeles. It turned out that about half of the library materials at either Berkeley or Los Angeles were not accessible to people who were off campus. There were so many branch and division libraries, and special libraries, that only had a card catalog or some other retrieval mechanism, that people off-campus only had bibliographic access to about half of the library's collections. And that's a remarkable figure. When we keep talking about the powerful library resources of Cal and UCLA, it turned out that for people off-campus, they really didn't have anywhere near the full access that we thought they had. This study measured the extent of bibliographic access available to off-campus users for the resources of the libraries on the UC campuses at Berkeley and Los Angeles.

To do this, random samples of bibliographic items were drawn from card catalogs on both campuses, with each sample representative of the resources of both the General Library systems and most of the unofficial campus libraries. Major printed catalogs were identified which contained a significant number of records for material on these campuses, and then checked to see if each sample item was identified with the campus from which was drawn. A maximum of 67 and 69% of the Berkeley and Los Angeles samples, respectively, were found to be bibliographically accessible (i.e., potentially available) through available printed catalogs. The libraries of all of the UC and CSUC campuses, and several other libraries of interest were then

surveyed to determine which of the printed catalogs were available on those campuses. The potential bibliographic access was estimated for off-campus users at over 30 locations throughout the state.

The estimate of potential availability was further modified by a determination, for each sample, of limitations on access because of inter-library loan policies. For the Berkeley sample only, a determination was made of the further limits on accessibility because of the physical availability of the sample items in inventory; that appeared to be about 54% for the Berkeley campus and 60% for the L.A. campus.¹²¹ These data are probably invalid now because of the widespread availability of the UC online catalog system.

Okay, so that's another one of the fun studies that you'd like to do more of, where you could find those problems, find some appropriate measures, and you could find a solution to those problems.

Then there was another fun 1975 ILR project that was aimed at getting planning data for the conversion of a large number of library card catalog records into machine-readable form. In 1970, ILR converted to machine-readable form over 1 million catalog card records representing about 750,000 unique Roman-language titles cataloged by UC libraries during the period 1963 – 1967, and from this database printed the *UC Union Catalog Supplement* (UCUCS-1). Some 1.7 million additional Roman-language card records representing monographs cataloged by UC libraries between 1968 to 1972 (herein called UCUCS-2) were then collected and manually pre-processed by ILR in preparation for obtaining equivalent machine language records. This study determined the extent to which the corresponding records of interest were available in existing UC databases and in a few "outside" databases.

A 1/2% stratified sample was drawn from each UC campus's card contributions, totaling 8,337 records. Of these, about 48% could be found in one of the machine files already available at, and used by, the UC system. About 27% were available in LC MARC files, about 9% in the UC Santa Cruz files, and about 12% could be found in the UCUCS-1 files. Of those not found in any of the three UC files about 30% (an estimated 217,000 records) could be located in the OCLC database.

¹²¹ CB, Dale Reed & Margaret Buss. (June 1975). "Bibliographic Access to the University of California Library Resources at Berkeley and Los Angeles." ILR report. 188 Pg. ERIC Report No. ED-115 310.

These findings indicated that of the total 1.7 million new card records, at least 807,000 could be copied from existing machine files. This was a long ways from the early Stacey's and early MARC record production efforts in 1967. The sample was also analyzed by language, imprint date, and availability of a unique identification number (e.g., ISBN or LCCN).¹²²

I did remember a couple of things for other countries. They're starting to get fuzzy with regard to which country (This is now about 40 years ago.), but I do remember that one of the countries that I studied had a total of one library school graduate in the country. And, so you're supposed to build a national system around that? That would be hard to do. Some of the places had few resources to build special libraries, and they guarded their collections closely, and became very clever about building their collections while spending little money. Those libraries became very adept at swapping publications – “We'll send you our field station's annual reports if you'll send us the annual reports of your field stations.” I ran into one field research station, an ag research station, where the librarian was especially ingenious in terms of building a journal collection. He had very little money (foreign currency) authorized to buy publications such as journals. So what this person did was to use his journal money to subscribe to *Current Contents*, which was a publication by Gene Garfield that simply, on a weekly basis, reprinted the most recent tables of contents of all the publications that had come out the prior week, in chemistry or whatever subject field that *Current Contents* series concentrated on. Each citation in those *Contents* pages usually included the author's mailing address. Because this was a government research facility with a free postal account, he used free postcards to send to each of the authors in that table of contents that he knew his people would be interested in, asking for a reprint of their paper. And he would then, over time, re-compile the journal from all these different, separate reprints that he received.

Problems and issues that I also remember from overseas work in developing countries include there being no interlibrary loan activity to speak of between institutions. So if graduate students wanted to get something from another campus, or another university, they had to approach the issue by getting a letter from their professor to the other school's librarian, saying essentially, “Please, sir, can you let me borrow this particular publication for my student, I will

¹²² CB. (Jan. 1976). “Planning Data for the Conversion of UCUCS-2 Catalog Card Records into Machine-Readable Form (UCUCS-2 Conversion Planning)”. ILR. 33 Pg. ERIC Report No. ED-118 070.

take very good care of it.” So that was the way you had to work to get any kind of interlibrary loan. They didn’t have copy machines that you could use to any effect, because equipment was scarce, and nobody wanted to foot the bill for supplies for interlibrary loan copying. There could, in principle, have been a tremendous amount of inter-library loan activity. There were often some institutional issues where there was just some nagging issues between University A and University B, and you were never going to get them to work together for trading books or whatever. Those were some of the things I remember. But it sure brought home a lot of issues based on, “Can’t you guys just cooperate?” And national government oversight to dictate that cooperation just wasn’t there. Things we take for granted just didn’t always happen there.

From the point of view of the university library users overseas, I remember hearing of two particular mechanisms used to help battle their library resource/availability issue. They didn’t have a “Reserved Reading” room where high-demand publications were available for on-site use or short term borrowing. So, the first technique was one used by some users to ensure their continued and ready access to a shelved publication then in continuous demand for a particular course’s reading requirement. Their approach, with stack privileges, was to pick the publication from the stacks and re-shelve it in a distant part of the stacks, away from where other readers would look for it. This way, the selfish reader could always go back to finish reading it when they wanted to. The second approach was much rarer, and more damaging, and was accomplished with a short piece of string. This worked particularly well for single journal articles. The reader walks into the library chewing a piece of thin string about one foot long. After finding the journal and locating the article of interest, the reader lays the piece of wet string in the gutter of the journal at the article location and closes the journal for a couple of minutes. After that, the wet string has turned the paper in the gutter to mush, and the reader can simply lift out the “reprint” of interest and take it away for reading at a later time and place.

Okay, well here’s a big project, a 1976 study -- an analysis of errors in the *University of California Union Catalog Supplement (UCUCS)*. *UCUCS* was the computer-produced catalog with 47 volumes of 850 pages each, that was published by ILR in 1972. Because nobody had ever produced such a big union catalog, or computer-produced catalog, I thought it only appropriate that we analyze the errors in it. This was the biggest computer-produced catalog ever produced, probably in the world. And so I felt that there ought to be some studies of it, in terms of... since nobody ever proofread the thing -- how bad was it? And so we did an error

study. (Because the UC administration had advanced so much money to produce this thing, and we were still trying to sell some sets of it, there were probably some raised eyebrows about our publicly describing all the warts and uglies associated with it. But I never heard anything about it, and I don't think it was directly related to ILR later losing its UC funding and support.)

We did this study by drawing a random sample of 94 pages, or 5,900 entries from the 47 volumes. Each page of that random sample was then thoroughly examined by two graduate students in the Library School, and each error discovered was analyzed according to six aspects: type, location, effect, cause, language, and non-monographic type. A total of 4,338 errors were found in the sample; that's an error rate of 46 errors per page, or 0.74 errors per catalog entry. Categorized according to the degree of seriousness of their effect, minor errors made up about half of those found; serious errors made up about 43 per cent; and fatal errors totaled about 7 per cent of the errors found in the sample.

This was probably the largest book catalog ever produced by computer processing. It was unique in that there was no key-verification of the input records, and no human editing or proofreading of the computer output records before they went to the print shop for printing. For anybody considering a similar venture, it was important to determine and publicize the impact of the decision to skip the proofreading and correction of the output records before printing the final product. This was probably a noteworthy error study because of the size and the detail associated with the study.¹²³

MB: I remember that that got a lot of attention.

CB: It should have.

MB: And set back enthusiasm for library automation quite a bit, as I recall.

CB: As it should have. Producing the catalog without proofreading and error correction (at least for obvious major errors) was a major gamble. And some things might have been done differently. But hard to say. You'd have to look at the type of errors to see. The effort to control the quality of the keyboarding was one of several planned methods of quality control which were either only partially successful or else never implemented at all because of various influencing factors. The UCUCS project plan was cast and well underway before I arrived there. It was never

¹²³ CB, Margaret Buss, Deborah Sommer & Judy Todd. (June 1976). "Analysis of Errors in the *University of California Union Catalog Supplement*". ILR Report No. ILR-7602. ERIC Report No. ED-127 922. 72 Pg.

intended by the Project Manager that the database be exhaustively manually proofread or edited. To do so would have been impossible given the then-prescribed time and money constraints of the UCUCS project. Moreover, a major purpose of the project, according to the Project Director, was to experiment with producing a book catalog with a minimum of manual intervention and with an error level that was supposedly agreed in advance as one of the product specifications. As much of the catalog production as possible was to be performed by the computer processes with only limited human inspection, including quality control. Three other major quality control efforts were originally planned, all to be executed mechanically with a minimum of human intervention. Only one of these was actually utilized, however, and it was used on only one part of the database.

It was intended that the Harvard Shelflist, available in machine-language form, be used to derive a baseline name authority list of about 260,000 entries against which all author names in the UCUCS database would be matched. Exact matches would be assumed to be spelled correctly. Author names which did not find a match in the authority list would be printed out for a manual check. This plan was never implemented because the software was incomplete by the time photocomposition was scheduled to begin.

It was also intended that all English words in title fields would be checked against an authority list. The authority list in this case was the shorter *Oxford English Dictionary*. The program to perform this operation was written, and much of the debugging had been done, but the program was never used, due primarily to time constraints. Also, because the program was so complex and sophisticated, it was not certain that there was sufficient money available to pay for the computer time which would be necessary if it had been used in production.

A third mechanical quality control effort was used in production to a limited extent. This involved comparing the subject headings which would appear in the Subject catalog with a machine-readable authority list, the machine file equivalents of the *LC Subject Heading List* and other authority lists. All of the subject headings in the total UCUCS file were run through the machine process. Approximately 40% of the needed changes, amounting to 1,058,072 changes, were ultimately made in the UCUCS Master File—again, limited because of time and monetary constraints.

In summary, most of the source records went all the way from keyboarding to page printing and binding without manual intervention at any point in the production cycle. This was a

management decision that resulted in a high error rate (mostly because it was not possible within time and budget constraints to implement several of the planned programs and procedures) but with a lower unit costs that had been experienced by any other equivalent book catalog conversion effort before or since UCUCS. The unit cost of approximately \$1.16 per record includes such processes as keyboarding and optical-scan reading of source records; formatting of source records; and operation of an authority control file improvement system, consolidation of duplicate entries, and formatting for videocomposition.

MB: I had an impression, or maybe it was a rumor, that they went ahead and produced it because they had to have something to show for their work, and they didn't have the time or the resources that better quality control would have required, or at least that was their assumption.

CB: There was just no way that they could have done any proofreading or re-keying for redundancy or anything like that. What they could have done, perhaps, was to do a fairly large sample to identify what constituted the errors, and then ask themselves, "Are there some simple proofing checks that I can make on the data that comes in that says, hey there's a problem here, you have no "100" field, or some other field that you think is critical that should be there but the data is missing." If you did more of that data checking on the entry when stuff first came in and then had a review loop of things that get kicked out and sent back in -- if you did more of a review like that, you might have been able to stop some of the major problems.

MB: I had a distinct impression that at that time, there was a widespread naiveté about the difference between research and development on the one hand, and production on the other, and people didn't understand or choose to acknowledge that you can't just go straight into production in a novel technology. You've probably got to invest more in research and development and evaluation than people are wont to pay for. Do you think that's a fair comment?

CB: Yes. I would agree with it. I would have expected that there would be some baby steps before there was this great big set of volumes. There could have been more... just like the Dragon speech recognition software gets better and better all the time because it keeps finding the exceptions—that is, what is it that keeps getting kicked out as difficulties?

Let me show you something. This is part of the UCUCS error study that I was doing that I didn't have a chance to complete. These are just initial articles...

The indexing rules for some of the computer processing done for the printing of bibliographic files or their searching may need some tweaking with regard to the treatment given to initial articles such as A, An, The, etc., in English-language files, and Le or Les in French-language files. For printed keyword indexes, it may be a waste of paper to print index entries for those words. Planners for future systems should consider implementing a simple technique to remove true initial articles as indexing access points. This could be done easily by checking to see if, at least, the article is in a table of initial articles such as the one that was assembled by this study. Using such a rule with the *UCUCS* database processing would have saved over 80 pages of printed index entries that started with La, and allowed the printing or the indexing of the second term of each of those citations, which would otherwise not happen.

My reason for doing this study was primarily because ILR had a unique opportunity to provide some useful information to future planners because of the data that was made available to us as a by-product of the preparation and printing of the *UCUCS* database. *UCUCS* was an academic collection of material in many languages, but limited to Roman-alphabet monograph titles. There were more than 80 different initial articles seen in this database. ILR staff members, with many language skills, used reference tools for many languages in order to identify initial articles that might be found in this catalog. A total of 98 different initial articles (E to UNE) were identified from over 38 languages. Some of the more frequent articles in this database were for foreign-language book titles in French (5,618 Le; 4,782 Les) and Spanish (4,331 El).

Because of the size and scope of the text corpus, this study offered a rare opportunity to obtain some meaningful empirical evidence of the frequency and impact of ignoring initial articles in the natural-language indexing of bibliographic text material (e.g., titles of publications, chapters, or sub-sections).¹²⁴ Every little thing like these initial articles contributes to errors, mixed indexing opportunities, extra paper used, and things like that. I never had a chance to really finish this initial article study the way I would have liked to. I would have had crews working on each of the types of errors that were found, but that didn't happen. No final report was prepared because ILR was decommissioned before that could happen.

¹²⁴ CB. (Sept. 1975). "Initial Article Filing in Computer-Based Book Catalogs: Techniques, Problems, and Article Frequencies". *J. Library Automation*. 8 (3). 221 – 247.

I believe that one of the issues pushing for a speedy completion of the *UCUCS* project was a feeling that ILR had to keep pushing through and finish it because we had orders, purchase orders, for a number of sets.

MB: And there was probably a state of denial about how much money should have been invested in it.

CB: Yes. If there was a chance to get some money back, I think the Library Council would have said, "Even though we got some of those copies, we still think you ought to try to continue the distribution because I think you already sold copies to the State Library of California, and maybe USC, and maybe some other major libraries."

MB: But the problem of initial definite and indefinite articles is a long-understood problem. They really should not have made that mistake. Really.

CB: (UCUCS started Vol. 1 of the Author/Title set with about 12 wasted pages of initial article "A" entries that kept those title entries from being properly file under the second word in the title entry.) UCUCS printing began in August 1972. One April 1974 internal memo from Allan Humphrey, the ILR staff member assigned to do the marketing of the UCUCS product , noted that to date, only 11 individual sets had been sold, other than the bulk order of 20 sets for CSUC. No further sales were expected.¹²⁵

As an aside, it's a problem that Lockheed DIALOG had as well, in the sense that when I was just working with English language databases there, mostly report literature, it was not a big issue, but when the file sizes got to be big, and covered more foreign language articles and initial articles, it become a problem because you couldn't say, 'Oh, toss them all out,' because then you'd toss out index access to a publication with a title like *'Die for me, Mister,'* or something like that where 'Die' is used as an English word instead of German article. So the online services all took a balanced approach when deciding to either throw them out or keep them in, or whatever. The same thing was true for 'a'. Because online storage costs were so high at that time, the DIALOG search system from its beginning had a "stop word list" in its software, that essentially said, 'No, we won't build an index to these words, consequently you can't search on them'. And "a" was on that list. Dialog staff initially explained it to users by saying, "Do you realize how many hits you'd get on that?" And the searchers in the life sciences and

¹²⁵ Allan Humphrey. (Apr. 10, 1974) "Current Status of UCUCS Marketing Efforts". Memo to CB. 4pg. ILR. UCB.

pharmaceutical offices would answer, “Yes, but I want to search on vitamin A, how do I do that?” And the Dialog staff would probably have answered something like, “I think you have to use “so-and-so acid instead.” So those problems came up all the time.

But the fact is, *UCUCS* had a certain percent of errors, or fatal errors. That was significant. So I’d hoped to be able to do more of this kind of analysis work at ILR, but I didn’t get to that point. And, it’s probably time for some kind of obituary to be written for *UCUCS* by this time now, because the people who were involved with it are no longer there, and it was a grand experiment, and, well, we also kept a lot of students employed, and that was good. So that was the last for today.

MB: Okay.

CB: Oh wait. I did one more error study, this one in 1976 at DIALOG, looking at several of the DIALOG databases. Using a sample of over 3,600 index terms drawn from 11 different online bibliographic databases (e.g., CA, BIOSIS, NTIS), estimates were made of the spelling error frequencies of each of these databases. The sampled terms included assigned index terms as well as some terms from the titles and abstracts.

The samples were drawn by defining somewhat arbitrary alphabetic bounds (e.g., APPLE to AQUA, GRAPE to GREECE) on the online composite index term displays for each database, and then printing and counting the misspellings in those summary listings. The misspelling rate of the displayed index terms ranged from less than 1% for one database to almost 23% for the database with the worst spelling score. The rates were considerably less when measured in terms of percent of indexed documents with misspelled index terms.

These findings would be of interest to the database suppliers (one even cited this data in one of its ads), the tape spinner, and the searcher. This was probably the first time that this type of study had been conducted; and it was made possible by the ready availability of online computer indexes to the databases.¹²⁶

When the above study was started, we had already started work on an improved title word search key for large catalog files. Because there were very few computer systems with sufficient memory and computer capacity to perform title word searching with large bibliographic databases, some major database search systems such as the one operated by OCLC

¹²⁶ CB. (January 1977). “Frequency and Impact of Spelling Errors in Bibliographic Databases.” *Information Processing and Management*. 13(1) 1-12. Manuscript received May 1, 1976.

used search codes compacted from the title words of a citation. We had concerns with that code, didn't want it to become a standard, and did this study to find a better way. The objectives of this study were to: 1) evaluate the performance of the OCLC 3,1,1,1 search code, in terms of its precision of retrieval, particularly with a large file; and 2) develop and test other search codes that were a potential improvement over the 3,1,1,1 code. The complete LC MARC database of over 500,000 records was used as the test database.

The new search key developed in this study provided better title discrimination than the OCLC key, for any file size. This was a significant contribution, but it was only temporary, as more computer systems were subsequently able to add sufficient memory to provide full text searching for all title words.¹²⁷

My last R&D project at DIALOG was on the identification and deletion of duplicate citations in single or multiple databases. I had been interested for many years in the topic of detection and elimination of duplicate citation records (dups) in bibliographic databases. This was particularly true for large online databases being used in combined multi-file searches. In practice, it is useful to be able to identify and eliminate dups in order to reduce redundant search output for the user, as well as reduce printout time and royalty or other costs if the file output is being charged on a per output record basis. This was not a trivial concern. Overlaps of as much as 55% and 70% in DIALOG file pairs were found in this study. Because some online bibliographic databases (e.g., CAB) had as much as 14% duplication within itself, a dupe detection scheme would also be useful in a single-file mode.

With lots of empirical data from the DIALOG search system, I compared 10 pairs of related files (e.g., BIOSIS – CAB) in order to manually find duplicate records, and then identified the ways in which dups could be identified with those pairs. Because of the editing rules and the ways in which data elements were defined for each database, finding the dups required an algorithm that was specific for each database pair.

There is also the question of which dupe is to be eliminated (e.g., the record with an abstract or the largest record vs. the record with citation only; or the most expensive record of the two).

¹²⁷ Lawrence K. Legard & CB. (Dec. 1976) . "An Improved Title Word Search Key for Large Catalog Files". *J. Library Automation*. 9(4) 318 – 327.

I left DIALOG before I was able to oversee the implementation of this feature on DIALOG. But to assist that effort, I left significant R & D notes behind with DIALOG staff members, along with empirical data on the estimated extent of citation overlap for 10 selected DIALOG file pairs.

This feature was subsequently implemented by DIALOG.¹²⁸

File 25 Volunteer Activity

MB: It is March the first, 2012, and it is 1:22pm, and I'm in Menlo Park, and Charlie Bourne is going to resume the exciting saga.

CB: Are you aware that you just went through February 29th?

MB: Yes, leap year. By tradition, this is the day when women are entitled to propose marriage instead of waiting to be asked.

CB: Is that right?

MB: Yes. I don't think they need that justification, but still.

CB: It's good to have an escape valve. Okay. I think we'll eventually get all these little bits and pieces separated out. Here is a collection of volunteer activities. I spent a couple of weeks working through lots of different kinds of records to pull this stuff together. Maybe I could just use this as a script, and talk about it.

MB: Yes, good idea.

CB: Okay. Well, I didn't volunteer very much, if anything, before high school, except when I joined the Sea Scouts. And we actually took a boat out and sunk it. And there wasn't any more Sea Scouts in our town after that. That happened out at the Alviso slough on San Francisco Bay. It was one of the old WWII war surplus landing crafts where the front drops down. It started when some good-minded people with a maritime background thought they could fix it up for the local Sea Scouts chapter so that we could take it out on the Bay, and do all kinds of fun things with it. So after working on it for a few weekends, we started it up to see if the motor still worked – it did, and we went home. But our leaders didn't realize that that little

¹²⁸ CB. In-house memos to DUPELIM File: A collection of 17 memos on this topic, all published in-house on March 23, 1989. DIALOG.

startup shook the motor mounts loose and kind of vibrated the boat to pieces, not so that you could see it, but so, as we drove away, it slowly sunk behind us. Okay, that was Sea Scouts.

When I was in Los Gatos High School I joined its band (a marching and concert band), playing the clarinet. I also served as President of the band, drum major for two years for marching down the streets and other events, and Master of Ceremonies for the high school music department variety show. I was always being asked to do something (“You want something done? You ask a busy person.”). I starred in our junior class production of “Junior Miss,” a light drama that was kind of fun because I played a relatively old man in the production, and they gave me gray hair, and a suit, and I think a moustache, and after the production was over for the second night, a bunch of us hopped in a car and went over the hill to Santa Cruz to attend a local bar because we were all in old age makeup, and they served us drinks.

I was also on the high school newspaper staff, President of the Latin club, and lettered in varsity football and track.

MB: Now, the Latin club, was that as in Latin language or Latin music?

CB: Hah! People do make a distinction these days. No, this was Latin language, with togas.

MB: I see. Before the fashion for toga parties.

CB: Yes, right. I was pretty busy when I was in high school. And I think all that activity probably put me at ease in front of an audience. I think I told you the story of how I got into the Marine Corps.

MB: Yes.

CB: That was considered a volunteer activity then, but a lot of people today wouldn't think of it as a volunteer activity. I didn't think much of it at the time, but it turned out that I later thought a lot about it. I served as a volunteer judo coach at a YMCA in Pomona when I was working there before going to UC; another fellow and I from Convair did that. I also did some guest lecture spot for the Library Extension Courses at Berkeley, I think in '63 – 66.

MB: Who would've been the instructor? Would that have been Michael Cooper, in those days?

CB: I had no instructor other than myself.

MB: Oh, you taught the whole course.

CB: Yes. Also served as a Little League baseball coach for two years in Menlo Park. Some of these activities you could argue were selfish; I did it not because I was asked to do it, but because I enjoyed doing it. So maybe that doesn't count if you're looking for a pure donation of time.

Okay, '66, was appointed a Director of the ALA's new group, the Information Science and Automation Division.

MB: Who else was involved in that? Was that Kilgour, or Steve Salmon, or...?

CB: No, it was Joe Becker.

MB: Oh, okay.

CB: Joe Becker was very much ALA, and he asked me to serve, and I said, 'Yeah, okay, sure. What's there to do, with a brand new group?' And by the time we got sort of organized, ALA got their own people organized, and some of us who had never been part of ALA were being asked to pay a couple hundred bucks a year just to fill in this spot for them; I wasn't too keen about that, and that was the end of my ALA activities.

And then, as we discussed earlier, there was the history of the local ADI committee and its support of the 1962 ADI Annual meeting in Berkeley. And after that came a local technical committee activity for the 1968 Western Joint Computer Conference. And that's one of the things we talked about last time. And then I had the responsibility for putting on the 1969 ASIS meeting in San Francisco. There was always a learning situation with any of these big meetings, especially if you hadn't worked with a large hotel before, and had to negotiate a wide range of issues, services, and prices. That was all very interesting.

As mentioned earlier, I served for a year as the Editor of the Literature Notes section of *American Documentation*. And finally in '68 I was elected President-elect of ADI. I'm rambling on and on, and I'm sure I've mentioned some or all of these things in our prior conversations... I want to go back and clean them up later.

MB: Was that (name change) on your watch?

CB: No, I did not push for that. That was something that Gene Garfield pushed for.

MB: Okay.

CB: I can't help but pull out some odds and ends, and souvenirs. Have you ever seen one of these? It comes under the heading of "collectanea." An auspicious name for it. In the sixties, one of the major special information centers being run by the Air Force, operated on this

principle: they would take a Soviet publication, and they would essentially separate all the articles, take everything significant out of the article, and put that information on these cards (one concept per card, along with its associated indexing), and file the individual cards, as many as you needed, under various subject headings that came up in the cards themselves. This left you with a large manual card file, with lots of access points, many more than usual in a card catalog, but with lots of relevant content per index access point. This was long before anybody could afford to put a lot of information into computer storage.

MB: They look like they're 8 by 5, or 8 by 4.

CB: Yeah, 5 by 8, I think, nominally.

MB: IRC sounds familiar; wasn't there an IRC press, or something?

CB: There may have been; I'm not sure that was it. It may have been... There's a materials data center, but it's just one of those things I tripped across in one of my folders.

Okay. One thing I just remembered. In 1969 I was elected President-elect of ADI, and Chairman of the annual convention that was held in San Francisco at the Hilton Hotel. My wife and I sat at the head table of the Annual Banquet with Senator Hubert Humphrey, the banquet speaker. Our two children attended the banquet with about a thousand others and sat at a front table with a friend of ours right in front of us. That was a memorable family event.

As I went through digging out all this stuff from old calendars and things like that, it just occurred to me how much time I had spent giving speeches somewhere because somebody asked me to, or because I was an ADI officer and expected to, something like that. There were guest lectures at the Universities... and I was asked to teach, or give a class or a series of lectures such as the six lectures I gave at a University of Oregon library workshop. And to an ASIS group in Columbus, Ohio, that year. A story that goes with one of my University Library workshops was that one of the local University librarians, had gone all the way through enough workshop training to be knowledgeable; she was really interested and she knew enough about what she was doing, and she wanted to get started in something in library mechanization, library automation, whatever you want to call it. And I guess her University Librarian boss got tired of hearing about it from her, because she was always on it. So he said to her one day, I guess to shut her up, "Alright, you can do it. I'm going to put three hundred dollars into an account for you so that you can do your library mechanization work." He didn't have a clue about how much money it would take.

I remember being invited to give a talk at Brigham Young University in 1976 on the topic of a Centennial Review and Projections. I gave the talk, and it was to be an historical talk. So I reviewed for the folks there a number of older issues in library work like how do you make book paste; you'd be surprised at the dangerous stuff that's in there, like arsenic, because they want any of the earwigs, cockroaches, or other critters that eat that paste to be killed by it. So I talked about that, and other issues that were in the news at the time. It was Dewey who pointed out that, "This library card is not a 3 by 5 card; It's 75 by 125 millimeters." Dewey had us on the decimal system, and tried to get us away from inches. So there were a number of things like that that were kind of interesting at the time.

After going back and looking at my records, I was really surprised by how many papers I had been asked to write for other people's activities. I've included a partial list below of all the invited papers that I prepared and delivered, as well as all the invited participations in panels as a resource person. I've not included anything that was directly or indirectly related to my job (e.g., presentations to directly promote DIALOG or my own organization's business interests). The following are all strictly volunteer donations:

1962: ADI/UCLA/NSF/NASA Workshop. "Review of the Methodology of Information Systems Design".

Society for Industrial Microbiology. "Problems and Prospects in Biological Communications".

1963: NMA. "Survey of the Utilization of Mechanized Image Systems".

LC/NSF/CLR. "Conference on Libraries and Automation". Invited participant.

SLA/CLA. "An Approach Toward Developing Methods of Library Evaluation".

1964: NSF. "Review of the Criteria and Techniques Used or Suggested for the Evaluation of Reference Retrieval Systems".

1965: UC Extension: "An Introduction to Data Processing". 2 lectures.

IFIP. "Library Data Processing". Symposium Chairman.

SLA/UCB University Extension. "Basic Equipment Used in Data Processing".

1966: Encyclopaedia Britannica. "Information Processing". An assigned portion of a section.

Gordon Research Conference: "The Role of Consulting Organizations in the Development of Information Systems". Presented a paper and serves as discussion leader.

1967: California State Data Processing Society. “Microfilm and Image Handling Equipment”.

SLA: “A 1967 Review of Library Automation”.

ALA/ISAD: “A 1967 Review of Library Automation”.

1968: ALA. “Trends Affecting Library Automation”.

Encyclopedia of Library and Information Science. “Information Processing”. Co-authored section for incorporation into that publication.

1969: SLA. “Evaluation of Library Services”.

1970: SLA/Wash. Library Assoc. “Systems Analysis and Library Service Evaluation”.

ALA/USOE. Conference on Interlibrary Communication and Information Networks. CB attended as an invited participant.

1972: USN Postgraduate School. “A Review of Some Continuing Problems Associated with Library Data Processing”.

1974: SLA San Diego Chapter. “Computer-based Information Services”.

CLA. “History and Overview of Computer Searching”.

UNESCO. “Technical Assistance in Preparation of the UNISIST Handbook for Scientific and Technical Information and Documentation Services in Developing Countries”.

1975: ASIS/SIGLAW. “Hardware”

ASIST. “Voice from a Past President. CB. 1970”

1976: BYU. “Library Automation: Centennial Review and Projections”.

ILR. “Computer-based Reference Services as an Alternative Means to Improve Resource-Poor Local Libraries in Developing Countries”

ILR. “An Improved Title Word Search Key for Large Catalog Files” published with Larry Legard.

1977: ASIDIC. “Training for Computer-Based Reference Services”.

DIALOG. “Successful Search Strategies”.

NLM Research Grants Program. CB invited to participate as a reacting/commenting member of a NLM Task Force on their Research Grants Program.

ILR. “Summary of Cost Data from 300 Reports of Library Technical Processing Activities”

ILR. “Retrospective Reference Searching – Background, History and Performance”

1978: NFAIS. Quality Control Aspects of Databases Furnished by Abstracting and Indexing Services for Online Searching”.
American Society of Public Administration. “National Policy for Scientific and Technical Information”.
Sarada Ranganathan Endowment for Library Science. “Technology in Support of Library Science and Information Service”. Six lectures in a one-week period.
Govt. of India. Dept. of Science and Technology. CB participated as a resource person at their Seminar on Primary Communications in Science and Technology.

1979: UNESCO/U.S. State Dept. CB participated as a member of the U.S. delegation to the Intergovernmental Conference on Scientific and Technical Information for Development (UNISIST II).
IBM. “New Directions for Libraries”. For their 1979 Librarians’ Conference.
ASIS. “Economics of Providing Online Services”. For their annual meeting.
ASIS. “On-Line Systems: History, Technology, and Economics”
Dept. of the Interior. “Impact of Technology on Library Operations”.

1980: FSTA. “Suggestions for Improvements in FSTA Tapes”.

1981: NFAIS. “Are Online Abstracting and Indexing Databases Becoming Qualitatively Different from their Paper Equivalents?”

1983: ASIS. “Observations, Issues and Challenges of the Online Industry”. Keynote presentation for their Mid-year Meeting.
NFAIS: “Value-added Processes in the Private Sector”.

1984: NLM. Sub-committee on Pricing. “Differential Pricing for NLM Services”.
Cranfield Conference. “Online Services/ Database Supplier Relationships”.

1985: ASIS. International Relations Committee. “Centralization of International Information: Promise and Problems”.

1986: NFAIS. “Online Executives’ View of Information Delivery”.

1987: NFAIS. “Gateways Revisited: How do they Affect Database Producers? – The Online Vendor View”.

1988: NFAIS. “New Product Opportunities as a Spinoff from Conventional Database Publishing”.

Utah Library Association. “Librarians’ Survival in a Diverse Society” and “Potential Impact of New Information Products on Libraries and Library Applications”.

Al-Bayan. “Computer-based Information Services and the End User”

1989: UCB Library School Alumni Assoc.: “What’s New?”

India Ministry of Defence. Defence Research and Development Organization.

“CDROM and Other Computer-based Information Tools for Developing Countries” for the International Conference on Bibliographic Databases and Networks” in New Delhi.

1990: ASIDIC: “A Review of Technology and Trends in Document Delivery”.

UN Institute for Training and Research. “Online, CDROM, and other Computer-based Information Tools for Developing Countries”.

National Association of Software and Service Companies (India). “Online Information Systems and CDROM Publishing”.

1991: NSF. “Database Use and Technology in Japan”. CB participated as a member of a 5-person team of experts selected by NSF for a field trip to Japan to examine and evaluate, on behalf of U.S. industry, the state-of-the-art of Japanese database research and development activity.

1992: NFAIS. “Historical Overview”.

1994: UCB Library School. “A Quick Look at the Pre-Online Environment”.

1999: NFAIS. 40 Years of Database Distribution and Use: An Overview and Observation”.

2001: UCB School of Librarianship. “History and Heritage: Remarks for UCB Workshop”.

2007: Menlo Park Green Ribbon Citizens’ Committee to Control Climate Crisis. “Global Cooling Suggestions from a Transportation Commissioner’s Point of View”.

Along with responding to requests for papers and presentations, there were also requests to serve on various advisory boards. My records indicate the following participation:

1963 - ___: Member, John Wiley & Sons. Advisory Board on Information Sciences

1965: Member, CIA Advisory Panel on Information Science

1965 – 68: Member, Advisory Board, Chemical Abstracts Service

1966 – 76: U.S. representative to a Committee of the FID (Int'l. Federation for Documentation)

1966 – 67: Member, Board of Directors, ALA's Information Science & Automation Division

1966 -: Member, Advisory Board to *ARIST*

1967 – 69: Member, Advisory Board. ERIC Clearinghouse for Library & Information Sciences

1968 _: Member, Advisory Board. *Encyclopedia of Library & Information Science*

1972: Member, National Advisory Board for the Study of Information and Education

1987 – 90: Member, Board of Directors, National Information Standards Organization

1987 – 90: Member, Advisory Board, *World Affairs Report*

1989 – 91: Member, Library of Congress Network Advisory Committee.

Okay, I was a UNESCO consultant in Indonesia for two months; I talked about that a bit in one of our earlier discussions (File 14). It was a good time, but it was two months out of my life to do that.

MB: What actually did you do in those two months?

CB: I, with my partner from Germany, taught three courses to three different groups of people. And we had to invent those courses, starting from scratch, because we didn't know until we got there that we were going to have to do it that way, so we just did it.

In 1979 there was a UNESCO Intergovernmental meeting in Paris, and I was named a member of the US delegation to this meeting: the Intergovernmental Conference on Scientific and Technological Information for Development (UNISIST II). This was kind of interesting to me because I hadn't run in these circles before; these "circles" were people who were the usual management types from NSF and some of the other federal agencies. Their mission was primarily to maintain a particular political position to be taken, namely to counter the developing countries' desire, at that time, to have all the information that might be useful for a developing country's development and growth -- the patents, copyrights, trademarks -- anything that would help somebody get an industry started, all available to them for free. The whole issue of proprietary rights was going to be turned upside down if you really took this route; with the southern nations having free proprietary rights from the developed nations. So that's what that

meeting was about. And it was kind of interesting, because contrary to some of the kind of hardened images that I'd seen, heard, or imagined -- there were people who were quite used to seeing each other there at such meetings. The American and the Russian delegations had their own separate caucus meetings, but the Americans brought some bottles of brandy for the Soviet members that they had known for a long time. So that's what that was like.

I gave a talk at an ASIS mid-year meeting in Kentucky in 1983. I had a good crowd there. I'm not sure you ever really need an ASIS mid-year meeting, but it was a popular... I don't even know if they're doing that now...

MB: I was there.

CB: You were there?

MB: Yes.

CB: Okay. How many people did you have?

MB: I don't remember.

CB: But it does serve the purpose of providing--at least somewhat--of a major meeting for a few people, and a chance to meet new people.

Okay. New topic. There was also a time, first in 1966-69, when I was consulting for LC, and then in 1989-91 when I was working on LC's Network Advisory Committee.

MB: That would be with Henriette Avram.

CB: Right. She worked at LC; and she got me working on issues at LC. My first activity with LC was with PSI in 1966-67 with a project to provide consulting help over a 6-month period when LC supplied computer tapes with English-language cataloging information to 16 participating libraries. My staff and I did extensive telephone interviews, initial and follow-up, with those 16 libraries; this was the startup test and experiment that preceded the eventual LC MARC Distribution Service that became a major service to the national library system.¹²⁹

During the early development stages of LC's MARC project, there was an interest in determining what the processing rates and cost would be for an operational MARC system. This information was necessary for planning purposes and could not be obtained with any confidence or precision by making any estimates at that time. Consequently, it was decided to monitor the operations of the pilot MARC operation and to develop a cost model of this operating system,

¹²⁹ Aug. 18, 1966 letter from LC to the participating libraries.

identifying the unit costs associated with many of the sub-operations of this system. I provided consulting assistance to develop this model and identify the associated unit costs.

The cost models were subsequently used by LC in their 1969 update of this activity.¹³⁰ I later served as a consultant to the LC RECON project.¹³¹

In 1985, I was invited by UNESCO to give a library mechanization workshop in Rabat, Morocco. This was a two-week workshop sponsored by UNESCO/UNDP and the Arab League. It was conducted by Prof. Mohammed Aman (another American library school professor) and me to train people from nine different North African and Middle East countries to manage and run online search services in their libraries or information centers. Online practice time was provided for the workshop participants.

Did I mention the story about my kidnapping there?

MB: No. I never heard of that.

CB: Well, it just looked like a kidnapping. I traveled a lot, or did, for all of my working years, and because so much of it was overseas, I would make a practice of not calling when I got there, because there would always be some inconvenience to somebody because of the time difference. So on this particular trip, I flew from SFO directly to New York, but my connecting flight from New York to Casablanca left late ... so late that I missed my connecting flight from Casablanca to Rabat. So, for me, in Casablanca, that just meant, "Well, how do I get from here to Rabat?" Well, there were no more local flights, so you'll have to take a local bus. And that's what I arranged to do, and that got me into the bus station in downtown Rabat. But when I got to the hotel where I supposedly had a reservation, they had no record of any reservation for me, and they had no place where they could put me. "Sorry sir, but you might find some space on the other side of town." So I did. I got there, and I had a quiet weekend by myself, and got prepared for what I was supposed to do, which was to go to a particular place at a certain time and start the workshop. And that's what I did. And just when I got there, the workshop host just happened to be on the phone with my wife, saying, "But he's here now, he's okay. He's here now." And they talked to her, and I talked to her. And that was all innocent enough.

¹³⁰ CB. (Aug. 1967). "Cost Models of the Pilot MARC System." PSI. Final Technical Report. 56 pg. This report has not been formally approved by LC for public distribution.

¹³¹ LC. (1969). "Conversion of Retrospective Catalog Records to Machine-Readable Form: A Study of the Feasibility of a National Bibliographic Service." LCCN 70-601790. ____ Pg.

But to go back a couple of days -- when I didn't show up on the plane arriving in Rabat, the two people who were sent to pick me up were concerned. (I didn't know that anybody was going to pick me up.) They did not speak English very well; (English was not their primary language) and so they called my Lockheed DIALOG office and talked to my secretary, and they said something like, "Mr. Bourne is missing; he's not here anymore,"-- words to that effect. So my secretary, after consulting with my boss, took that information and called my wife and said, "This is going to cause some trouble but I have to tell you, this is what they told me, and we'll start working this through Lockheed's international security department, and it'd be good if you started working it through your local police department at Menlo Park."

My wife said, "Yes, okay; I'll do that." And she started talking to the local police to see if she could open a missing person inquiry at her end. Well, the local police investigators came out and interviewed my wife, asking her if I had a girlfriend or boyfriend, if I did drugs, if I had financial problems,... all the things that seem to be the most frequent reasons why somebody doesn't come home. And so that went on at home for a couple of days, and it got no better. The Lockheed Security Services didn't do any better. Nobody found me. So finally, when the weekend was over and I turned up for work, everyone was happy, and that's the way it went. However, there were some scared people for a little bit.

I served as a guest lecturer in Dubai in 1988. And I served as guest lecturer in Singapore in 1990 for the UN Institute for Training and Research.¹³²

I was invited in 1991 to serve on a team to travel to Japan and review and evaluate computer sciences R&D there, for the US interests, and report back to Washington. This was a situation where the American industries were complaining that the Japanese government was putting too much support into their computer industry, so the Japanese government agreed that, "Okay then, we'll just arrange for you to come and have a good look on your own, with your own people, with our support. And we'll do that for a few years and see if you still have a problem." And so that's what we did; we went over there with a talented team, and went to a number of different institutions and looked at things that people were working on, and found that it was really interesting. Things that we hadn't seen before, like your Garmin or Google maps, or maps for your PC, when you look at them and then you zoom in down on them, the streets that

¹³²¹³² CB. (Sept. 17, 1990) "Online, CDROM, and Other Computer-based Information Tools for Developing Countries". (Unpublished presentation.)

had been out of view all of a sudden start bubbling to the surface; you start out with a map with four or five big roads on it, and with an increase in magnification, all these other streets just come up, and how do you arrange all the emerging view of all the streets that otherwise you wouldn't see? So all that kind of stuff was being shown to us before any of us had ever seen it stateside.

We visited one ethnic museum that had made a practice of recording all their artifacts in a digital form, so that when they obtained an object for the museum, they had it photographed in a three-dimensional digital color image, along with a ruler or some other guide to show the size; and an indication of its weight, and some other information along with it. That was how everything in the museum was recorded; that was its inventory. It was great for scholars or visitors. If you wanted to look at straw baskets or straw hats from a certain region, you could flip through all of the computer images and see the weights and all the measures along with it, and have all of that stuff as part of your lab work right in front of you. And, that was something that, to our knowledge, no facility in our country had. We came back and duly reported, and NSF thanked us for doing that.

I was invited to be a Delegate-at-Large to the White House Conference on Library and Information Services in 1991. I learned a lot more at that time about how the various special interest groups operated--in terms of everybody trying to get their position across, of one kind or another, it was an interesting activity.

I attended an ASIS History Pioneer conference in Pittsburgh. And I'm not sure from the records that I have, whether that in fact was something run by ASIS, or was it something that was run by the Institute of...

MB: It was run by Bob Williams and me.

CB: Was it really?

MB: As an ASIS event. It was funded partly by NSF, but more by the Chemical Heritage Foundation. And it was, as I recall, an ASIS pre-conference.

CB: Okay. It's good to get that back.

MB: There are proceedings of it, too; I don't know if you have a copy.

CB: Well, I remember the Pioneer thing being supported by the Chemical Foundation, and also Gene Garfield's involvement. And I remember a crew of "pioneers" coming in and taping some statements, and trying to capture some of that stuff that they had done.

MB: As I recall, after dinner, Toni Carbo went around with a microphone for pioneers to tell a story, and she was smart enough never to let the pioneer hold the microphone. You might not get it back.

CB: Yes, indeed. But they had their own separate conference in Philadelphia.

MB: That was organized the same way.

CB: Okay. New Topic. In 1999, I was invited to attend and give the Miles Conrad Memorial Lecturer Award at the Philadelphia meeting, for the indexing and abstracting services (NFAIS).

MB: Who was Miles Conrad?

CB: Good question. I didn't find out until many years later in my career that he was a biologist and somebody who worked on information activities such as abstracting and indexing services that were relevant to biologists. He was the Director of *Biological Abstracts* for many years, and the first President of NFAIS.

In 2001-2002 I served on the San Mateo County Grand Jury.

MB: Was that time-consuming?

CB: Yes. Very time-consuming. Because you'd tend to pick these long, continuing study topics, like, "Should that school district be permitted to sell their excess property in order to use the money to invest in the stock market? They act like they don't believe there's any restrictions on doing something like that." You have to talk to a lot of people before you can answer that with some confidence. Or, "Are they still bringing guns into the county courthouse? Should employees and others be bringing pistols into this building? No, I don't think so." And so on.

Okay. There is this California state organization called the Fair Political Practices Commission (FPPC), which by law is supposed to look at issues where people aren't playing right with the law with regard to their behavior while running for, or in office. An example would be soliciting or accepting donations from a person or organization while in office or on a government Board or Agency that is reviewing a request by the donor. And I'd gotten pretty tired of seeing some people in our town serving on a planning commission while doing such things that were so wrong in terms of their vested interests and actions taken. So I prepared a case for that Commission's review. My research identified and documented about a dozen violations of the law, and I submitted it, got them charged with a breach of faith, conflict of

interest, or some other charges, and consequently stopped their bad behavior. That ended their re-election efforts. They negotiated a plea deal and got off with a fine. I felt good about that citizen volunteer activity.

I worked on Menlo Park's "Save Santa Cruz Avenue" Committee; this was a greening and proposed improvement of the street that I lived on. I also served on Menlo Park's Green Ribbon Citizens' Committee to Control Climate Crisis. This group was charged to answer the question, "What things could be done, to improve global warming, from this town's point of view? How could we do that?" "Well, for example, we could build a lot more parking strips downtown and around the parks for bicycles, to make it easier to get people onto bikes and out of cars."

I served on Menlo Park's Transportation Commission for six years, and that was a learning experience. I also applied for, and passed, the first round of applicant screening for California's first Citizens' Re-districting Commission but didn't make it to the finals. That would have been fun.

Since retiring, I've critiqued most of the Environmental Impact Reports prepared for major construction projects that could adversely impact the quality of life in our little town of 30,000. That's all been volunteer activity on my part to try to get some mitigation. We've got a number of these projects all around us, where developers have proposed major construction projects and our City Council has approved them. The construction is moving ahead, but it will severely and adversely impact the streets, housing, and the intersections that are around those projects. So there's a lot of bad stuff going on here with regard to current and expected traffic problems caused by major developments.

MB: Did this result in any litigation?

CB: Some of them resulted in some litigation. Our basic case against California High-Speed Rail coming through town is one example; it's been in the courts for 2 years now.

MB: Now, this date: is that 2002 or 2010, do you suppose?

CB: 2010 would be a good date.

MB: Unless you can travel back in time, it wasn't 2020.

CB: (CB Note: In checking later, I can confirm it was about 2012 when our "basic" High-Speed Rail case was filed. "Basic" means that the statewide ballot argument proposed a construction cost, ridership counts, and travel times that the Authority has since agreed that they

can't deliver; so the voters were given a bait-and-switch scam that shouldn't be allowed to proceed.

Okay. And there's the Gene Garfield ...

MB: I can easily check on what that date was. I suspect it was 1993. I can easily find out, because there was a... I attended that, but I wasn't involved in organizing it. I was awfully busy at that time; I don't remember why. The first time around, I helped Arnold Thackray, the president of the Chemical Heritage Foundation, write the proposal to NSF that got funding for the conference. So I was co-P.I. on the grant. The second time around, I helped with a grant proposal but it wasn't successful, and other people organized the conference. I merely attended.

CB: Masae Gotanda, does that name ring a bell?

MB: Gotanda?

CB: As I mentioned earlier in File 21, I helped her bring some automation to the Hawaii State Library System during the 1973 to '78 time period. She mentioned something to me then about some of her earlier work when she had heard of your dissertation work, and that she had also taken some of that same approach when she did her work.

I'm trying to get my papers in order and stuff keeps coming out, such as Emmanuel Goldberg and his knowledge machine.

MB: Yes. Much-delayed review (of his work).

CB: You should be congratulated.

MB: That was where I could have used some of your help, on microform, mechanical searching of microform.

CB: Yep, more than happy to do that. Okay, that's all I've got here.

END OF INTERVIEW TRANSCRIPT