SCIENCE HISTORY INSTITUTE

O. DAVID SPARKMAN

Transcript of an Interview
Conducted by

James J. Bohning

at

Sparkman's home
Antioch, California

on

6 July 2007

(With Subsequent Corrections and Additions)

ACKNOWLEDGMENT

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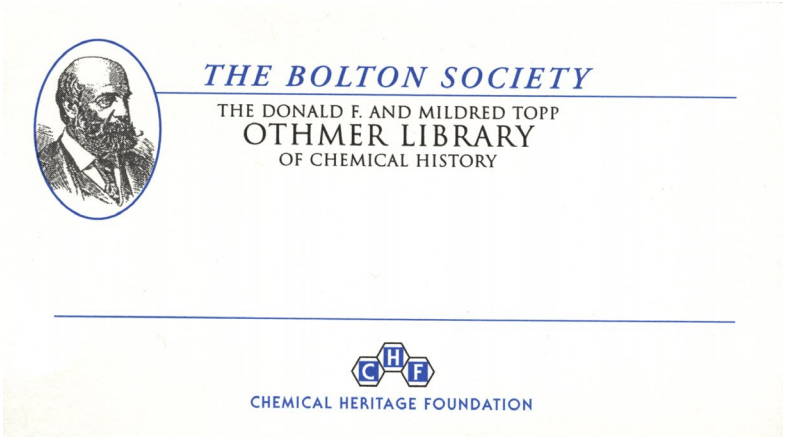

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O. DAVID SPARKMAN

1942	Born in Dallas, Texas, on 31 May

Education

1965	NSF Fellowship, Oklahoma State University at Stillwater, Biochemistry
1966	BS, North Texas State University at Denton, Texas, Chemistry

Professional Experience

	The Western Company of North America, Inc.
1966-1967	Analytical Chemistry Manager for Oil Well Services Company
	Analytical Consultants, Inc.
1967-1969	Laboratory Director and Vice President of Analytical Testing
	Thuron/Zoëcon Industries, Inc.
1969-1974	International Product Manager and Assistant to Vice President of Legal Affairs
	Institute of Applied Sciences at North Texas State University
1974-1975	Research Associate in Environmental Water Chemistry
	Systems Industries, Inc.
1975-1977	Worldwide Sales and Marketing of Mass Spectrometry Data System
	Riber/Nermag
1977-1982	Applications Chemist for Vice President of Marketing, North America Division
	American Chemical Society and others
1978-present	Mass Spectrometry Short Course Instructor
	JEOL USA
1982-1983	Mass Spectrometry Product Manager

	J&S Information Systems
1983-1989	President
	Varian, Inc.
1989-1994	Product Manager for the Saturn GC/MS
	Mass Spectrometry Data Center, National Institute of Standards and Technology United States Department of Commerce
1994-present	Contractor
	University of the Pacific
1999-present	Adjunct Professor of Chemistry and Director, Mass Spectrometry Facility

Honors

1995–2001	American Society for Mass Spectrometry, Corporate Members Advisory Committee
1995-2003	Editorial Advisory Board of GC/MS UpDate Part A: Environmental and GC/MS UpDate Part B: Biomedical, Clinical, Drugs
1998-2003	Editorial Advisory Board, *Journal of the American Society for Mass Spectrometry*
1999-2001	Sanibel Committee, American Society for Mass Spectrometry
2004-2006	Member-at-Large for Education, American Society for Mass Spectrometry
2008	Award for Continued Service in the Advancement of Analytical Chemistry American Chemical Society, Analytical Chemistry Division
2009	Alumni Appreciation Day Honoree, Department of Chemistry University of North Texas, Denton, Texas
	Faculty Advisor, Beta Pi Chapter, Alpha Chi Sigma, University of the Pacific
	Elected Member, Executive Committee, Subdivision of Chromatography, Analytical Chemistry Division, American Chemical Society
	Publication Committee, American Society for Mass Spectrometry

Mass Spectrometry Section Editor, John Wiley *Encyclopedia of Analytical Chemistry*

President and Program Chairman, Bay Area Mass Spectrometry

Book Review Editor, European Journal of Mass Spectrometry

Writer and Reviewer, *Journal of the American Society for Mass Spectrometry*, *Journal of Chemical Information and Computer Sciences*, *Spectroscopy*, and *Journal of Mass Spectrometry*

Member, Editorial Advisory Board, *European Journal of Mass Spectrometry*, John Wiley *Encyclopedia of Environmental Analysis and Remediation*, and John Wiley *Encyclopedia of Analytical Chemistry: Instrumentation and Applications*

ABSTRACT

O. David Sparkman grew up in the Dallas-Fort Worth area of Texas, one of two children. His father managed a refrigeration supply company and then owned a restaurant; his mother was a stenographer and then an office manager. Sparkman developed his interest in chemistry in high school and decided to attend North Texas State University for several reasons: it had a good reputation; it was close to home; it was inexpensive and had financial support; and it provided work in the chemistry department. William H. (Bill) Glaze was Sparkman's mentor and has continued to be a friend and colleague. While at Oklahoma State University for a National Science Foundation (NSF) research fellowship, Sparkman decided he was interested in organic analytical chemistry and instrumentation; he taught himself nuclear magnetic resonance (NMR) and infrared spectroscopy (IR). Back at North Texas he became manager of the instrument room and taught quantitative inorganic analysis. He took a short course on the Spectrometric Identification of Organic Compounds sponsored by the American Chemical Society (ACS) held during a Southwest/Southeast combined Regional Meeting taught by Robert Silverstein and Clayton Bassler.

Wanting industrial experience, Sparkman took a job with the Western Company of North America, which provided oil field services. While there he made a library of gas chromatograms and IR spectra of the company's corrosion-inhibitor components, his first foray into data provision and management. His activities at the Western Company served the company well in that using his library he identified a bad mixture and saved Western from a significant expense. During this time, he also reconnected with Bill Glaze and the two, with a couple of others, formed Analytical Consultants, Inc. (ACI), where he worked for two years. After leaving ACI, he joined Thuron Industries, a pesticides products manufacturer. Not long after, Zoëcon, a spinoff from Syntex with the goal of producing more ecological friendly pesticides, bought Thuron. When Zoëcon's president, Carl Djerassi, visited Thuron, he was surprised to find that Sparkman was a skillful organic analytical chemist and knew of his publications in mass spectrometry.

From Thuron Sparkman joined with his old friend, colleague, and mentor, Bill Glaze, who had established a new environmental institute at North Texas. Minicomputers became available for data systems, and Sparkman, who had been recruited from Glaze's institute by a computer company to work on the sales and development of a mass spectral data system, got Riber, a French mass spectrometry company, to buy Systems Industries' data systems and was then hired by Riber to go to Paris to provide applications support and continued development. He then moved to California when Riber wanted to sell mass spectrometers in the United States; he sold the first one to Djerassi. When Riber went bankrupt, Sparkman went to New Jersey to work for JEOL Ltd. Microcomputers were becoming very significant at that point, and he and another employee left JEOL to form J&S Information Systems, a consulting firm. He also taught a gas chromatography/mass spectrometry (GC/MS) course, beginning in 1978, with J. Throck Watson (whom he had met while at Riber) for the ACS at PittCon and national meetings. Sparkman met his wife in New Jersey but was glad to go back to California and eager to get back into mass spectrometry. Varian was again manufacturing mass spectrometers; Sparkman was able to go to work for them. Varian was introducing a fairly new technology, the

three-dimensional quadrupole ion trap (3D QIT). He liked this technology but not its bureaucracy, and he left for the Mass Spectrometry Data Center at the National Institute of Standards and Technology (NIST) some five years later, where he contributed to the development of a mass spectrometry search program and database of electron ionization spectra. Next Patrick R. Jones, Chairman of the Chemistry Department at the University of the Pacific, began a collaboration with Sparkman and had him teach courses in mass spectrometry as an adjunct professor. Sparkman founded the Pacific Mass Spectrometry Facility. Sparkman and Jack Watson had expanded their course offering to include a five-day, hands-on course taught at Michigan State University where Watson was a faculty member. When space became a problem at MSU, Sparkman moved the course to Pacific with the support of Watson.

At Varian Sparkman began to combine his love of books and history with his passion for mass spectrometry; he started to assemble his library. A new colleague that he met while consulting for a company that published software for chemists—one of their authors—introduced him to Powell Books, where he at once began to shop. Next AbeBooks received his largesse for its out-of-print books. He also persuaded the American Society for Mass Spectrometry (ASMS) to republish early works; Klaus Biemann's was first. To keep together his extensive library—well over a thousand volumes on mass spectrometry alone—and the computer supplements he has accumulated, he has offered his collection to the Chemical Heritage Foundation (CHF), provided CHF keeps it all together.

Sparkman takes the interviewer on a tour of his library, explaining the organization; the various works themselves and their history; the reasons for their importance; and a number of related anecdotes. He talks about his most prized book, his most expensive, and his most elusive. He gives more information on where he has found the works. He mourns the attitude of libraries today, namely, "Toss them out!" but he also admits that he has benefited from this. He has even written a short article for the Bolton Society on the fun and frustration of book acquisition. He bemoans the decline in publishing standards, using his own recent work as an example. He believes that his greatest accomplishment has been in information management and access to information; he has not catalogued his library, but he has a list. He brokered an arrangement between Wiley Publishing and ASMS, a deal that allows members of ASMS to access all Wiley mass spectrometry journals that are online and are at least five years old. He believes his own collection is second only to Fred W. MacLafferty's. Noting the importance of article titles in literature citation, he described his successful efforts to have all of the mass spectrometry journals, now, require this. Five years after this interview, Sparkman added an epilogue.

INTERVIEWER

James J. Bohning was professor emeritus of chemistry at Wilkes University, where he had been a faculty member from 1959 to 1990. He served there as chemistry department chair from 1970 to 1986 and environmental science department chair from 1987 to 1990. Bohning was chair of the American Chemical Society's Division of the History of Chemistry in 1986; he received the division's Outstanding Paper Award in 1989 and presented more than forty papers

at national meetings of the society. Bohning was on the advisory committee of the society's National Historic Chemical Landmarks Program from its inception in 1992 through 2001 and is currently a consultant to the committee. He developed the oral history program of the Chemical Heritage Foundation, and he was CHF's director of oral history from 1990 to 1995. From 1995 to 1998, Bohning was a science writer for the News Service group of the American Chemical Society. In May 2005, he received the Joseph Priestley Service Award from the Susquehanna Valley Section of the American Chemical Society. Bohning passed away in September 2011.

ABOUT THIS TRANSCRIPT

The Center for Oral History, Science History Institute, is committed both to preserving the recording of each oral history interview in our collection and to enhancing research use of the interviews by preparing carefully edited transcripts of those recordings. The preparation of interview transcripts begins with the creation of a verbatim typescript of the recording and proceeds through review and editing by staff of the Center; interviewees also review the typescript and can request additions, deletions, or that sections be sealed for specified periods of time. The Center keeps track of all changes that staff, interviewers, and interviewees make to the original typescript. Please contact us if you would like additional information about these materials. We have established guidelines to help us maintain fidelity to the language and meaning of each recorded interview while making minor editorial adjustments for clarity and readability. Wherever possible, we supply the full names of people, organizations, or geographical locations mentioned during the interview. We add footnotes to the transcript to provide full citations for any publications that are discussed, to point to extant oral history interviews, and to clear up misstatements or provide context for ambiguous references in the transcript. We use brackets to indicate the addition of material that was not in the audio, and bracketed ellipses to indicate the deletion of recorded material. The transcript also includes time stamps at five-minute intervals. We omit without noting most instances of verbal crutches and all instances of nonlexical utterances. We also make small grammatical corrections where necessary to communicate interview participants' meaning. Finally, staff of the Center create the abstract, chronology, and table of contents. With the availability of online full-text searching of our transcripts, the Center for Oral History opted to discontinue the practice of preparing a back-of-the-book index for each oral history transcript in 2020. **The Science History Institute is committed to the responsible presentation of the history of science by addressing evidence of inequality and oppression as well as the subsequent silences in our collections. To that end, we recognize there may be language in our oral history collection that is outdated, offensive, or harmful, such as, but not limited to, the following: racist, sexist, Eurocentric, ableist, and/or homophobic language or depictions.**

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College Years 3

Entered North Texas State University. Good reputation; inexpensive; close to home; financial support; work in chemistry department. Originally teachers college; discussion of change of name and focus. Robert A. Welch Foundation provided money for students and research. Worked in lab at 4:00 a.m. because of heat. Research on anti-tumor drug synthesis. Importance of communication. William Glaze his mentor. Undergraduate research fellowship to Oklahoma State University to study thiamine in rat brains. Taught himself nuclear magnetic resonance (NMR). Interested in organic analytical chemistry and instrumentation. Back to North Texas; took over management of instrument room. Also taught quantitative inorganic analysis. Short class at American Chemical Society in Memphis, Tennessee. Taught by Robert Silverstein and Clayton Bassler.

First Jobs 7

No good schools in analytic chemistry. Wanted industrial experience so took job with Western Company of North America. Found oil field services really practical engineering. Company wanted gas chromatograph, asked Sparkman to choose one; chose Hewlett Packard 5750. Cost more than his house. Recovering secondary oil from old wells. Built library of corrosion inhibitors' components and solved problem using his library. Company bought more instruments, Sparkman learned much more. Left after two years to set up Analytical Chemistry, Inc. (ACI), with Glaze. Left after two years for pesticide production company, Thuron Industries. Made No-Pest strips and flea collars. Lawsuit with Shell Oil. Worked on identifying unknowns. Paul Wilks. Shell gave them wrong formula; Sparkman saved company million dollars. Thuron bought by Zoëcon. Carl Djerassi's visit. Developed lifelong friendship.

Next Career Moves 11

US Environmental Protection Agency just established. Water purity compromised by chlorine disinfection; Sparkman to Houston to work on ultraviolet disinfection. Glaze also involved. Importance of gas chromatography-mass spectrometry. Finnigan instrument. Glaze established new environmental institute at North Texas; Sparkman went there. George Waller's prototype instrument. Too many data for analog analysis; minicomputers now available for data systems. Finnigan-Systems Industries (SI) nexus. Got Riber to buy part of SI's data system products line; Sparkman to work for Riber

in Paris; back to California to sell Riber's first mass spectrometer in U.S.; sold to Djerassi. Djerassi's plays. Riber bankrupt; Sparkman to New Jersey to work for JEOL, Japanese manufacturer of mass spectrometers. Met his wife. Microcomputers becoming important. Left JEOL to form company with computer expert from JEOL; consulting for six years. Company called J&S Information Systems. Did not like New Jersey. Had met Jack Watson in Paris; had become good friends. Taught together at American Chemical Society (ACS); Sparkman strong on data systems.

Back to California 17

Varian again manufacturing mass spectrometers; bought Finnigan Instrument Corp. Sparkman to Varian; liked its technology but not bureaucracy. Went to Mass Spectrometry Data Center at National Institute of Standards and Technology (NIST) and developed more courses to teach at ACS. Worked on the development mass spectrometry search program. Patrick Jones, Chairman of the Chemistry Department at the University of the Pacific, hired Sparkman for Mass Spectrometry Data Center. Teaches course developed with Watson at Michigan State University; course now in twenty-fifth year. Began with two JEOL instruments; now up to ten. ACS changed rules for courses; so Sparkman now affiliated with LC Resources. Still finds mass spectrometry fascinating because always changing; resurgence of time-of-flight; quadrupole ion trap. Koichi Tanaka's and John Fenn's Nobel Prizes.

Book Collecting, pt. 1 23

Began acquisition while at Varian; always had too many books to move. Met new client, saw Kiser book, found out about Powell's Books. Immediately went online and found seventeen more mass spectrometry books from 1950s; then fifty-six from 1960s. Discovered AbeBooks for out-of-print books. Got ASMS to agree to republish early works; Biemann first, now up to seven. Found more books through bibliographies in his books. Decided to leave entire library, including computers, to Chemical Heritage Foundation (CHF). Francis Aston before World War II. Uses for mass spectrometry: synthetic rubber; isolating pure uranium at Oak Ridge, Tennessee, for atomic bomb; President Hoover's company. Germans wrote number of books; Atomic Energy Commission translated Ewald and Hintenberger. German translation of Russian book and original Russian book in photocopy. Chemical notation understandable in any language. British first to commercialize organic mass spectrometry for dye industry in Manchester. From O-16 standard to C-12. Sometimes several printings or editions of same book. Importance of dust jackets. Signed copies. Books from friends who know he will give them to CHF. Libraries, even Library of Congress, toss books out.

Book Collecting, pt. 2 33

Most expensive book; most elusive. Krieger reprints. McGraw-Hill series. Journal series from many organizations. Difficulty browsing with electronic

books. Books on phase ion chemistry; vacuum systems; mass spectra; chromatography. Signs copy of own book for interviewer. Alfred Nier and CHF interview. Keith Nier. Benjamin Silliman's pre-Civil War physics. Michael Grayson. Sparkman's greatest accomplishment in information and access; brokered deal that allows ASMS member to have access to all Wiley journals older than five years. ASMS's money stockpile. At least 1,000 books just on mass spectrometry. Two things he won't buy: special reports from Royal Society and print-on-demand books. Harrie Massey. Bolton Society article about his finds. Sadtler Standard Spectra. Condition of books. Considers gas chromatography work his greatest contribution to science. Fred MacLafferty's collection. Fenn's electrospray did not begin until Fenn was seventy-two, so Sparkman has time to get Nobel. Collection only fifteen years old. Badgers friends for books. Terrible review for Wiley-published book; decline in publishing standards. Marcel Dekker. Has all seven editions of Silverstein and Bassler book. First McLafferty book. Arnold Thackray. Methuen series. Many books from Rockefeller University's discards. Idea for pocket reference to interpret mass spectra; just a give-away.

Epilogue, Five Years Later 59

Just finished second edition of *Gas Chromatography and Mass Spectrometry: A Practical Guide*, with Zelda Penton. Bruker Daltonics had 500 copies imprinted with its logo and gives copy with each instrument sold. Wife died of multiple myeloma. Was a professional colleague; edited all his work, including last book, despite illness. Frustration with Elsevier. Jack Watson has glioma; chemotherapy not working. Dog, Maggie, hard-working mass spectrometrist, put down. Continues to teach at University of the Pacific and to manage Pacific Mass Spectrometry Facility. Also still writes and edits and collects books. Collection to go to CHF.

INTERVIEWEE: **O. David Sparkman**

INTERVIEWER: **James J. Bohning**

LOCATION: **Antioch, California**

DATE: **6 July 2007**

BOHNING: [. . .] Let's start by indicating that today is July 6. [. . .] This is Jim [James J.] Bohning speaking with [O.] David Sparkman at his home in Antioch, California. David, I'd like to start a little bit with your family background, and I guess I need to start with when and where were you born.

SPARKMAN: I was born [May 31], 1942 in Dallas, Texas. [. . .]

BOHNING: Can you tell me something about your parents and your family background?

SPARKMAN: Well, my father worked in [management and sales in] the refrigeration supply industry [for many years and retired as a restaurateur owning a small twenty-four-hour cafe on the edge of Dallas].

My mother worked as a stenographer. She was an early stenographer [and was very skilled in the arts of typing—before the time of electric typewriters—and shorthand. She retired as the office manager of a regional sales of American Sterilizer Company, later known as Amsco, International, Inc. and acquired in 1996—by now known as STERIS Corporation—in Dallas, Texas. Both of my parents were products of the Depression being born in the early 1900s. My father was a high-school dropout, and my mother almost completed a college degree before the death of her father and the necessity to quit school to help her mother support her two siblings. They married in the late 1930s. Because of my father's involvement in the refrigeration industry, he was prevented from enlisting in military service during World War II. My father served in the Texas National Guard during the war. From the time they had married, they had wanted children. After medical examinations told them that they would probably remain childless], they adopted me in [1942, less than six weeks after my birth].

I have a sister who was adopted in 1944. [She too was adopted a few weeks after her birth from different birth parents than mine.] Then my parents divorced sometime in the mid-1950s. I don't recall exactly when. I lived with my mother, but still had an association with my father after that.

BOHNING: So did you get all your early schooling in Dallas?

SPARKMAN: All of it in Dallas.

BOHNING: Where did you go to school?

SPARKMAN: Well, actually, I got some of my early schooling in Fort Worth, because my parents lived between Dallas and Fort Worth and that was at a time when those were actually two separate cities. Probably today they're still two separate cities, because there's a lot of philosophical difference between Dallas and Fort Worth. [. . .] I finished grade school in Dallas at a place called Robert E. Lee. [Before their divorce my parents moved around a lot due to real-estate investments and later on due to my father changing from a refrigeration job in Dallas to owning his own business in Fort Worth. After the divorce and moving back to Dallas, my mother moved us every year to fifteen months; I never knew exactly why. We always stayed in East Dallas, but this is why I experienced a different school every year until I got to junior high.] I went to junior high at J. L. Long, which is in a section of Dallas called Lakewood in East Dallas. Then I went to high school at Woodrow Wilson and N. R. Crozier Technical High School.

BOHNING: Along the line, were there any teachers or anyone who had an influence on you?

SPARKMAN: There were a few teachers. I had a mechanical drawing teacher in junior high school, [who] sort of fostered my initial interest to go into engineering. He had a pretty pronounced influence. Other than that, no.

BOHNING: When did you get your first chemistry?

SPARKMAN: My first [interest in] chemistry [was] in high school and that's a rather interesting story. [. . .] I took the high school chemistry course [. . .] in my sophomore year. There were two guys in the class with me [who] were seniors. I became quite good friends with [them]. We started the Chemistry Club, [and we] were very active in the Chemistry Club. They graduated.

One went to the University of Texas, and one went to the University of Oklahoma, both to major in chemistry, and both flunked out their first year. When I went to college, I went to North Texas State University, which at that time didn't have a school of engineering, so I wasn't going to become an engineer. It did have a department of chemistry and I said, "Well, I'll just

show these two guys and I'll major in chemistry," and that's how I got started in chemistry. [laughter]

BOHNING: Why North Texas State?

SPARKMAN: Several reasons. It was close to Dallas. It was only about thirty miles from Dallas. It was a university. It was a four-year college. There was financial support, and I could work in the Chemistry Department. The school had a very good reputation, and it was very inexpensive. Because—being that I was born in Texas, a third of the exorbitant tuition of seventy-five dollars a semester was waived. [laughter]

BOHNING: [. . .] It's now the University of North Texas?

SPARKMAN: Yes.

BOHNING: I guess a lot of state schools did that. They dropped the state part of the name.

SPARKMAN: There's a lot about state schools. Most schools [with state in their name were part of the land grant college system and started as] A&Ms, Agricultural and Mineral [Mechanical] Colleges which were, [in part], established for training officers for the military. [. . .] Michigan State University was originally Michigan A&M. But North Texas was a normal college, and normal colleges were established specifically for the [. . .] [higher education of primary school teachers]. Many of those schools then became teachers colleges, so what was North Texas Normal College became North Texas State Teachers College, and then it became North Texas State College, and, [later], North Texas State University, and now the University of North Texas, which differentiates it from the two very large school systems in Texas, the University of Texas and the Texas A&M system.

BOHNING: [. . .] What was the student population when you were there?

SPARKMAN: [. . .] I don't recall, and I didn't pay much attention to that, but it was under ten thousand and over five thousand.

BOHNING: [. . .] What was the Chemistry Department like?

SPARKMAN: The Chemistry Department was a place where every chemistry major—undergraduate and graduate and while I was there they had a master's program and then in my last year they started a PhD program—and every student worked in the department [. . .] as a teaching assistant [TA], prepping laboratories or doing research.

Of course, Texas, for chemists, is one of the greatest places in the world because of the Robert A. Welch Foundation, which meant that there was plenty of money for research and there was a lot of support for students. [. . .] The building that we were in was not that old, but it was built before the time of air conditioning, and the Chemistry Department was on the third floor. The research laboratories had air conditioning—room air conditioners that were in the windows—but the student laboratories were all un-air conditioned with very high ceilings.

One summer, I [was a teaching assistant for] undergraduate quantitative analysis, back when real men did quantitative analysis, and we did gravimetric analysis. So I would start the laboratory at about four o'clock in the morning. [laughter] The windows in the building were huge, of course, to allow for circulation. A lot of times there were loud bangs because doors would blow shut if a [welcomed gust of] wind came through. So it was not an inhospitable place [to be]. The lecture halls had no air conditioning and the chemistry classes, even in the fall and the late spring [when] it gets very hot in Texas, [were] always started very early in the morning to avoid the heat.

BOHNING: I didn't realize that they had a PhD program. You said it started just as you left?

SPARKMAN: Yes.

BOHNING: What was the size of the faculty?

SPARKMAN: I would say there were about a dozen faculty members and as I left, they brought in about three or four new faculty members as they were starting this program, all of [whom] did become tenured, and some of [whom] have now retired.

BOHNING: Did you do any research as an undergraduate?

SPARKMAN: Yes.

BOHNING: What did you work on?

SPARKMAN: I was working in the area of biochemistry, and I was synthesizing anti-tumor drugs that we were testing on mice.

BOHNING: Was it required for every undergraduate to do research?

SPARKMAN: Yes. [. . .] You had to do research and there was an interesting aspect to it. Every undergraduate research [course] was under the direction of the department chairman, J. L. Carrico. [. . .] [You received credit for two semesters even though you often spent more time than that working projects for the same faculty member.] The first semester you were given an incomplete and then the second semester you were given the grade for two semesters. After you finished your research paper and your advisor was satisfied with it, then Carrico went over it and he went over it from a grammar-communication standpoint, emphasizing the importance of communication. [. . .] That had a very lasting effect on me, because [later, at the University of the Pacific], we were getting a number of graduate students from China, and we would talk about making sure that it is clear what is [actually meant in our lectures], such as, "The duck is ready to eat." [laughter] So [Dr. Carrico spending] a lot of time [on the appropriate way to communicate] had a very profound effect on me, I think [understanding communication was] a very important aspect [of my education at North Texas].

BOHNING: Was there anyone [who] was a mentor?

SPARKMAN: Yes. There was one person, Bill Glaze, William H. Glaze, who at the time was in the area of physical chemistry and organometallics. He became a mentor because during my [tenure] at North Texas I had an undergraduate research fellowship to Oklahoma State University, where I did some studies on thiamin deficiency in rat brain. While I was there, because I was eager to learn, I taught myself analytical instrument techniques of NMR [nuclear magnetic resonance] and infrared [IR]. I became very proficient in doing analysis in those techniques. That's when I began to realize that I was interested in analytical chemistry, organic analytical chemistry, and instrumentation.

[. . .] The department did not allow any of the students, even the graduate students, to do their own analysis [on our NMR and IRs]. They submitted their samples, and the analyses were done for them. Glaze had been responsible for getting the NSF [National Science Foundation] grants that paid for a lot of the instrumentation. [When I came back from that summer at Oklahoma State the fellow who] had been in charge of [our instrument room] had graduated and left and they needed someone new. Glaze came to me and asked me if I would do that job, which I did do. He and I became very close friends.

I was very surprised to find he didn't know very much about interpretation of these data, so I was able to show him a lot and he was able to help me a lot in the area of physical chemistry. Then, that December I went to Memphis, Tennessee and took the first [ever offered

ACS, American Chemical Society, short course in continuing education at the Southwest/Southeast combined Regional Meeting—the Robert M. Silverstein and G. Clayton Bassler course entitled *Spectrometric Identification of Organic* Compounds—the same as the title of their now infamous book]. [. . .] That was a great course. Because of attending it [I knew that I wanted to pursue a career in analytical chemistry]. I learned quite a bit [from that course].

[. . .] When I finished school, one of the early things that I did in my career was started an analytical testing laboratory and [Bill] Glaze was [actively] involved in that. [He and I are still in contact today.]

BOHNING: [. . .] So you ran the laboratory [your] senior year? It was the junior-senior summer that you went to Oklahoma?

SPARKMAN: Yes.

BOHNING: [. . .] Did Silverstein and Bassler teach this course?

SPARKMAN: Yes.

BOHNING: What were they like?

SPARKMAN: They were very approachable. They were very good teachers. I was a little surprised because I had read the advertisement for the course in *Chemical & Engineering News*, and it said that [. . .] the course was directed toward people [who] had a PhD in chemistry. I figured when I applied for the course that they were not going to let me take it. Little did I understand that the ACS is interested in making money, not in supporting its requirements. [laughter]

So they [. . .] accepted me and then they sent me the book and all of the materials that were to be used in the course with this huge amount of pre-course questions and reading to do. What did I know? I just did it, so I was very well prepared. They were very impressed with me, and I was very impressed with them. I was very surprised that most of the people in the class were not very well prepared. [. . .] [This was] another thing I hadn't understood [about a lot of people, especially those working in industry. After I stated teaching for the ACS, all of this became very clear].

BOHNING: This would've been 1966, '65?

SPARKMAN: [. . .] This was in December of ’65 [before graduating in June].

BOHNING: [. . .] This was pretty early though in the days of NMR. [. . .]

SPARKMAN: Yes. It was only proton NMR. Our department had a Varian [Associates] A60, which was a fixed-field magnet. I did all the analysis, all of the maintenance on the instrument, and helped the people with their interpretation of [the data], because by the time I came back from the December course there was no one, student or faculty, [who] knew as much about interpreting those data as I did.

BOHNING: You really had quite a bit of responsibility then as a senior undergraduate in terms of the functioning of the Chemistry Department.

SPARKMAN: Yes, and I also that semester, [I again taught] quantitative inorganic analysis—still with the Fisher burners.

BOHNING: Yes. I remember those days. [laughter] We didn’t have air conditioning in our building either. Did you think about going on to graduate school?

SPARKMAN: I thought about it, but I [really] couldn’t find a good school at that time in analytical chemistry and I wanted to get some industrial experience. So I took a job in Dallas working for an oil field services company. It turned out that that was a little bit of a disappointment because it was more practical engineering than it was really chemistry. The first project that I worked on was rapid-curing resins for runway repairs. We actually did nothing but make different formulations and test them for their compression and tensile strength. We would make these formulations and vary them at different temperatures, including −5 degrees Fahrenheit. Now, that project taught me a lot about kinetics because the reactions were very slow to take place, so I would add more catalyst. I found out that once you reached a certain threshold in the formation of the free radicals that thing took off like a scalded dog, and I had a few minor explosions of my plastics because of that. [laughter]

Then, for some reason—and no one in the company knew why—the company decided it wanted a gas chromatograph [GC]. Because I had all this instrumental experience, [and] they felt a gas chromatograph and an infrared spectrophotometer [and NMR] are all instruments [and are] all pretty much the same thing, they asked me to actually choose the gas chromatograph that we were going to buy. [. . .] I chose a Hewlett-Packard 5750, after a tremendous amount of fretting and studying material and looking at the different instruments. [. . .] The four candidates were Perkin-Elmer [Corporation], Beckman [Instruments, Inc.], Varian, and Hewlett-Packard.

Now both Varian and Hewlett Packard were just new into analytical instrumentation through acquisitions of Aerograph and F&M Scientific, respectively.

So I picked this instrument and it was fifteen thousand dollars. At that time, I was married, and my wife and I had just bought a house for thirteen thousand dollars. [laughter] So this was quite a decision for me. It also taught me a lot about economics. Then the delivery times were very long because this was during the time that the Vietnam War was ramping up, and all the government contractors were buying up gas chromatographs and taking the production, so my delivery kept getting pushed back. Then, you have the buyer's remorse. "Did I make the right decision?" [. . .] [I] thought about this [over and over]. The instrument finally came, and I set up a laboratory with it. That turned out to be very good because, like I said, no one knew what we were going to do with this [and I had time to teach myself gas chromatography, getting the company to send me to a couple of very good hands-on courses].

[. . .] The division [I worked for] was a contract engineering company that did government contract research. But we also had an oil field services company that was involved in secondary and tertiary recovery of oil from old wells. The way you do this is [to] pour hydrochloric acid through the drill pipe and then bring the spent acid, which burns out the limestone, up through the annular space between the casing and the drill pipe. Now, this process meant that you had to put a corrosion inhibitor in [the acid solution] to keep from destroying the casing and the drill pipe. Our company had formulated a lot of organic corrosion inhibitors and at the time we were ahead of our major competitor, which was Halliburton [Company. Shortly after] we got the gas chromatograph and I got it set up and I saw some of the things that could be done for separations, I took every one of our corrosion inhibitors and every component in them and chromatographed them to build a library of profiles.

I did this over about a two-month period of time, altering the conditions to get everything just right, and I had a library of conditions. One night [I got a call from a field supervisor] and he said, "We have a problem" and I said, "It's three o'clock in the morning. You have a problem. I don't have a problem." [laughter] And [then he] said, "We were treating a well and all of a sudden, coming back up through the well head [were] chunks of drill pipe and casing. We ate up the well, and it's about a million dollars' worth of stuff and we need to know why." So they flew samples in from West Texas. These were [. . .] West Texas wells, which are relatively shallow and [where] temperatures are very high, which is what exacerbates that problem of eating stuff up [with high concentrations of hydrochloric acid. Using the GC and my libraries of chromatograms] I very quickly [found] that the people [who] formulated our [corrosion] inhibitor had left out a major ingredient. So, the problem was not ours; it was the formulator.

After that point, I was golden. [laughter] I was able to buy a number of other instruments, and I developed some very good skills in gas chromatography. Gas chromatography, at that time, was changing. It was still using packed columns but there was a big movement to use much lower loadings of liquid stationary phase than had originally been used. Ten or 20 percent [. . .] was used up until that time, but lower loadings were now being used, [2 percent or less].

[END OF AUDIO, FILE 1.1]

BOHNING: What was the name of the company? [. . .]

SPARKMAN: The Western Company of North America. The Western Company no longer exists. The guy [who] owned that company [also] owned that Dallas baseball team that George Bush owned before Bush owned it. He went into offshore drilling, and lost the company, and that was the end of it. I think the technology was bought out in bankruptcy by Halliburton.

But after this, and after becoming pretty proficient in gas chromatography, which was something that I had not really studied in school at all because it was so new a technique, I started this laboratory with Bill Glaze and then got recruited from it to work for a pesticide manufacturer in Dallas, which turned out to be rather interesting.

One of the things that I did in the contract laboratory that I started [was to become] interested in information-rich detection from gas chromatography. You could separate compounds by gas chromatography, but, other than their retention time, you didn't have much of a way to determine what they were. A former Perkin-Elmer employee named Paul Wilks began developing devices that could be used in infrared spectrophotometers.[1] One of the devices that he came up with was a ten-centimeter gas cell that would fit into the interface of an infrared spectrophotometer; you could stop the flow from a packed GC column and obtain a gas-phase infrared spectrum for identification.

This turned out to be a very valuable tool in identification of unknowns. We did some great stuff [with] it. Then the company talked about buying a GC/MS, but I decided to take my profits from the company and go to work for this pesticide company before the company decided to do that.

BOHNING: Let me just put the time frame together. You worked for the Western Company from [1966 for] how long?

SPARKMAN: From '66 until '68.

BOHNING: Then you started your own company with Glaze.

[1] Paul A. Wilks, Jr., interview by David C. Brock and Arthur Daemmrich at Chemical Heritage Foundation, Philadelphia, Pennsylvania, 29 October 2002 (Philadelphia: Chemical Heritage Foundation, Oral History Transcript # 0267).

SPARKMAN: In ’68, into 1970. Then in 1970, I went to work for this pesticide company, which at that time was named Thuron Industries.

BOHNING: What was the name of your own company, by the way?

SPARKMAN: Analytical Chemistry Inc., ACI. So after going to work for this pesticide company, I got involved in a very interesting project. The company was a manufacturer of these No-Pest Strips that were hung in homes for controlling houseflies. That same pesticide, which was Vapona [dichlorvos], was used for flea prevention in dogs, and you would put these collars on dogs.

[Thuron] was manufacturing this material in what Shell Chemical [Company] believed was a violation of one of their patents. [Thuron] felt that they had a position that it wasn’t a violation of the [Shell] patents, but then Shell refused to sell the chemical to [Thuron], and the company was in sort of a bad position, because this had become one of their major products.

[Thuron] found out that Shell sold—[which] they could buy on the open market—a cattle dip that contained [. . .] the same pesticide. There were three components. There was [an aromatic organic] volatile solvent, because that was necessary [. . .] to dissolve the pesticide, an emulsifier, [and] the pesticide. You’d put [this mix into water to form a cattle dip].

[Thuron] decided that they would [. . .] build a still to [remove the organic solvent, leaving a residue of the emulsifier and the pesticide. They then planned to use this distillation residue to formulate their No-Pest Strips. I used] gas chromatography to figure out what the requirements [were] for the still and we started working with an engineering company to build this. We had bought, literally, thousands of drums of this stuff. And I said, “Now, I want to be able to predict our yield, so I want to go out and sample from a number of these drums in a statistical way to determine what our yield is going to be, because I suspect it’s going to vary.”

Everybody in the company said, “That’s a waste of time. [There are other things you should] be doing. To get to some of these [drums of formulated pesticide] is going to take an operator to run a forklift, and we just don’t want to do it.” I said, “Well, we’re going to do it.” We did, and it turned out that Shell had got wind of what we were doing and, instead of formulating the material with xylene as the organic [solvent], which could be easily distilled off, they formulated it with heavy aromatic naphtha, which meant that the pesticide eluded in the middle of this stuff. Of course, if I hadn’t done that study, we would’ve spent a million dollars on this still. It turned out that we only had about fifty gallons of the [formulated pesticide that was in xylene].

[The building of the still was stopped.] The company upped its “illegal” activities on [this issue], and prevailed in their lawsuit, [forcing] Shell to take back all of the material that we

had bought refunding our money. We probably wouldn't have been able to recover that money for the still if we'd built it.

Now, that company had very good distribution of pesticides. It did the No-Pest Strips. It was the primary OEM [original equipment manufacturer] for flea collars for dogs. It had a proprietary formulation which put a pesticide in with sugar. Everybody else mixed the pesticide with the sugar, and when you would spread this out then the sugar would melt, and the pesticide would no longer be effective. This company developed a process where it mixed the sugar in the pesticide, and then passed it through heavy steel rollers to impregnate the sugar so it was homogeneous. We pretty much controlled the fly control market for the livestock industry [with our sugar bait].

There was a new company in California that was getting into safe environmental pesticides, and that company was called Zoëcon [Corporation]. Zoëcon was a spin-off from Syntex [Research], and Zoëcon acquired Thuron Industries. Now, the board of directors of Zoëcon came to [. . .] Texas from California, really looking down on us, because they were the environmentally clean pesticide people, and we were the nasty, dirty, hard pesticide people.

There was a guy [who] was the Chairman of the Board and President of Zoëcon named Carl Djerassi.[2] Carl Djerassi [. . .] has a very well-known reputation in mass spectrometry [MS]. So Djerassi comes out. I walk up to Djerassi with a copy of his 1967 book with [Herbert] Budzikiewicz and [Dudley H.] Williams, and I said, "Would you autograph this for me, please?"[3] And he said, "Who are you? How did you know about this book? There's nobody at this company [who] knows anything about this stuff." [laughter]

BOHNING: That's typical Djerassi.

SPARKMAN: Right. So I explained to him who I was and that I admired [this book], although I suspected he didn't have much hand in it, and he agreed that that was true. He provided the laboratory and space and the guy that did most of it was Budzikiewicz. But he and I became good friends at that time. So I continued to work for Thuron Industries and Zoëcon for a few years, mainly doing analytical consulting and working with the vice president of legal, providing technical opinions.

I left there in 1974, and went to Houston, Texas. I wanted a change of scenery. I had a friend down there that had a [. . .] government contract research company and he hired me as a chemist. I started working with him on the area of ozone and UV [ultraviolet] disinfection of drinking water [as an alternative to chlorine disinfection].

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[2] Carl Djerassi, interview by Jeffrey L. Sturchio and Arnold Thackray at Stanford University, 31 July 1985 (Philadelphia: Chemical Heritage Foundation, Oral History Transcript #0017).

[3] Carl Djerassi, Herbert Budzikiewicz, and Dudley H. Williams, *Mass Spectrometry of Organic Compounds* (San Francisco: Holden-Day, 1967).

This was the time that the EPA, [US Environment Protection Agency], which was newly formed, had discovered that there was a much greater hazard in drinking water than the biological hazards that the US Public Health Department had been interested in. That problem was halogenated organic compounds that were in the water. This was when the big New Orleans drinking water study was done and they found bromoform in the water.[4]

[. . .] Where did all this stuff come from? It came from the chlorine disinfection. Chlorine [reacting with] humic substances, which couldn't be filtered out, was producing the chloroform and the carbon tetrachloride. The bromide ion that was natural in some waters was being oxidized to bromine and this was the source of the brominated compounds. The same thing was true for iodines and iodated compounds.

Once they understood where this stuff came from—at first, they thought it was industrial waste, but then it turned out that it was a product of the process—they started looking at alternatives to chlorination. Now the ozone UV is something that we started doing a lot of work in, because we had a relationship with people at the University of Houston, who saw this as a possible alternative. The problem with that technique is that there's no residual. Chlorination gives you residual, so you can store the water and kill off the bacteria, but the ozone UV doesn't give you any residual.

I worked with this company on this, and Bill Glaze, in the meantime, had undergone a midlife crisis. He stopped being a physical organic chemist and became an environmental organic chemist. He no longer worked with organometallics, and he started becoming interested [in natural waters] with a guy named J. K. G. Silvey at North Texas [State University].

I got Glaze involved with our project. Glaze wanted to get into the field of gas chromatography/mass spectrometry [GC/MS], which was having a tremendous beginning through instrumentation developed by Finnigan [Instrument] Corporation in San Jose, [California.[5] He talked me into going to work for his newly formed Environmental Institute at North Texas because of my extensive knowledge of GC. I went to work for Glaze and got acquainted with Finngian GC/MS. While I was at Oklahoma State, I had some involvement with George Waller and his LKB-9000, which was an analog-based GC/MS. As a matter of fact, it was the first commercial GC/MS; Waller's instrument was a prototype and the first in the United States. I had also learned a later about the interpretation of mass spectra from Djerassi and the Budzikiewicz book. Up until now] all the instrumentation that I'd dealt with—all of the data that I'd dealt with [from these] analytical instruments—was all analog data. But the one thing about the GC/MS system is there was so much data, there was no way to deal with [the vast amounts of data produced in an analog form]. It was just absolutely impossible.

About the same time that GC/MS began to become a reality, the minicomputer was developed at MIT [Massachusetts Institute of Technology] and Digital Equipment Corporation

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[4] See James L. Agee, "Protecting America's Drinking Water Our Responsibilities Under the Safe Drinking Water Act." *EPA Journal* 1 (1975): 2.

[5] Robert E. Finnigan, interview by David C. Brock at Los Altos, California, 4 December 2001 (Philadelphia: Chemical Heritage Foundation, Oral History Transcript #0227).

came about. One of the first uses [of the minicomputer] in the analytical laboratory was for a GC/MS data systems. [At this point], I became very interested in the data systems and in computers and how [all of that worked together with the instrument].

BOHNING: [. . .] When you say you went to work for Glaze, the company you had formed was that still in existence? [. . .]

SPARKMAN: No, that company had been sold off, and Glaze had established [. . .] an environmental research institute [at North Texas]. I was working for this company involving Glaze in Houston, and Glaze wanted someone to come and do this gas chromatography/mass spectrometry for him in the environmental institute.

I was so excited about the opportunity to work with this. To me, this was the ultimate in information-rich detection. I just jumped at it and went [to work for Glaze]. [. . .] I had actually never had a course in computers. We had [had], in the laboratories I worked at, a [desktop] electronic calculator thing that was made by Olivetti [SpA] called an Olivetti Programmer 101 [and allowed form somewhat complex programs to store on magnetic cards; I had been familiar with it but not to a great extent].

You may have experienced these. These were interesting devices that you could write programs on and store them on magnetic cards. Then you could put the program in and then key in your data for it to process, but that was the only real computer experience I'd had. When I was in college, North Texas didn't have a computer. SMU [Southern Methodist University] had a computer. I had friends at SMU that worked on that and I [had seen this computer which filled a building with rack after rack of vacuum tubes, but I had never worked with one using anything other than the machine language associated with Programmer 101].

So this thing, the minicomputer, which was nineteen inches wide, ten-and-a-half inches high, and about three feet deep, was just incredible [to me]. The things that we could do with [it] were just unbelievable. I started reading in the literature and working on this. In 1975, what happened was Finnigan Corporation had made it in GC/MS, because they had tied up with a company called Systems Industries [SI], which commercialized a data system that was developed at Stanford in the medical school, in the department of immunology.

But then, Finnigan got greedy because, every time they sold a GC/MS [with a] data system, over half of the sales price went to Systems Industries. [Through an acquisition] they started developing their own system and severed the relationship with Systems Industries. Systems Industries [. . .] was rather upset by this because, even though it was a company that had been originated [. . .] to build disk drive [systems] for the minicomputer, the major portion of their income was coming from these mass spectrometry data systems.

[Systems Industries] decided that they would continue to sell these data systems and they recruited me from Glaze's laboratory to go to work to help them sell these and develop new

capabilities for them. I started to work for them in 1975. [. . .] They allowed me pretty much a free hand. I made some relations at Michigan State University where they had developed new software [which I was able to use to greatly expand this device].

After a time, [. . .] about 1977, SI's disk drive business had taken off and this product was no longer in their definition. They said, "We want you to find somebody to acquire this product." At that time, we had a number of OEM customers [who were manufacturing their own GC/MS systems] and the one that was the most likely [to buy the SI GC/MS data system] was a French company, whose name was Riber. I convinced Riber that they should buy this product line from Systems Industries. Then they would have an exclusive on it, which would give them [. . .] a competitive advantage. Other companies that were contenders were companies that I didn't think had that much of a future because of their technology; they included DuPont [E. I. du Pont de Nemours and Company]. This was when DuPont was in the analytical instrument business.

So Riber bought the company. My bosses at [SI] were very pleased. They thought I got a very good price for [the data system product line]. They gave me a very nice commission and then they said, [. . .] "We want to thank you for all your hard work, but we no longer have a job for you." And I said, "I should've seen that one coming." [laughter]

So I went to Riber with my hat in hand and said, "Do you have any jobs that I might do? [. . .] I like this particular field and I'd like to continue in this field." Riber hired me. [. . .] At that time, I was living in California, and they moved me from California to Paris, France.

Now, when I moved from Texas, from working with Glaze to California, that was the last time I lived in Texas. I moved to Paris and then the company sent me back from Paris in 1979 to start up the [US subsidiary] and the sales of their mass spectrometers. [. . .] I had to sell that very first instrument, which was a very difficult job, because this was a foreign manufacturer and so on. We were doing fairly well selling retrofits to the data systems that were already in the field, but we had to sell [the first mass spectrometer], and we had to sell it to somebody that had a very good reputation.

We also wanted to sell it in California so we could be close to servicing it. [I said, "I have an old friend,"] so I went to Zoëcon and sold it to Carl Djerassi. [laughter] Carl remembered me, of course, and we had contact through the years and, without a question, he bought the instrument. Now, [. . .] Djerassi is a flamboyant person. In his office [at Zoëcon in Palo Alto], he had a burl wood throne that was his desk and it was on a dais. The people that came to his office to talk to him sat on large pillows that were on the floor [so that he was above them as he sat]. Now, my boss in France, who was a very formal person, kept insisting he had to meet this person I had sold this instrument to, and I kept trying to avoid that. [laughter] I almost lost my job that day because he couldn't believe the environment [in which] we were in talking to Djerassi. [laughter]

[END OF AUDIO, FILE 1.2]

BOHNING: That's a nice Djerassi story. I hadn't heard that one. [. . .]

SPARKMAN: Yes, Carl is an interesting guy. [laughter]

BOHNING: I think he just had another play, didn't he? It was something I read recently.

SPARKMAN: *Oxygen*? [. . .]

BOHNING: One since then.

SPARKMAN: Oh, is there another one since then?

BOHNING: It was a newer one. I've forgotten what it's about, but I think it was in *C&EN* [Chemical & Engineering News].[6]

SPARKMAN: [. . .] Anyway, [getting back to] the French company. [We] did very well. The instruments got established in the US. What happened, though, was we would send copies of our purchase orders from the US—for instruments—to France. [. . .] The company had gone through being owned by a group of men, to being sold off to a larger company, Instruments S.A., and then being spun out back to the individual owner. The owner would take the purchase order to the bank to borrow the money to manufacture the instrument, which is not uncommon.

What is uncommon is he would take the same purchase order to several banks. [laughter] Finally this caught up with him and the company went bankrupt. I didn't see much of a future in it, so I then went to work in 1983 for JEOL [Ltd.], which is a Japanese manufacturer of mass spectrometers. JEOL moved me from California to New Jersey. Single—well, actually, I can't say that. I started to say it was the single greatest mistake of my life. [laughter] But if I hadn't moved to New Jersey, I wouldn't have met my wife.

So anyway, I moved back there to work for JEOL, and it turned out that JEOL didn't have the product that they said that they had. There was another guy [working in JEOL, who] was a computer programmer, who I had [recommended JEOL hire as a fresh graduate from Michigan State; this was the guy I had worked with on a lot of the advancements in the Riber GC/MS data system]. This was at the time when the [. . .] microcomputer was just beginning to

[6] Rick Mullin, "Uncomfortable Issues in *Phallacy*," *Chemical & Engineering News* 85 no. 23 (2007): 41-2.

come of age. The IBM PC [personal computer] had been out for about a year and a half. The Lotus 1-2-3 program was gaining tremendous popularity.

This guy and I decided we're in one of the greatest business areas of the world, [geographically], so we started a consulting firm in microcomputers. [. . .] I took a job at a local ComputerLand [retail store], selling computers, because people were buying these things and didn't know what to do with them, and I could recruit them for our business. We continued to do that from 1983 until 1989.

BOHNING: This was the J&S Information Systems?

SPARKMAN: Right, J&S Information Systems. [. . .] At first, it was a lot of fun because there was a lot of new technology that I was learning, and a lot of new aspects, but the people that I was working with were different than the scientific people that I'd always worked with. And I began to miss that.

Now, during [my time at Riber and then JEOL], as sort of a segue way here, there was a guy named Jack Watson [J. Throck Watson], who at the time was at Vanderbilt University.[7] He had some contacts with some people in France where he had done a postdoc [postdoctoral fellowship]. My boss at the Riber company always wanted to associate with as many people in mass spectrometry as possible.

[In the late 1960s and early 1970s there were three names most often associated with mass spectrometry: Klaus Biemann, John H. Beynon, and Fred W. McLafferty.[8] Biemann was at MIT and turned out some of the leading second-generation mass spectrometrists, and Watson was one of these. Biemann has added more successful people to mass spectrometry than anyone else, although McLafferty is not far behind. When Watson came to Paris, after attending a mass spectrometry meeting in England, my boss at Riber had me meet him at the airport. Watson and I met and immediately became very good friends over a typical French dinner lasting for several hours.]

About the time I moved back to the United States with Riber, he asked me to join with him teaching an ACS short course on gas chromatography/mass spectrometry, based on this book that he had just written, which was *Introduction to Mass Spectrometry*.[9] He was especially

[7] J. Throck Watson, interview by Michael A. Grayson at Watson's home in East Lansing, Michigan, 27-28 October 2013 (Philadelphia: Chemical Heritage Foundation, Oral History Transcript # 0903).
[8] Klaus Biemann, interview by Michael A. Grayson at Alton Bay, New Hampshire, 29 August 2006 (Philadelphia: Chemical Heritage Foundation, Oral History Transcript # 0279); John H. Beynon, interview by Michael A. Grayson at Swansea, Wales, United Kingdom, 22 April 2008 (Philadelphia: Chemical Heritage Foundation, Oral History Transcript # 0420); Fred W. McLafferty, interview by Michael A. Grayson at Cornell University, Ithaca, New York, 22 and 23 January 2007 (Philadelphia: Chemical Heritage Foundation, Oral History Transcript # 0352).
[9] J. Throck Watson, *Introduction to Mass Spectrometry: Biomedical, Environmental, and Forensic Applications* (New York: Raven Press, 1976).

interested in me [joining him in the endeavor] because of my knowledge of the data systems. [. . .]

[recording paused]

Watson was especially interested in me because of my knowledge of the data systems, and this was an area [where he was not very strong]. He and I became close friends and, even after I left JEOL and sort of left the field of mass spectrometry, he and I continued to teach this course for the American Chemical Society [from 1979]. I continued to attend the mass spectrometry meetings that were held every year. I was doing it because I knew that at some point in time I would get back into this area.

In 1989, Varian, who had left the field of mass spectrometry about five or six years earlier [when they sold what was the Varian MAT mass spectrometry business located in Germany to Finnigan], decided to get back into it. And this time, they wanted to get into it with GC/mass spec and they acquired some technology from Finnigan because T. Z. Chu was in terrible financial straits, and he had to sell off some technology in order to try and keep the company alive. [Finnigan was publicly traded and under a lot of pressure from its stockholders. Chu sold Varian] technology on the [the three-dimensional quadrupole] ion trap [3D QIT] and I came to work for Varian in California. Now, the main reason that I went to work for Varian in California—I did want to get back into mass spectrometry—but I [really] wanted to get out of New Jersey. [laughter]

It was very embarrassing because I came for the interview, [I had several long discussions, and I did a demonstrating of my training skills in the field of mass spectrometry]. [. . .] The job that I interviewed for was to do training of [the Varian] sales force in mass spectrometry. After the interview, the guy that was to be my boss called and he said, "Well, we've decided that we don't want to offer you that job. We want you to be the product manager for the product. Would this be something you'd be interested in?" I said, "Yes." And he said, "We want to offer you a job." And I said, "Okay, I accept. [. . .] When would you like me to start?" And he said, "Well, could you start on the first of October?" I said, "No, I have an obligation," which was one of my clients in the consulting [business], "but I can start on the fifteenth of October." He said, "Okay, that'll be fine." And I said, "Thank you very much. I'll be in touch." He said, "Do you want to know what the salary is?" I thought, "Uh-oh," because I was very interested in [leaving New Jersey]. [laughter] I said, "Oh, you do have a move package, don't you?" And he said, "Oh, yes." I said, "That's all I needed to know. Surprise me." But then we talked salary. So I went to work for Varian.

BOHNING: Where in New Jersey were you, by the way?

SPARKMAN: I lived in a town called [. . .] Mountainside on Route 22. It's just a little bit south of Summit. It's not a bad area. It's okay. It was an okay area if you had to live in New Jersey, but I just didn't want to live in New [Jersey]. When I moved there—I moved there in

April—and that spring and summer were very nice. Fall was beautiful. First snow was okay. Second snow was all right. Third snow was not very good. When it got to be the end of April [the next year] and there was still dirty snow on the ground, I knew I wasn't going to stay there. [laughter]

Anyhow, I moved out [to California] and started to work for Varian. Varian wasn't my first experience with a large company, but it was just [. . .] incredible the amount of bureaucracy. [. . .] Having had my own business for the last six years, it was very, very difficult to adjust. The technology part was great, but I found the bureaucracy stifling. After several years, I began to look for something else to do. I knew that I did not want to jump to another mass spectrometry manufacturer. They all had the same stifling bureaucracy.

[. . .] [During my time at Varian], I had developed a very close relationship with [the people in the Mass Spectrometry Data Center at the] National Institute of Standards and Technology [NIST], formerly NBS [National Bureau of Standards]. They had [become the stewards for the EPA/NIH mass spectral database, which was provided by all mass spec manufacturers, usually in a format for the manufacturer's propriety database search software]. This database had been growing quite a bit since I first became involved with it [in the mid-1970s on the System 150. The guy heading this project in NIST] and I became very good friends. [NIST] wanted to develop their own search program [so that people could have easier access to all the data in the database rather than being restricted to just searches of experimental obtained spectra against this large collection of spectra. NIST also wanted to improve the quality of the database and they wanted to develop stronger relations with distributors, both instrument manufacturers and third-party vendors that specialized in scientific software. In 1994] Steve Stein, directory of the Mass Spectrometry Data Center in NIST] offered me a [consulting] contract, which was annually about half of what I made at Varian.

Also at that time, [the] ACS was really ramping up the number of courses that they were offering. [This was] because I had taken a more active role [in the course content to expand the interest, resulting mine and Jack's courses becoming] very popular. I decided [that I could] live on [the money from these two activities and started my own independent consulting business]. I was working with NIST and teaching courses and developing new courses. [Watson and I, and another Varian colleague], ended up developing several new [two- and three-day] courses.

At that time also, Watson had started a course at Michigan State, which was a five-day hands-on course. [It] was a very lucrative course, and I [became a part of that. This course involved getting instrument manufacturers to provided new instruments with the latest bells and whistles. Graduate students not only from Jack's research group but [also] the rest of the department were used as teaching assistants. They had to learn the instrument well enough to appear as an expert and guide multiple people—mostly from industry—in groups of three or four though a variety of experiments. This gave these student TAs an education beyond their wildest expectations. These activities gave me] enough money to do fairly well—or support myself and not have to do other things. So that's [when] I started doing [what I am still doing today and will continue to do as long as I am able. These activities continued from 1994 until

1999. NIST renewed my one-year consulting agreement a couple of times and then gave me a five-year contract].

Now about 1999, there were a lot of people [and, more importantly, instrument manufacturers] that had adopted this NIST [MS] Search Program that I was very instrumental in developing. [. . .] I have a lot of friends in the industry; a lot of people were doing different things [such as offering third-party hardware service and being distributors of the NIST Database and its software for third-party data systems they were offering as retrofits to older instruments no longer supported by the manufacturers].

I had this one friend [who] at the ASMS [American Society for Mass Spectrometry] meeting in Dallas [. . .] came to me and [. . .] said, "Listen, I'm in terrible trouble. I sold this guy a copy of the NIST [Database] and Search Program and I don't know how to make it work with the software that he has. I know you know how to do [this]. Will you show him how to [make it work]? And can you show him here at the meeting?" I said, "[Yes], I can do that, Ben. [. . .] Just catch me a little later." [After that], about every hour, he'd say, [. . .] "Can you do it now? Can you do it now?"

"A little later." So [on] Wednesday of that week, I said, "Okay, Ben, I'll do it [now." Each time Ben would approach me, he usually had the guy he wanted to show how things worked in tow]. I sat down with the guy. I had my laptop computer, and I had [the mass spectral data analysis software he was using on it along with] the NIST program. I started showing him how to do [interact between the two programs]. This guy was just taking notes, ferociously. I'm looking over at him and I can see that his eyes are glazing over. And I said, "The problem is not that you don't know how to hook this up to the data system. You've never run that data system, have you?" He said, "That's right."

I said, "Okay, I will." It turned out that the guy was at the University of the Pacific [in Stockton, California]. He was chairman of the department at the University of Pacific, [Patrick R. Jones]. And I said, "Well, I've been meaning to get over there, and you're just across the Delta [the Northern California Delta, which is one of the richest agricultural areas in the world, from where I live in Antioch]. I'll come over and see you." Sort of in the back of my mind, I thought, "Now, he probably thinks I'm telling him this and never expects to see me. But I really ought to go over there and see what they have."

The week after [I returned from ASMS], I drove over across the Delta [. . .] and found the [. . .] building that houses the [Chemistry Department]. The first thing I saw, I couldn't believe. They had head-in parking right in front of the building with no permits required. [laughter] Free, open parking. Then, I walked into the building and saw the chairman's office and there were several doors open. One of them was to a large classroom that was an amphitheater that would seat about a hundred people. There was another room that was filled with computers—[and last, but not least]—there was a laboratory that had laboratory benches without center islands on them.

At this time, I was in the process of moving that course that Watson had started at Michigan State to California, and I was going to move it to [the University of California at] Berkeley. I was not looking forward to this, because there's no parking at Berkeley. I'm not a Nobel laureate, yet. [laughter] That was the only available free parking. There were hills that you had to climb, and security was difficult. You couldn't leave things in the laboratories overnight. [. . .]

I was just really concerned about this. I looked at [these amenities at Pacific and said to myself, "I have found myself a home." Pat Jones and I started a great friendship [that day which continues till now]. I installed the system on his computer, and I taught him how to use it. [Then] I asked him if he would be interested in having this course moved to Pacific. Well, of course, he was just absolutely delighted.

And [Jack, Fred, and I did teach the course at Pacific that year]. It had already been scheduled at Berkeley. It was to be taught in August and [. . .] this was late June. We had to contact all the people that had already registered and get them switched over, switch their hotels and so on. We did that and it was successful. [. . .] We have offered the course there every year since. [This course celebrated its 25th anniversary in 2012.]

[Pat] was very interested in mass spectrometry. He's a physical chemist—graduated from Stanford—and had never had any really decent mass spectrometers. He had two very old instruments. [As part of my now involvement with Pacific we started a mass spectrometry facility with two new instruments]. I was able to make a deal with JEOL to get two high-resolution—[actually, medium resolution—one with R = 5,000 at 10 percent valley and the other with R = 5,000 at FWHM], double-focus instruments, a GC/MS and a LC/MS [liquid chromatograph/mass spectrometer]. [. . .] Today, we have ten mass spectrometers. Those two JEOL instruments are the oldest. All of [Pat's] old [iron] has been moved out and put into storage in various places in the building. A lot of the stuff that was in his laboratory, which looked like the black hole of Calcutta, is gone, and [this lab is] now a modern mass spectrometry laboratory.

In the fall of 1999, [Pat] asked me to teach a graduate course in mass spectrometry, which I did, and I have continued to do so since then. We've had several students graduate from our laboratory over these past eight [now thirteen] years. All of them have been able to get very good jobs. [Continuing my consulting with NIST, teaching two-, three-, and five-day short courses in various types of mass spectrometry, and directing the Pacific Mass Spectrometry Facility is] what I've been doing now for the last eight [now thirteen] years.

BOHNING: [Are] you still teaching any ACS courses, or just this one here?

SPARKMAN: No. What [. . .] happened was the guy that was in charge of the ACS short course program retired last year [2007]. A new guy came in and the new guy wanted to make a number of changes. One, he didn't want to have any courses that were longer than two days.

Several of my courses, out of necessity, had to be three days. Necessity, for my way of wanting to teach them. Also, he wanted us to sign a contract that said that the courses belonged to the ACS, that we could not teach them without permission from ACS, and ACS could use the materials in any way that they wanted.

So I, [Fred and Jack], and several other [ACS] instructors elected not to do that [and we're now teaching those same courses with a company called LC Resources], and those are two- and three-day courses offered around the country. Also, I had developed for the ACS a web-based mass spectral interpretation course, which I now teach for LC Resources. And this course offered at Pacific is now offered through LC Resources and not through ACS.[10]

BOHNING: You've been teaching these courses a long time, then.

SPARKMAN: Yes, [more than] thirty years.

BOHNING: Did any of them ever become audio courses, or would that have been too difficult? At one point, ACS was selling these courses on tape. [. . .]

SPARKMAN: There were two sets of audio tapes that were sold on mass spectrometry. One was done by Don [Donald W.] DeYoung and another was a set from Catherine Fenselau.[11] But, no, [my courses] never became audio courses. The closest thing that could've become a type of audio course was the web course. Because the way the web course is done [it would be possible to use that as a computer-based audio course]. The web course meets for six weeks, twice a week, an hour-and-a-half each session. And I give a lecture using Voice Over IP [Internet Protocol], and [also] use PowerPoint [PPT] slides to accompany the lectures.

All of that is recorded, so that the participants can go back and review [each lecture—voice and the PPT presentation]. We post this on something. I don't know what you use at Lehigh [University], but at Pacific we use Blackboard.

BOHNING: We have that at Lehigh.

SPARKMAN: [. . .] There was another type of thing called Virtual Campus that ACS did. [. . .] The participants could go back and replay the lectures and those stayed available until the end of

[10] Sparkman notes: In 2010, Fred Klink and I started a company called Mass-Spec-Training.com. The course we originally taught the ACS and subsequently taught through LC Resources are now (as of 2012) taught through Mass-Spec-Training.com.

[11] Catherine Fenselau, interview by Michael A. Grayson at University of Maryland, College Park, Maryland, 13-14 April 2012 (Philadelphia: Chemical Heritage Foundation, Oral History Transcript # 0710).

the course. At the end of the course, [. . .] the participants were no longer given [. . .] access to them.

What happens is each [. . .] session has a homework assignment. The people do the homework assignment and fax it in and then I review the homework at the beginning of the next session. I mark—not grade—the homework that they send in and send it back by regular mail. That's a very good distance learning technique. It's a little different. What's the guy's name at Lehigh [who does this sort of thing]?

BOHNING: Ned [D.] Heindel**.**

SPARKMAN: Ned Heindel. It's a little different than the way Ned does it because I don't use any video of myself. It's just my voice, and I can use the PowerPoint presentations, or I can use application software.

BOHNING: Are these mostly spectral interpretations versus how to run an instrument [or is it both]?

SPARKMAN: Yes, it's spectral interpretation and it has to do [. . .] a lot with how to select the spectrum to interpret. There are problems in mass spectrometry when you use gas chromatography because the concentration of the analyte is continually changing as the chromatographic peak develops. This can cause spectral anomalies, and how do you deal with those? Then there are problems that a chromatographic peak can represent more than a single component, and how do you deal with that?

So it's not only the interpretation of the spectra, but the understanding of the spectrum. But now we have to get to the important thing.

BOHNING: Well, I just wanted to ask you one more thing, and that is that since you've been doing it for thirty years, and you were doing it in an area that was changing constantly. So that means these courses had— you couldn't just teach a course; you had to keep modifying and changing as you went along. [. . .] That must be quite a challenge to do that.

SPARKMAN: It is, but it's the thing that makes it so exciting and so interesting. It's kind of hard to [. . .] explain, but when I started, in order to analyze an organic molecule by mass spectrometry, the molecule had to be volatile and not thermally labile. You had to be able to get it into the gas phase to ionize it. Today, we can take and ionize intact proteins that have masses of hundreds of kilodaltons and we can get a great deal of information.

The mass spectrometers that [. . .] existed for a long period of time were the magnetic sector instruments, the time-of-flight instruments, which almost fell into total disuse because of their shortcomings and the transmission quadrupole. Time-of-flight [MS] has made a resurgence and is probably the most important of all instruments. The quadrupole ion trap in various iterations has changed the field of mass spectrometry.

The Nobel Prizes that were won by [Koichi] Tanaka and John [B.] Fenn [in 2002] show clearly how the field has advanced. [. . .] That prize was for being able to ionize material in the condensed phase. So it's that continual changing that makes it very exciting.

[END OF AUDIO, FILE 1.3]

BOHNING: [. . .] I guess what we need to start with is how and when you started collecting [books]. [. . .] Did you consciously do this, or did it start out just because of the work you were doing and then you made a conscious effort to start the collection?

SPARKMAN: Well, I've always been a bibliophile. I have loved books and I've seen the [intellectual] value in books [and history of various subjects]. But, as I would move around, I never really collected a lot of books. Books were heavy and difficult to move and so, over the years, books that I had collected I just left places. As a matter of fact, when I left New Jersey to come out here, I had a couple of dozen *Proceedings of the American Society of Mass Spectrometry*, and they were in the office where I was working, and I just left them there. I just forgot them and didn't even think about them for a couple years. [. . .]

When I went to work for Varian, I acquired a few books that were pertinent to the work that I was doing at the time. Then, in 1994, when I left Varian, I started developing more of an interest in some of the older technology. I met a guy through one of my consulting relationships. I started consulting for a company called ChemSW [Fairfield, California], which [published] software for chemists. They had a number of mass spectrometry programs and they had [an author who] was with the CDC [Centers for Disease Control and Prevention] in Atlanta, [Georgia]. He and I started a correspondence because I told him things that he could do to improve his program from a user perspective. I went to Atlanta, and I met him. I went to his home, and he showed me a book by a fellow named [Robert W.] Kiser. It was a mass spectrometry book that was written in the '60s and it was just really a fascinating book.[12] I said, "Where in the world did you find [this]?"

I've always gone to old bookstores and so on. He said, "I got it online from a place called Powell's Books in Oregon." [At this time the Internet was just beginning to take off. After being told about how he got this book, when I came home, I went online to the Powell's

[12] Robert W. Kiser, *Introduction to Mass Spectrometry and its Applications* (Englewood Cliffs, NJ: Prentice-Hall, 1965).

Books website] and I did a search on mass spectrometry and found another copy of the Kiser book and found a bunch of other books. One of the other books was by a guy named Barnard, [George] P. Barnard. He was from England, and he had written a book in the '50s.[13] So, I bought those two books. Then over time I bought a couple more books [from the Powell's Books website from that period. In the period from 1950 to 1960 there were only seventeen books with mass spectrometry in their keywords list. Six of these were the proceedings of conferences. Between 1960 and 1970] people started publishing more mass spectrometry books. [That period had fifty-six titles along with proceedings from a number of conferences and collections of mass spectra in book form.] There was sort of a dearth in the '80s, but in the mid '90s there began to be a few, and I would buy the newer books.

Then I found [some other websites for out-of-print books]. There were two of them. One of them was AbeBooks and the other one—which ended up being sold to Amazon.com and I can't remember what it was—it was another used book search engine that at the time competed with AbeBooks. I would search those [endlessly looking for new titles in mass spectrometry. Then] one day I just kind of said [to myself], "You know, I want to have all the books that have been written on mass spectrometry."

Also, another thing occurred [at about this time]. I went to a FACS meeting—Federation of Analytical Chemists meeting—and a guy named Peter [H.] Dawson, who is a Canadian, got up and gave a talk. I thought, "My God I thought this guy was dead." He had written the quintessential book on quadrupole technology.[14] In searching all of these search engines, going to all of these bookstores—because at this point, [. . .] every time I'd go to a [city], I'd look for bookstores and go to these bookstores—I'd never been able to find a copy of it. I'd had some Xeroxed pages of the chapter on quadrupole ion traps from that, but this book was sort of the Holy Grail.

Dawson gets up and gives [his] talk and I'm just amazed because I thought he was dead. He looked awfully good for a dead man. [laughter] In his talk, he talks about that book and gives a current copyright date, which I think was about 1995, and I said, "No, that's not right because this is a book from the '70s." It turned out that the American Institute of Physics had republished that book.[15]

[This started me] thinking about important books that had disappeared. [. . .] At the 1997 ASMS meeting, I came up with the idea that ASMS should republish books in mass spectrometry. I approached Klaus Biemann and asked him if he would give ASMS permission to reprint his book, which was written in 1962.[16] He, of course, agreed and said he was quite flattered. I got two other members of the Society, we prepared a letter, sent it to the Board of

[13] George P. Barnard, *Modern Mass Spectrometry* (London: Institute of Physics, 1953).
[14] Peter H. Dawson, ed., *Quadrupole Mass Spectrometry and its Applications* (Amsterdam: Elsevier Scientific Publishing Co., 1976).
[15] Peter H. Dawson, ed., *Quadrupole Mass Spectrometry and its Applications* (New York: American Institute of Physics, 1995).
[16] Klaus Biemann, *Mass Spectrometry: Organic Chemical Applications* (New York: McGraw-Hill, 1962).

Directors and suggested that they publish old books. They've now republished about seven of them, which when we go in here [my office in my home] you'll see.

As time went on, I would find sources of books by [getting] a book [and looking at its bibliography]. I remember one that was very important [. . .] by a guy named [John] Roboz, and Roboz had a bibliography.[17] Kiser had a bibliography. So these sent me looking for other books. I began to acquire books. [. . .] One of my greatest experiences was in New Orleans, [Louisiana], in a bookstore [where] I found a book that was entitled, *Electron Impact and Ionization Theory*.[18] I said, "This sounds like gas phase ions." I pulled that book down and started reading through it. I sat there and read it for a long period of time, saw it was a great book, set it on this couch that I was on, walked to the restroom, came back, and—because this was during the Pittsburgh Conference [PittCon], there were a lot of chemists—some guy was about to pick up my book. So I dispatched him quickly and took the book, paid for it—which was only about ten dollars—and went running out the door. [laughter] Then I began to learn about the source of literature, especially from the '30s and '40s, that was not in journals but [was] in monographs, so I started building the library and collecting it.

At one point, I decided that this library can't just fade away. What happens with so many people—especially in universities—when they retire, people from the department come and take their books and the collections are just gone. So that's when I decided [when—this was about the same time that] I became aware of CHF [Chemical Heritage Foundation]—that [my] library would go to CHF when I go. It's not just the books and the journals, but I want my computers to go, because I have a lot of stuff that I've downloaded from the web that's electronic [and that I have developed for teaching my courses].

So if you'd like to go in here, I can . . . [pointing to his study]

BOHNING: Yes, the only thing is, I would like—because I want you to talk about the collection, but I would like to get it on tape. [. . .]

SPARKMAN: Well, that won't be a problem. I've got a table in there you can set [your recorder] on.

BOHNING: That's fine. Let's do that then.

[recording paused]

[17] John Roboz, *Introduction to Mass Spectrometry: Instrumentation and Techniques* (New York: Interscience Publishers, 1968).
[18] Raimonds Peterkops, *Theory of Ionization of Atoms by Electron Impact* (Boulder, CO: Colorado Associated University Press, 1977).

SPARKMAN: [. . .] This is my collection. It is randomly assembled, mainly to where the shelves will accommodate things. This is the book by G. P. Barnard that was one of the early books after World War II.[19] Mass spectrometry, up until World War II, was primarily the privy of physicists and the big person was [Francis W.] Aston determining the accurate masses of the nuclides.

[One of the things that] happened in World War II was that the Japanese took over Malaysia, which cost [the Allies] the rubber resources. Synthetic rubber became very important and mass spectrometry for organic purposes was something that became important [to the development of synthetic rubber]. But mass spectrometry's biggest role was in the development of the atomic bomb, because it was mass spectrometry technology that was used to isolate the pure uranium at Oak Ridge, [Tennessee, with these huge] instruments that were built by General Electric.

Herbert Hoover's son [Herbert Hoover, Jr.] started a company called Consolidated Engineering Corporation, CEC, which was really the first commercial manufacturer of organic mass spectrometers. The company was originally started to help do exploration for oil, but it ended up being used [for] scientific instruments. It was only after World War II that people became interested in it for something other than organic chemistry. There'd been a little bit, but those were mainly curiosities about polyatomic molecules in the gas phase.

[The Barnard] book, when it came out, which was in 1953, was really considered the quintessential book [on mass spectrometry].[20] He also—and I have been able to get a copy of [it]—published a little pamphlet in 1956 of various research that took place in mass spectrometry.[21]

Now, of course, the other people that were very big in developing the atomic bomb were the Germans, and the Germans have published several books in mass spectrometry. One of the early books was this book right here, which is by [Heinz] Ewald and [Heinrich] Hintenberger and this is considered a quintessential book in mass spectrometry and it's 1952.[22] That book was so important that the US Atomic Energy Commission [AEC], in about 1962, ten years later, translated it into English.[23] [. . .]

BOHNING: I wonder if they had permission to do this.

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[19] Barnard, *Modern Mass Spectrometry*.
[20] Barnard, *Modern Mass Spectrometry*.
[21] George P. Barnard, *Mass Spectrometer Researches* (London: H. M. Stationery Office, 1956).
[22] Heinz Ewald and Heinrich Hintenberger, *Methoden und Amwendungen der Massenspektroakopie* (Weinbeim/Bergstrasse: Verlag Chemie, 1952).
[23] Heinz Ewald and Heinrich Hintenberger, *Methods and Uses of Mass Spectrometry* (Oak Ridge, TN: US Atomic Energy Commission, Division of Technical Information, 1962).

SPARKMAN: I doubt it. As a matter of fact, probably not at all, because the government doesn't need permission. They can take patented material and [use as they like for their purposes]. There are patents that Finnigan [owns] that the government has violated in having Teledyne build instruments for the government's [use because the US government] is not bound [by normal restrictions due to] the patents. So, I would say, probably not.

Now, here is my crown jewel. This book is a 1956 book that's in German, but if you look, you see [will] something up here talking about '53 and that certainly doesn't look like German to me.[24]

BOHNING: No, it's not. [laughter]

SPARKMAN: So I carefully figured out what this book is. [. . .] It is a German translation of a Russian language book. This is the author of the Russian language book, and it says in here that the publisher of this [book], VCH [Verband Chemiehandel], helped in [performing] the translation of the scientific [information]. So what's the most valuable thing? A copy of the original Russian and that is the crown jewel.[25]

BOHNING: How did you find this?

SPARKMAN: [. . .] I have a friend who is a professor in Moscow, [Russia], who is head of the Russian Mass Spectrometry Society, so I wrote him explaining this to him and he said, "Well maybe we can get a copy from the library and make a copy for you. Will that do?" And I said yes. At the ASMS meeting in Indianapolis a few weeks ago [June 2007] he walked up and handed me this.

BOHNING: Oh my.

SPARKMAN: Now here's the thing that's so interesting. This shows that [. . .] five thousand copies of this book were printed. [. . .] Now, I have a good appreciation for what five thousand copies of a book are because, in 2000, I wrote this book, *Mass Spectrometry Desk Reference*, and it went into a second printing.[26] The first printing was two thousand, the second printing was two thousand, and the publisher still has some of these. And this is considered to be a very

[24] G. R. Rieck, *Einführung in die Massenspektrometrie* (Berlin:VEB Deutscher Verlag Der Wissenschaften, 1956). Citation provided by the interviewee.
[25] Georgiy Rudolfovich Rik, *Mass-Spektroskopiya*, Modern Problems of Physics Series, edited by Akademik P.I. Lukirskiy (Moscow: Government Publishing House for Technical-Theoretical Literature, 1953).
[26] O. David Sparkman, *Mass Spectrometry Desk Reference* (Pittsburgh, PA: Global View Publishing, 2000).

popular book and it's very widely cited. But [there] were five thousand Russian language books. So where did all of those go? [laughter] [. . .] That is the fascinating thing about all of this.

[. . .] I also have newer books in Russian. One of the interesting things [is that] chemistry is a symbolic language. I can read molecules in any language because the fragmentation mechanisms that are shown in this Russian language book are the same as they will be in an English language, or French language book [27]. It was from one of these books that I saw the only explanation that I have ever seen of the loss of NO from nitrobenzene, which is a very involved mechanism. [. . .] I couldn't read the words associated with it, but I could certainly follow the mechanisms that were shown.

BOHNING: Were the Russians a big player in mass spec?

SPARKMAN: [The] Russians have been a big player in mass spectrometry, and they continue to be. [. . .] There's so much that they did in parallel to what was going on here in the United States [and in Japan, England, and Europe] when it was the Soviet Union. This book is from the Soviet era and, of course, that one I just showed you is also from the Soviet era.

BOHNING: When mass spec moved from the physicist to the chemist—as an analytical tool—were the Americans the first to do that, or were the Japanese?

SPARKMAN: No, the Americans were the first to commercialize it, but the first people that really did it were probably the English, the Brits, and they were doing it for the dye industry and in that whole industrialized area of Manchester, [United Kingdom]. This guy right here, who is still alive, John Beynon, is one of the [. . .] pioneers of [organic] mass spectrometry and he published the first, sort of, modern book in [organic mass spectrometry] in 1960.[28] Now, interestingly enough, this book has masses of elemental compositions in tables in the back, but this book was published in 1960. Do you know what's significant about that?

BOHNING: No.

SPARKMAN: What happened at that time is that we moved from the oxygen-16 standard to the carbon-12 standard. Now, what's even more significant—and I've been the person that's been the single flag bearer in this. There were two oxygen-16 standards. One was the chemist's. The chemist's oxygen-16 standard said that the atomic weight of oxygen was 16, or that one

[27] P. B. Terentyev and A. P. Stankyavichyus, *Mass Spectrometric Analysis of Biologically Active Nitrogen Bases* (Vilnius: Mokslas, 1987). This source is Lithuanian.
[28] J. H. Beynon, *Mass Spectrometry and its Applications to Organic Compounds* (Amsterdam: Elsevier Publishing Company, 1960).

atomic weight unit, [amu], was one-sixteenth of the atomic weight of oxygen. The physicist's said that the atomic weight unit was one-sixteenth of the most abundant, naturally occurring, stable isotope of oxygen. The difference between those two was a factor of 1.000275. [. . .] That's why we had to make a change, because there was too much confusion [as to which scale was being used. Beynon's table of elemental compositions and exact masses was based on the physicist scale].

When we changed to carbon-12, it was also decided that, rather than having a third definition for one amu, we would no longer use "amu" and the symbol would be the lowercase letter "u," but even today in a modern chemistry book you'll still see "amu." It's been something that's very hard to die. [laughter]

BOHNING: This book, like the Russian one you showed me that you received from your friend not too long ago, [is] in beautiful condition.

SPARKMAN: Yes. Now one of the things that I do is—see, I'll have multiple copies of books. If I can't find a book other than ex-library, I go ahead and buy it. But then I continue to look for that book and look for the condition, and so some of them like this Beynon book. Now, the Beynon book I have several copies of because it went through several printings. That's one of the things that I've learned is that there can be slight differences—people will talk about a "printing" but actually there's some modifications and corrections in it.

[This is an important point. Jack Watson and I published *Introduction to Mass Spectrometry: Instrumentation, Applications and Strategies for Data Interpretation*.[29] There were reprintings with corrections and changes in March and September of 2008, and in October of 2009. As an example of how extensive these changes can be is the fact that the October 2009 printing refers to the NIST 08 Database, Mass Spectral Database and Search Program, which was released after the original 2007 printing. The first three printings refer to NIST 05.]

BOHNING: So you do look for printings and editions and . . . ?

SPARKMAN: All of that. Yes, printings, editions. See, these books right here. [. . .] This is a second printing—or actually a second distribution—of this Budzikiewicz, Djerassi, Williams book, where they taped in this errata sheet.[30] And I have copies without the errata sheet, so all of these are important things. Dust jackets are important. [. . .] Here's the thing that's so incredible—Djerassi, Budzikiewicz, Williams did these four books from 1964 to 1967. Now,

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[29] J. Throck Watson and O. David Sparkman, *Introduction to Mass Spectrometry: Instrumentation, Applications and Strategies for Data Interpretation* (Chichester, UK: John Wiley & Sons, 2007). Sparkman notes: There were reprintings with corrections.

[30] Herbert Budzikiewicz, Carl Djerassi, Dudley Williams, *Interpretation of Mass Spectra of Organic Compounds*, (San Francisco, CA: Holden Day, 1964).

this book is actually sort of a compilation of some of the [first three], and [from all the tabs I have added] you can see how much I use this book even today and the stuff in here is very important.

[telephone ringing]

BOHNING: I've got to change the tape here, too.

[END OF AUDIO, FILE 1.4]

SPARKMAN: [. . .] This is a book, when I became aware if its existence—and it's hard to say whether or not this is a book or this is an issue from a journal, but these things came out a lot during that era, [of the 1930s.[31] When I saw the title] I wanted that book. When I searched it the first time on AbeBooks, it was five hundred dollars. I knew that was a good way to a divorce. [laughter] And my wife handles the finances, so she would know that I did [it]. So I searched it a second way and found [this] one for fifteen dollars, but they wanted twenty-five dollars to ship it from France. So I said, "I've got to take a chance." And look at the condition of [this] book.

BOHNING: It's beautiful.

SPARKMAN: It's just perfect.

BOHNING: Yes, it is. I'm even reluctant to open it. [laughter]

SPARKMAN: I do very carefully. [. . .] [This book is] more on the inorganic side [of mass spectrometry].

BOHNING: 1937?

SPARKMAN: 1937.

BOHNING: Is he related to de Broglie? I mean, Maurice [de Broglie]. Is he related to Louis [de Broglie]?

[31] Louis Cartan *Spectrographie de masse; Les isotopes et leurs masses* (Paris: Hermann & cie, 1937).

SPARKMAN: I don't know. I don't know. I don't know how common of a French name that is, so I can't say. See this Cartan name is a very common French name. I have another book here. This is [from 1938].[32]

BOHNING: I know that name. This is the same person that's on [the first] one. [pointing to Cartan]

SPARKMAN: [Yes].

BOHNING: [These books are] like they were put on the shelf when they came out and [never touched].

SPARKMAN: Of course, there were a lot of books like that, and I think that there were large numbers of these things printed [and] distributed to schools and companies, and so on.

BOHNING: You mentioned before that you asked someone to sign a copy. Do you have many signed copies?

SPARKMAN: I have a few signed copies. Now, the Djerassi-signed copy is over in my office at [Pacific]. Let's see. I don't have a Beynon signed copy, but I have a friend that, as soon as he dies, said that I will get his Beynon-signed copy. I have several friends like that, and it's bets as to who will outlive [whom]. [laughter] [That friend is William H. Budde, a scientist at the US EPA in Cincinnati, Ohio, for many years. He has since retired and sent me the book, which not only has Beynon's signature, but is one of the rare copies with a dust cover.]

BOHNING: Do you have similar arrangements? [Oh yes], yours are all going to CHF.

SPARKMAN: All [of my books, papers, and computer files] are going to CHF. That's one of the things [that is very important because] a number of these books I have collected from people because they [know that they] will go to CHF.

[32] Jean Thibaud, Louis Cartan, and Paul Compart, *Quelques techniques actuelles en physique nucléaire. Méthode de la trochoïde: électrons positifs: spectrographie de masse: isotopes: compteurs de particules à amplification linéaire compteurs de Geiger et Müller* (Paris: Gauthier-Villars, 1938).

Here are some spectra that were assembled. These were published by the Atomic Energy Commission from a guy at NIH [National Institutes of Health], and this is about the only hard copy of these spectra that are in existence.[33]

Up here [. . .] are three volumes of the Wiley Spectral collections that have been published in hard copy over the years.[34] These have now gone to all electronic, and it's no longer practical to publish them in hard copy.

Here's a nice set that I have. [These] are Merck Indexes. [This] is the last Merck Index, which is the fourteenth edition, but this [other one] is probably the most valuable.[35] It's the first edition, and it's in German, so that goes back quite a long way. There are all sorts of obscure things that, as you start collecting, you run across and you find out about.

Here is something that came from a library and, if you look at this, you'll see . . .

BOHNING: It's photocopied.

SPARKMAN: It's photocopied and look how it's done. It's that the pages are folded over—and this was before the time of Xerox machines. I would love to find an original of [this] but have been unable to do so.[36] [I am not sure that it even exists.]

BOHNING: Interesting. It looks like [this copy] was at NASA at one time [in a lab. This statement was based on library markings in the copy I had at the time. Since this initial interview, I obtained a second copy which is from The Central Research Library at 3M Company. It is the same type photocopy as discussed above.]

SPARKMAN: Yes. The other thing that is so sad, with regard to books, is the way that libraries deaccession books, which means that a lot of times they take the books [from the shelves] and throw them into dumpsters. It's not only libraries like my university's library [that does this], but the Library of Congress does [it. The] Library of Congress throws books away. There are all these used bookstores in the DC area that are sitting around there on the day that they're throwing things away. Fortunately, a lot of the stuff that I got [was from the Library of

[33] Sanford P. Markey, W. G. Urban, S. P. Levine, and American Society for Mass Spectrometry Committee VI, *Mass Spectra of Compounds of Biological Interest*, 3 vols. (Oak Ridge, TN: US Atomic Energy Commission, Technical Information Center, 1974–1978).
[34] Einar Stenhagen, Sixten Abrahamsson, and Fred W. McLafferty, *Atlas of Mass Spectral Data*, 3 vols. (New York: Interscience Publishers, 1969).
[35] Maryadele J. O'Neil, ed., *The Merck Index*, 14th ed. (Whitehouse Station, NJ: Merck, 2006).
[36] Mark G. Inghram and Richard J Hayden, *A Handbook on Mass Spectroscopy*, Nuclear Science Series Report No. 14, National Academy of Sciences Publication 311 (Washington, DC: National Research Council, 1954).

Congress]. I was able to get [it] when it was still fairly inexpensive. I think because of some of my collecting, some of these things have gone up in price. [laughter]

Now, here's one book that is a hard copy of mass spectra of flavor compounds, flavor and fragrance compounds, that was put together by Walt [Walter G.] Jennings.[37] I paid about four hundred dollars for [this] one and I've seen it for as much as two thousand dollars because apparently it's very rare. [. . .]

BOHNING: [. . .] 1980. I wonder how many copies were printed.

SPARKMAN: Maybe five hundred. I wish that publishers would put on there how many copies they print, when they do that. [. . .]

BOHNING: Just in terms of monetary value, is that the most [. . .] expensive book in your collection?

SPARKMAN: That's the one that I have paid the most for. [. . .] Probably the most expensive is that collection of *Encyclopedias of Analytical Chemistry*.[38] [. . .] I was on the editorial board and edited the mass spectrometry section, so I got [the set] as part of my honorarium.

[Pointing to the seven of the ten volumes of the *Encyclopedia of Mass Spectrometry*.] These are fairly expensive, but [. . .] because I'm associated with Elsevier I get copies of these at no charge. These are about five hundred dollars a volume.[39]

BOHNING: Elsevier books have always been on the high side in terms of price.

SPARKMAN: Yes, they have been, and Elsevier, their journals are very high. Now here are the six volumes of books that have been re-published by ASMS [as of 2012, seven different

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[37] Walter Jennings and Takayuki Shibamoto, *Qualitative Analysis of Flavor and Fragrance Volatiles by Glass Capillary Gas Chromatography* (New York: Academic Press, 1980).

[38] Robert A. Meyers, ed., *Encyclopedia of Analytical Chemistry: Applications, Theory, and Instrumentation*, 15 vols. (Chichester, UK and New York: John Wiley & Sons, 2000). Sparkman notes: A three volume supplement was published in 2011. This encyclopedia is updated in the online version every year, with articles being replaced and new articles being added.

[39] Michael L. Gross and Richard M. Caprioli, *The Encyclopedia of Mass Spectrometry*, 10 vols. (Amsterdam: Elsevier Science, 2003–2007). Sparkman notes: This is a ten-volume set with each volume having a separate subtitle and being published at different times. As of 2012, seven volumes had been published.

titles have been republished, and ASMS continues to add titles] and, of course, I have the originals of all of those.[40] There's also something else that was interesting.

[telephone ringing]

There was a company [named Krieger in Huntington, New York]. [. . .] They would take out-of-print books and reprint them, and they did that with a fairly large number of books. I was kind of surprised when I ran across [this], and I've tried to collect these reprints [. . .] by Krieger. [This Krieger re-print is of] a McGraw-Hill book, which is around here someplace.

I have [. . .] a book that was hand-bound for showing at an ACS meeting, when ACS was still in the publishing business. There were only three of the hand-bound ones and I was able to get one of those copies. [. . .] That book is signed by the author.[41]

Oh, here. See the Krieger book you were just looking at? This is the original [McGraw-Hill publication].[42]

BOHNING: With a dust jacket.

SPARKMAN: With a dust jacket and in great shape too.

BOHNING: McGraw-Hill didn't often [use] dust jackets. Well, there was a period when they didn't; maybe they did later. What is the year on that?

SPARKMAN: This is [. . .] '63. This is in that series [which was called the McGraw-Hill Series in Advanced Chemistry, which was characterized by a distinctive cloth binding that had a black spine with gold lettering and red cover with a small topical icon printed on the lower left of the red edge of the front cover. There were thirty-one titles in the series when the McDowell

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[40] Klaus Biemann, *Mass Spectrometry: Organic Chemical Applications* (New York: McGraw-Hill, 1962, reprinted by ASMS, 1998); John H. Beynon, *Mass Spectrometry and Its Applications to Organic Chemistry* (Amsterdam: Elsevier, 1960, reprinted by ASMS, 1999); John Roboz, *Introduction to Mass Spectrometry Instrumentation and Techniques* (New York: John Wiley & Sons, 1968, reprinted by ASMS, 2000); Robert W. Kiser, *Introduction to Mass Spectrometry and Its Application*; (Englewood Cliffs, NJ: Prentice-Hall, 1965, reprinted by ASMS, 2001). R. Graham Cooks, John H. Beynon; Richard M. Caprioli, and G. R. Lester, *Metastable Ions*; (New York: Elsevier, 1973, reprinted by ASMS 2004); Frank H. Field and Joe L. Franklin, *Electron Impact Phenomena and the Properties of Gaseous Ions*, rev. ed. (New York: Academic, 1970, reprinted by ASMS 2005); Edward A. Mason and Earl W. McDaniel, *Transport Properties of Ions in Gases* (Weinheim, Germany: Wiley-VCH, 1988, reprinted by ASMS 2010). Citation provided by interviewee.

[41] Robert J. Cotter, *Time-of-Flight Mass Spectrometry: Instrumentation and Applications in Biological Research* (Washington, DC: American Chemical Society, 1997).

[42] Charles A. McDowell, ed., *Mass Spectrometry*, Series in Advanced Chemistry (New York: McGraw-Hill, 1963, reprinted by Robert E. Krieger: Huntington, NY, 1979). Citation provided by interviewee.

book was published in 1963. Interestingly enough, the Biemann book, which is the Series and the only other book on mass spectrometry and published in 1962, lists the McDowell title which was not published until a year later.[43] This indicates that the titles for the series were commissioned and then published and printed as they became ready. Like the McDowell book, the Biemann book has a dust cover.]

BOHNING: Oh, [that's the] standard series. [. . .] I've got a number of them [. . .] with those bindings, [. . .] but they don't have dust jackets. [Most people who accumulated the Series discarded the dust cover because of the distinctive appears of the cloth binding when on bookshelves.]

SPARKMAN: Over here are all of the *Proceedings* from [the] ASMS, American Society for Mass Spectrometry. Now, the American Society for Mass Spectrometry started in 1969. The E14 committee of ASTM [American Society for Tests and Measurements], which evolved into ASMS, started in 1953, but they didn't start publishing their proceedings until '61. I have them from '61. Then, down here, are the last that were published in hard copy, [. . .] which was in [1998 in] Orlando, Florida. The interesting thing about that is they've all been published on CD-ROM [compact disk read-only memory] or DVD since that time, but no longer do you see [presentations cited like you did when they were published in hardcopy. Beginning with the 2010 Annual Meeting, ASMS discontinued the distribution of the *Proceedings* on CD-ROM or DVD disk. The *Proceedings* for the 2010 meeting and subsequent meetings are available only online.]

BOHNING: Really?

SPARKMAN: That's right. [. . .] My colleague [Jack] Watson asked me one day, "[Do] you ever look at those CDs? [. . .] [When] I got these [print versions], when they come [in the mail], I would thumb through them, I would see things, and I would [note them for future possibilities of citing them. But now that they're on CDs, I never look at them. [. . .] I've never looked at one of those CDs." [I think] that's an interesting commentary. [. . .]

BOHNING: Yes, it is. Unfortunately, that's probably going to be the way a lot of it's going to go.

SPARKMAN: Yes. [. . .]

[43] Biemann, *Mass Spectrometry: Organic Chemical Applications*.

BOHNING: Do you still collect the CDs?

SPARKMAN: Oh yes, I have all the CDs. They're all up here. [. . .] Here's 2000, 1999, 2006, 2005, 2004, [2003, 2002. Yes], I keep—I have everything.

BOHNING: Are they more searchable than the paper edition? In other words, can you put in a term, and it would find it wherever [it is]?

SPARKMAN: Yes. [. . .] You can, and that's nice. But one thing that I have experienced, having spent years in libraries and looking at journals that are bound and so on, is the number of times that I have gone, found a citation, looked it up in the original journal and right next to it there's an article that is even more important [to what I'm studying].

Now that was back in the time when the editors would group articles together and, yes, maybe it took a year or eighteen months from the time it was first submitted to [when] it was published, but things were grouped together. Today, if you look up that same article digitally, you won't see that other article, unless you happen to notice it in the table of contents as you're doing a search. But if you end up doing a search using SciFinder Scholar, and then, [. . .] through your system, [you get] taken straight to that article, you won't even see the table of contents.

BOHNING: Right. That's the downside of it all.

SPARKMAN: Now, in terms of literature, just recently was the saddest day of my life. See this little anemic magazine? And see the title on this, *Advances in Mass Spectrometry*, volume 17? These are the *Advances in Mass Spectrometry* starting with volume 1 and going through volume 16. [These are the proceedings of] a tri-annual [international] mass spectrometry meeting [IMSC] that is held mainly in Europe. You see volumes 6, 7, 8, 9, 10 and 11 were all two-volume sets. Now, this one here was pretty anemic [volume 16]. This was when [the IMSC] was sponsored by the group in Scotland, [and] you know the Scots are a little cheap. [laughter] But when I got this [volume 17], I just sat down and cried, because this is just [a] little *magazine*—[. . .] and it is a standard issue in the *European Journal of Mass Spectrometry*.

Now, they're going to send a second copy to all the people [who] attended that meeting, and so I'll get a second copy. I'll have one copy for up here and one copy for down here . . . [pointing to a collection of all the issues of the *European Journal of Mass Spectrometry* since its inauguration publication year of 1995].

BOHNING: Is the cost same though? [. . .]

SPARKMAN: [. . .] They don't charge you for that [the proceedings of this meeting]. If you participate in the meeting, there's no charge. [. . .]

But this [volume 17 of *Advances in Mass Spectrometry*], you probably won't even be able to find. Libraries won't have [this] unless they subscribe to this journal. [For these earlier volumes], of course, the costs were quite high. Now, one of the problems is, there's no consistency in these because they had different publishers. Up here are a series of articles that are of proceedings from meetings held in Italy.[44] The guy, in order to support this, had a publisher publish them and sell them to libraries, and that supported his meeting.

I have books on gas phase ion chemistry. I have books on vacuum systems. I have various small collections of mass spectra. I have a lot of chromatography books, because chromatography is such an integral part of mass spectrometry. And back in the '40s, '50s, and '60s, there were series of books that were published, like *Focusing of Charged Particles*,

[44] A list of the published proceedings of meetings organized by Alberto Frigerio: Alberto Frigerio and Hubert Milon, eds., *Chromatography and Mass Spectrometry in Nutrition Science and Food Safety*, Proceedings of the International Symposium on Chromatography and Mass Spectrometry in Nutrition Science and Food Safety, 19-22 June 1983, Analytical Chemistry Symposium Series vol. 21 (Amsterdam: Elsevier, 1984); Alberto Frigerio, ed., *Chromatography and Mass Spectrometry in Biomedical Sciences 2*, Proceedings of the International Conference on Chromatography and Mass Spectrometry in Biomedical Sciences, 20-23 June 1982, Analytical Chemistry Symposium Series vol. 14 (Amsterdam: Elsevier, 1983); Alberto Frigerio, ed., *Recent Developments in Mass Spectrometry in Biochemistry, Medicine and Environmental Research 8*, Proceedings of the Eighth International Symposium on Mass Spectrometry in Biochemistry and Medicine, 18-19 June, 1981, Analytical Chemistry Symposium Series vol. 8 (Amsterdam: Elsevier, 1982); Alberto Frigerio, ed., (Amsterdam: Elsevier, 1982); Alberto Frigerio, ed., *Recent Developments in Mass Spectrometry in Biochemistry, Medicine and Environmental Research 7*, Proceedings of the Seventh International Symposium on Mass Spectrometry in Biochemistry and Medicine, 16-18 June 1980, Analytical Chemistry Symposium Series vol. 7 (Amsterdam: Elsevier, 1981); Alberto Frigerio and Malcolm McCamish, eds., *Recent Developments in Mass Spectrometry in Biochemistry and Medicine 6*, Proceedings of the Sixth International Symposium on Mass Spectrometry in Biochemistry and Medicine, 21-22 June 1979, Analytical Chemistry Symposium Series vol. 4 (Amsterdam: Elsevier, 1980); Alberto Frigerio, ed., *Recent Developments in Mass Spectrometry in Biochemistry and Medicine*, vol. 2, Proceedings of the Fifth International Symposium on Mass Spectrometry in Biochemistry and Medicine, June, 1980 (New York: Plenum, 1979); Alberto Frigerio, ed., *Recent Developments in Mass Spectrometry in Biochemistry and Medicine*, vol. 1, Proceedings of the Fourth International Symposium on Mass Spectrometry in Biochemistry and Medicine, June 1977 (New York: Plenum, 1978); Alberto Frigerio and Emilio L. Ghisalberti, eds., *Mass Spectrometry in Drug Metabolism*, Proceedings of the International Symposium on Mass Spectrometry in Drug Metabolism, Mario Negri Institute for Pharmacological Research, June 1976 (New York: Plenum, 1977); Alberto Frigerio, ed., *Advances in Mass Spectrometry in Biochemistry and Medicine*, vol. 2, Proceedings of the Third International Symposium on Mass Spectrometry in Biochemistry and Medicine, Mario Negri Institute for Pharmacological Research, June 1975 (New York: Spectrum Publications, 1977); Alberto Frigerio, ed., *Advances in Mass Spectrometry in Biochemistry and Medicine*, vol. 1, Proceedings of the Second International Symposium on Mass Spectrometry in Biochemistry and Medicine, Mario Negri Institute for Pharmacological Research, June 1974 (New York: Halsted, 1976); Alberto Frigerio and Neal Castagnoli, eds., *Mass Spectrometry in Biochemistry and Medicine*, Monographs of the Mario Negri Institute for Pharmacological Research (New York: Raven, 1974); Alberto Frigerio, ed., *Proceedings of the International Symposium on Gas Chromatography Mass Spectrometry*, 17-19 May 1972 (Milan, Italy: Tamburini, 1974). Citation provided by interviewee.

Advances in Electronics, and these contain major chapters in mass spectrometry.[45] I found out about these through [bibliographies in] books like the [ones written by Roboz and Kiser].[46] [. . .]

BOHNING: Do you have all of these cataloged?

SPARKMAN: No. I have a list. [. . .] In this book, this is the second edition of my book, which is *Mass Spectrometry Desk Reference*, I have a listing of all of the monographs on mass spectrometry.[47] [. . .] This book also contains correct terms and how to use them and it contains incorrect terms. You'll find "amu" in here, which tells you, "Don't use that term." The bibliography in the Roboz book and in the Kiser book, in their last chapters they would talk about literature sources. [. . .] I'm looking for the Roboz book, which has got to be here someplace. Would you like to have [this copy of my book]?

BOHNING: Oh, thank you.

SPARKMAN: I have several copies, as you can imagine.

BOHNING: If you would sign it for me before I leave.

SPARKMAN: I will. I'll be very happy to do that.

BOHNING: Thank you.

SPARKMAN: [I know] many of the people [who] wrote these books. [. . .] These biological applications in mass spectrometry were written by George [R.] Waller.[48] Waller was the first editor of *Mass Spectrometry Reviews*. When I was at Oklahoma State that summer, I met him and became good friends with him. They are people like [Richard M.] Caprioli and [Sanford P.] Markey and Bill [William L.] Budde from EPA. We just honored Bill Budde and Ron [Ronald A.] Hites for their contributions in environmental sciences through mass spectrometry at this year's ASMS meeting.

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[45] Albert L. Septier, *Focusing of Charged Particles* (New York, Academic Press, 1967); Albert L. Septier, *Advances in Electronics* (New York: Academic Press, 1961). Citation provided by interviewee.
[46] Roboz, *Introduction to Mass Spectrometry*; Kiser *Introduction to Mass Spectrometry and Its Applications.*
[47] O. David Sparkman, *Mass Spectrometry Desk Reference*, 2nd ed. (Pittsburgh, PA: Global View Publishing, 2006).
[48] George R. Waller, ed., *The Biochemical Applications of Mass Spectrometry* (New York: Wiley-Interscience, 1972).

BOHNING: I assume you know Mike [Michael A.] Grayson?

SPARKMAN: Oh, yes.

BOHNING: I worked with him [when] he did an oral history interview with [Alfred O.C.] Nier.[49]

SPARKMAN: Yes.

BOHNING: I was at CHF at the time, and I worked closely with him, helping him to get ready, and then do the interview and process it all. He did a fabulous job [on] that interview.

SPARKMAN: Yes, he did. [. . .] Do you know Keith Nier?

BOHNING: I don't know [him].

SPARKMAN: He's Al Nier's son, and he spent a year at CHF, working on one of the CHF fellowships. He is a scientific historian.

BOHNING: I left CHF in '95, [. . .] so I never worked for them in the new building. I only worked up on the Penn [University of Pennsylvania] campus. [Things] were a lot a different than they are today. [laughter]

SPARKMAN: Oh, the new building is something. So I hear Arnie [Arnold Thackray] is retiring?

BOHNING: Yes.

SPARKMAN: Well, that's something.

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[49] Alfred O. C. Nier, interview by Michael A. Grayson and Thomas Krick, 7 and 8 April, 1989 (Philadelphia: Chemical Heritage Foundation, Oral History Transcript #0112).

BOHNING: First of the year. Well, he's going to become [. . .] something Emeritus. He'll have a title.

SPARKMAN: And an office. [laughter]

BOHNING: And an office. [laughter]

SPARKMAN: Well, it'll be interesting. I think CHF is a wonderful organization and, [. . .] I think the work in acquiring the [Roy G.] Neville collection was great.[50] The art collections that they have are really something.

One of the nice things about being in an old university—at Pacific our people don't really retire and go away. They just die and they're carried out of their offices. [laughter] I found some interesting books over there. [. . .] This is a book written by a guy at Yale and this is the third edition and it's dated 1852.[51]

BOHNING: Is that [Benjamin] Silliman?

SPARKMAN: Yes. And just think about that was before the Civil War. This is probably before the Dred Scott decision. I have another book over there. [. . .] We have an old dusty library that's in the Chemistry Department. None of the books are cataloged [. . .] and I just feel they're too rare to stand the chance of them going. So even though all of these books are not mass spectrometry, all of this will go to CHF, and they can sort out the different ones. [. . .]

[END OF AUDIO, FILE 1.5]

BOHNING: Would you consider your library a working library, or a collector's library?

SPARKMAN: A working library. Definitely a working library. [. . .] There are two reasons for that. One, I use these books every day. Not, of course, all of them, but different ones of them in different ways, on stuff that I'm writing, and stuff that I'm working on. There's stuff like this

[50] Roy G. Neville, interview by James J. Bohning at Pebble Beach, California, 20 and 21 June 2005 (Philadelphia: Chemical Heritage Foundation, Oral History Transcript # 0317).
[51] Benjamin Silliman, *First Principles of Chemistry*, 3rd ed. (Philadelphia: H.C. Peck and Theordore Bliss, 1852).

book by Dass. It's a 2007 book.[52] This Laskin and Lifshitz is a 2006 book.[53] Hillenkamp is a 2007 book.[54] Of course, the most significant book in this entire library is this book right here.[55]

BOHNING: Of course. [laughter] [This is the fourth edition]. When was the first?

SPARKMAN: Jack Watson did the first edition, and he's been the sole author on the first, second, and third editions.[56] The first one was in 1976. This is still in the proof stage, but there's the first edition, to give you some idea of how the field has changed.

BOHNING: [The first] one is Raven Press, whatever that is.[57] And the last one is Wiley. [. . .]

SPARKMAN: Right.

BOHNING: That shows something too.

SPARKMAN: Raven was around for a long time. Then it got absorbed by Lippincott.

BOHNING: Was it a scientific publisher? I don't remember the name.

SPARKMAN: Yes, it was a scientific publisher.

BOHNING: Interesting.

SPARKMAN: Now, of course, the really great books that go back to the very beginning of all of this are the books that are in this area right here. That's the very first one, and it's the first book on mass spectrometry.

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[52] Chhabil Dass, *Fundamentals of Mass Spectrometry* (Hoboken, NJ: Wiley-Interscience, 2007).
[53] Julia Laskin and Chava Lifshitz, *Principles of Mass Spectrometry Applied to Biomolecules* (Hoboken, NJ: Wiley-Interscience, 2005).
[54] F. Hillenkamp and Jasna Peter-Katalinic, *MALDI MS: A Practical Guide to Instrumentation, Methods and Applications* (Weinheim: Wiley-VCH, 2007).
[55] J. Throck Watson and O. David Sparkman, *Introduction to Mass Spectrometry: Instrumentation, Applications and Strategies for Data Interpretation* (Hoboken, NJ: John Wiley & Sons, 2007).
[56] Watson, *Introduction to Mass Spectrometry*.
[57] Watson, *Introduction to Mass Spectrometry*.

BOHNING: [From] Dickinson College [Library]. *Rays of Positive Electricity and Their Application to Chemical Analysis* [by] J. J. [John Joseph] Thomson.[58] Sure.

SPARKMAN: That book [. . .] could have had a lot to do with his Nobel Prize.[59] I think he was the first Nobel laureate in physics. I know [. . .] he was very early. I believe it was in 1907. This book went through two editions. Then there's this book by Francis Aston.[60]

BOHNING: Now it was Aston's son who was at Penn State, right? I think it was Jack [John J.] Aston.

SPARKMAN: [. . .] I'm not sure it was his son. I was unaware that Aston had a son [. . .] because I thought Aston was a perpetual bachelor. Now, that'd be very interesting.[61]

BOHNING: I know there was one at Penn State and I just made that assumption, but I don't know that for sure.

SPARKMAN: This went through two editions and then [Aston] wrote another [book] called [. . .] *Mass Spectrometry and Isotopes*, which [also] went through two editions. [62] [. . .] The second edition of that was published in [. . .] '43. He died before the atomic bomb was set off. He predicted the atomic bomb from his study of the atom and, of course, Thomson predicted all of the things that could end up being done with mass spectrometry, which included the organic chemistry era. Of course, back then was when *real men* did science. This is something that I've put together for ASMS that we handed out a few years ago.[63] [ASMS] commissioned building of this Aston instrument [and Thomson's original device].

BOHNING: Oh, my. Oh, my.

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[58] J. J. Thomson, *Rays of Positive Electricity and Their Application to Chemical Analysis* (London: Longmans, Green and Co., 1913).
[59] Thomson won the Nobel Prize in Physics in 1906, the sixth year in which the prize was awarded.
[60] Francis W. Aston, *Isotopes*, 1st ed. (London: E. Arnold & Co., 1922); Francis W. Aston, *Isotopes*, 2nd ed. (London: E. Arnold & Co., 1924).
[61] Francis W. Aston and John J. Aston are not father and son.
[62] Francis W. Aston, *Mass-Spectra and Isotopes*, 1st ed. (London: Arnold & Co., 1933); and Francis W. Aston, *Mass-Spectra and Isotopes*, 2nd ed. (London: Arnold & Co., 1942).
[63] Orval A. Mamer and Michael A. Grayson, *Building Blocks of the Atom: A Brief Illustrated Overview of the Birth of Mass Spectrometry* (Santa Fe, NM: American Society for Mass Spectroscopy). Citation provided by interviewee.

SPARKMAN: Then on the other side here is the Thomson device that was used in the discovery of the electron. You can have that too.

BOHNING: Thank you. Oh yes, Mike Grayson's name is on this.

SPARKMAN: Yes, Mike Grayson was very much involved in the material, the text, and so on for this. One of the things I'm trying to do, [. . .] and I haven't been able to find the source of the problem, but there [has] been some animosity on ASMS's part toward Chemical Heritage Foundation. [. . .] You see, I want these replicates to go to Chemical Heritage Foundation. That's where I think they belong, but I haven't been successful in making that happen.

Now, one of my big strong points is information and making access to information. When I was on the Board of Directors at ASMS, my single greatest accomplishment [maybe my single greatest accomplishment] in life is a deal that I put together between ASMS and Wiley. That deal was where, on rolling five years back, ASMS members, in perpetuity, will have access to all Wiley journals in mass spectrometry, and these include two journals that got merged into a third journal. In 1995, Wiley acquired Hayden, and Hayden had a journal called *Organic Mass Spectrometry*, which was one of the original [mass spectrometry] journals. They stopped printing that journal. [At that time, Wiley had its own mass spec] journal called *Biological Mass Spectrometry*.

They merged those into *The Journal of Mass Spectrometry*. [At the time *OMS* and *BMS* were not available electronically. I convinced my fellow board members to let me approach Wiley about ASMS paying to have the issues of these two now defunct journals scanned into an electronic form. The electronic version would be the property of Wiley; however, the ASMS membership would have access to these files in perpetuity. When I approached Wiley, they told me that they had already scanned all these back issues of the Hayden *OMS* and their BMS. Wiley and ASMS came to the agreement that the members would have access to the back issues of *OMS* and *BMS*, and also to issues of *Mass Spectrometry, Reviews, Rapid Communications in Mass Spectrometry*, and the *Journal of Mass Spectrometry* that were five years old and older] in perpetuity for a onetime payment that was made by ASMS. [. . .]

I [had] to convince Wiley to sell this, but I had to convince [the ASMS Board]—which is tighter than a tick—to buy it. And I did that, and I did that in the two-year period [I was the Member-at-Large for Education, from 2004 to 2006. The ASMS will continue to have this access in perpetuity even when this agreement expires in 2016—access to everything back to 2011. The contract will be renegotiated at that time for a continued five-year back access to currently published titles. I have no idea how ASMS will behave. They are sitting on a vast sum of money and that sum continues to grow every year.]

BOHNING: That's impressive.

SPARKMAN: I consider that to be my single greatest accomplishment in life, so I'm very pleased about that. [laughter]

BOHNING: How big an organization is ASMS?

SPARKMAN: It's got about seven thousand members, but what it has is it has a huge amount of money. Well, I consider it a huge amount. They have in the bank over three million dollars, [. . .] and everything is always done on a volunteer basis. Nobody gets paid for anything [except for the business management organization run by Jack Watson's former wife, Judith Sjoberg, and Jack and Judith's two children, Jennifer and Brent Watson. This organization does an excellent of handling the Society's business and organizing the various conferences the society holds throughout the year.] They have just had this fear that they wouldn't have enough money.

Now when I went on the board, I said, "You know, we have a lot of money and we ought to be spending this on the membership," and they said, "Oh no, we need all that money in case something happens and [no one comes to] our annual meeting." Just before I came on, we had a meeting in Montreal when the SARS thing was breaking out and there was fear that there'd be mass defection [due to] that. I said, "Well, let's stop and look what it's going to cost us. All the hotel contracts now have these disaster clauses in them, so that's not going to cost us anything." It all came out that if we had to cancel the meeting the week before, it might cost us one hundred thousand. I said, "Now let me see, a hundred thousand dollars, three million. [. . .] Okay, carry [the] one over here. Well, that leaves us $2,900,000. What are we going to do with that money?" [laughter]

BOHNING: Does the IRS get involved with things like that?

SPARKMAN: No, because it's all legitimate. It's just that that's how much money that we have accumulated as excess. Our dues are sixty-five dollars a year and they've remained the same [for many years].

BOHNING: That's reasonable.

SPARKMAN: The cost of our meeting is a hundred-and-fifty dollars a year. The sixty-five dollars a year gives you the journal—which is down there in print [pointing to a bookshelf with bound and loose volumes]—and it gives you access to all the back issues electronically. And now it gives you access to all these Wiley journals, so it's a hell of a deal.

BOHNING: What's the approximate number of volumes [of the journal]?

SPARKMAN: [Of *The Journal of Mass Spectrometry*, it is seventeen years. As for the number of volumes—books—in my library], I have counted several times, and I usually quote [that] I have about a thousand volumes on mass spectrometry. That's including books like this, but what it doesn't take into account [are individual issues of journals, it does] includes volume years of the journals. I have [all the volumes of the *Journal of The American Society for Mass Spectrometry*], *European Mass Spectrometry*, *Mass Spectrometry Reviews*, and *The Journal of Mass Spectrometry* [here], and then over at Pacific, because I don't have room here, as you can see, I have *Rapid Communications*—so that [greater than a thousand figure] includes volume years for those. And this is from '94, '95, so there are not that many volume years in there, but I figure I've got about a thousand volumes that specifically relate to mass spectrometry.

That doesn't count books that are on specifically chromatography, or here, a couple of books on derivatization. I don't count those in that thousand. But I figure there's about a thousand volumes [just on mass spectrometry]. That doesn't include duplicates. It does include replicates, like the Krieger books are replicates. The ASMS re-published books are replicates. One of the things—finally, after many years—I was able to get one of the original Dawson books.[64]

BOHNING: I was going to ask you what has been your most elusive volume.

SPARKMAN: My most elusive volume? Well, it changes. For a long time, that was very elusive. I couldn't find [the Dawson book]. All I could find was this, which was the API duplication of the book, which was done pretty well. Oh, yes. [. . .] There are books that have to do with collections of literature. [. . .] They were bibliographies that were published in the field. What happened was there were a couple of meetings that were held in the UK.

One of them was in 1950, and when they published the proceedings, at the end of the proceedings, you can see they published a bibliography.[65] There was another one of those meetings that was held in 1953, which was three years later.[66] Now those meetings were just no-name meetings held in England. Then there was nothing until 1958, when the first meeting was held that resulted in *Advances in Mass Spectrometry*, and they continued [. . .] the publication of these bibliographies [in the proceedings of those meeting for several years].[67]

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[64] Peter H. Dawson, ed., *Quadrupole Mass Spectrometry and Its Applications* (Amsterdam: Elsevier, 1976).
[65] *Mass Spectrometry*, A Report of a Conference Organized by the Mass Spectrometry Panel of The Institute of Petroleum, 20-21 April 1950 (London: The Institute of Petroleum, 1952). Citation provided by interviewee.
[66] Jack Blears, *Applied Mass Spectrometry*, A Report of a Conference Organized by the Mass Spectrometry Panel of The Institute of Petroleum, 29-31 October 1953 (London: The Institute of Petroleum, 1954). Citation provided by interviewee. Sparkman notes: Blears was Chairman of the Mass Spectrometry Panel.
[67] *Advances in Mass Spectrometry* (London: Heyden & Son 1959–c. 1980). Citation provided by interviewee.

One of the companies that was involved in manufactured mass spectrometry for many years was a company called AEI [Associated Electrical Industries Limited]. AEI published some monographs of bibliographies, and these were a couple of the supplements that they made for those. They provided those as advertising tools. There was the one main volume and then these two supplements that they had.[68] Those continued [until about 1964].[69] Then what happened is the Royal Academy got involved, and they started publishing these special periodic reports. Now, there are ten of those that have been published. I only have about six of them and I haven't been able to get others. They're still available from the Royal Society, but they're about four hundred dollars each. [. . .] I just won't spend the money for them. There are two things that I won't buy. One is those and the other [thing] I won't buy [is] reprints—you know, print on demand stuff. I'll just do without.

There's also a series of proceedings from meetings on dynamic mass spectrometry. So these have been the real elusive ones. [. . .] I can remember days that I would go to AbeBooks and I would see things there. These four right here [Volumes 3, 4, 5, and 6 of the *Advances in Mass Spectrometry*] all come from the same library.[70] They appeared on the same day on Abe[Books], about twenty dollars each. I'd been looking for them for years, and I had to type in the whole order, each [one-by-one], and I just knew somebody was going to get in there and get one of those before I could get it all typed in.

Those are some of the exciting times. Then, of course, this is the book by [Harrie S. W.] Massey, [with the title] *Electronic and Ionic Impact Phenomena*.[71] I wrote a little article for the Bolton Society [newsletter] a few years back talking about what it was like to find something like this in a bookstore, and it was very exciting.[72] I have taken books to the counter in bookstores, like this, looking over my shoulder making sure that somebody didn't come and take it from me. [laughter]

I have books that were never published. See this, *A Global View of MS/MS* [tandem mass spectrometry]; this was put together as a promotional piece for this book which the guys were writing, but they never finished it. So it's a pretty complete collection, and it is a working collection, and it will continue to grow. Where is it going to stop? I don't know. [. . .]

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[68] Associated Electrical Industries Limited, *Bibliography on Mass Spectrometry 1938-1957 Inclusive* (Oxford, UK: Pergamon Press, 1961); *Bibliography on Mass Spectrometry* vol 2, period mainly from January 1958 to December 1960; *Bibliography on Mass Spectrometry* vol.3, period mainly from January 1961 to December 1962. Sparkman notes: The first volume was prepared by the Intelligence and Interchange Section, Research Department, AEI Limited, formerly Metropolitan-Vickers Electrical Company Limited, and later volumes were prepared by the Instrumentation Division, Scientific Apparatus and X-Ray Department, AEI Limited, Trafford Park, Manchester.

[69] Sparkman notes: In the Editor's Foreword in Advances in Mass Spectrometry, vol. 4, Institute of Petroleum: London, 1968, it is stated that because of the United Kingdom formation, the Mass Spectrometry Data Center at Aldermaston, Berks, England, which as of then published the Mass Spectrometry Bulletin, that subsequent supplements to the AEI bibliography would no longer be prepared and thus no longer appear as part of the Proceedings of the International Mass Spectrometry Meetings. The Data Center was charged with keeping abreast of the literature from 1964.

[70] General Motors Corp. Library Research Laboratories, Warren, Michigan. Citation provided by interviewee.

[71] Harrie S.W. Massey and E. H. S. Burhop, *Electronic and Ionic Impact Phenomena* (Oxford: Clarendon Press, 1952).

[72] O. David Sparkman, "The Unexpected Book on the Shelf," *Boltonia* 2 (2000): 3-4.

I found out a lot about publishers. Some publishers promote in the US, but not Europe. Some promote in Europe, and not the US, and these are even organizations like Wiley [which is actually two different companies], Wiley US, Wiley Chichester.

Here's a book that there were thousands of copies published of.[73] The second edition was published after the guy died, but that was the first, sort of, interpretation book which preceded the Fred McLafferty book, which is considered [to be a] very famous book in the field [of mass spectral interpretation; however, the McLafferty book was not promoted outside the US][74]

BOHNING: Oh, Sadtler.

SPARKMAN: [The Hill book] was translated into multiple languages. [. . .]

BOHNING: [Didn't Sadtler have] those loose-leaf volumes of spectra?

SPARKMAN: Yes, Sadtler' Spectra. Those were mainly infrared, and some UV. Those now belong to, think, now Galileo, who now belongs to Thermo Fisher.[75]

BOHNING: So they didn't do mass spec?

SPARKMAN: No, they never did mass spec.

BOHNING: Okay. I don't know why I thought they had some mass spec.

SPARKMAN: No, never. [. . .] A lot of mass spectra were digitized.

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[73] Hilson C. Hill, *Introduction to Mass Spectrometry*, 2nd ed. (London: Heyden, 1972). Sparkman notes: The first edition was published in 1966, the second printing came out in 1969, the second edition was revised by A. G. Loudon, and the first edition was translated into German, Italian, and Japanese. Hilson C. Hill died in 1967. This was a paperback book consisting of a little over a hundred pages.

[74] Fred W. McLafferty**,** *Interpretation of Mass Spectra* (New York: W. A. Benjamin, 1967). Sparkman notes: There have been four editions including the second, published by Benjamin in 1973, the third published by University Science Books, Mill Valley, CA, in 1980, and the fourth written with Frantisek Tureek, also published by USB, in 1993. The second edition is the easiest to understand.

[75] Sadtler Spectra are now owned by BioRad.

Now here's something. When I saw this and got it, I said, "Oh my God, this is fantastic." This is a hardcopy, second edition of the Hill book [that appears to be in] perfect condition.[76] [However, on careful examination you will see several pages are torn out; probably a production problem.]

BOHNING: Yes. Yes, it's amazing. I notice that] a number of these books have either somebody's name or library in it. Do you suspect that, as you said earlier, these were just faculty members and after they passed on, [. . .] the family sold the collections to a dealer and . . .

SPARKMAN: I think that was pretty much what happened to a lot of them or people, as they moved on, [they] sold them or gave them away, or something of that nature. They just disappeared.

[Yes], here it is. That's what I found when I opened it.

BOHNING: Wow.

SPARKMAN: That page is missing. [. . .] [This] thing looked like it had never been opened and it was gone. And there's one more in there that's the same thing. So, you never know. But, now here's—let's see if I can find it. This is a real interesting one.

BOHNING: While you're looking, I have to get another tape. [. . .]

[END OF AUDIO, FILE 1.6]

SPARKMAN: [. . .] I have a book in here someplace called *Tandem Mass Spectrometry*.[77] When I got it, I thought, "Boy, this is in great condition." And I opened it, and it has a name—I bought it from a bookstore up in Oregon—it's got written in it the name of a friend of mine who's in mass spectrometry in Berkeley. I suspect that somebody stole this book from [her while working in her lab] and then sold their books off, so I'm very careful never to mention this book around [her] because I don't know, If [she] were to ask for it, I would be morally obliged to give it back to [her], and I don't want to do that. [laughter] So, I save myself that moral dilemma by just being careful not to mention it. But that's what you'll see [when you get into used books in your field]. [. . .]

[76] Hill, *Introduction to Mass Spectrometry*.
[77] Fred W. McLafferty, *Tandem Mass Spectrometry* (New York: John Wiley & Sons, 1983).

See, this guy, Robert Edward Clapp. I think I have a number of his books that I've got from this same bookstore down in New Orleans, and I suspect that it was his estate that sold them all, because that's where a lot of this stuff comes from, is from estates. [. . .]

When you go through editions, [like Watson has done with his and my fourth edition you will see] something like this. This guy, Massey, wrote books on negative ions, and this is the first edition, this is the second edition, and this is the third edition.[78] [The first edition is around a hundred pages, the second edition is one hundred and thirty pages, and the third edition is over seven hundred pages.]

BOHNING: [laughter] Oh, my.

SPARKMAN: Now, interestingly enough, negative ion detection in mass spectrometry has been an extremely important advancement because it can offer specificity. Negative ions are formed when electrophilic substances capture thermal energy electrons. So, if you have very complex matrices, then what will happen is that you can get very good [strong signals] from the electrophilic compounds, because the matrices won't have those compounds [that will capture the electrons]. You don't get signal from [the matrix]. This was a big advancement. A lot of money was made on this, on patents, and I went back and read the original patents after I found this book, which led me to these books, and there's no citation in those patents, or any of the people who developed its articles, about the work this guy did. The whole phenomenon is described [in this book].

[. . .] John [B.] Fenn is the guy that is credited with the development of electrospray, and he gives a lot of credit to a fellow named [Malcolm] Dole. Dole wasn't very widely published in the field, but there's a guy named Leonard [B.] Loeb who was at Berkeley, and this [. . .] book on static electrification describes the whole phenomenon of electrospray.[79] There's no references to any of this stuff that Loeb did, and Loeb published most of his stuff in books, [some] published by Berkeley Press [and others by more main-stream publishers]. So, again, it is a working library because it's the quest for the truth, finding the origins of some of these things [that are happening in mass spectrometry].

BOHNING: It's interesting that you can take a topic like this, and essentially, [. . .] as you've said, put together the complete set of works on mass spec. It's fascinating.

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[78] Harrie S. W. Massey, *Negative Ions*, 1st ed. (Cambridge: Cambridge University Press, 1938); Harrie S. W. Massey, *Negative Ions*, 2nd ed. (Cambridge: Cambridge University Press, 1950); and Harrie S.W. Massey, *Negative Ions*, 3rd ed. (Cambridge: Cambridge University Press, 1976).
[79] Leonard B. Loeb *Static Electrification* Springer Verlag, Berlin, 1958.

SPARKMAN: I would hope that somebody has done this for NMR and somebody has done it for infrared, but I don't know that to be the case. I've not seen compilations of books in those various fields. Gas chromatography, it's been done to a smaller extent, and there is so much stuff. I try and pick up stuff in gas chromatography, because I consider my main accomplishment in science [to be] what I did with gas chromatography in those early years. [. . .]

BOHNING: I'm glad you mentioned that, because I was going to ask you about that. Because certainly, as you described earlier, you spent a lot of time in gas chromatography. So I wondered what you had in your library on gas chromatography.

SPARKMAN: A lot of the books in here are on gas chromatography. Then, down here, all of these books are on gas chromatography/mass spectrometry. I'm a strong believer that there will be a time that the only detector that you will find on gas chromatographs is a mass spectrometer, that that will become the standard detector. It's really a shame now, because there is relatively little that is published in gas chromatography/mass spectrometry anymore.

[telephone ringing]

But there's more [inaudible] than any other field. There's not research money available for that because people are after the more sophisticated techniques involved in the biological sciences and so on. There are a lot of changes.

I'm just looking to see. [. . .] There have been some collections of mass spectra that have been hard to find, but I have been able to find those. My colleagues don't like for me to come to their laboratory because as I am talking to them, I'm scanning their bookshelves, looking for something. [laughter] I badgered poor Catherine Fenselau, who's at Baltimore, for two years until she gave me these, because she had these, and those were hard to find.[80] The guy that's probably got a collection better than I [have] is Fred McLafferty. Remember, Fred McLafferty attended the first Pittsburgh conference and Fred McLafferty is still a publishing scientist, into his eighties.

BOHNING: Amazing.

SPARKMAN: The reason I made that comment about I'm not a Nobel laureate yet is because John Fenn didn't begin to work on electrospray until he was seventy-two, so I have a little time [to] go, before I need to start on [the research that will lead to my Nobel award]. But Fred has been what a lot of people consider to be the quintessential mass spectrometrist. He's got these tremendous collections [of books and papers], but I'm afraid that his stuff will be just decimated

[80] Volumes 2 and 3 of the AEI bibliographies.

when he dies, because people will come in and start carrying everything off. He probably has hopes of being able to sell it to somebody, and I had to think about that. You know, I've got a lot of my personal money invested in this, but [. . .] I'm more interested in this stuff continuing than I am in the monetary value of it. That's why, [. . .] when CHF said they were willing to take it, they would come box it, keep it together, I was willing to [donate] it.

BOHNING: Will you be able to get a value for it as a contribution, for a tax deduction?

SPARKMAN: I don't know. I don't know. I haven't even looked into that. I know there are ways of doing that, but I'm not very much of a money person, so I don't understand those sorts of things. [laughter] I'm extremely proud of this and extremely proud of what I've done, and I've done it in a relatively short period of time, because I've done this in about [the last] fifteen years.

BOHNING: I was amazed when [. . .] we were talking [in the other room], and I thought to myself, "Boy." I thought that your collection went way back, but it's a relatively recent thing.

SPARKMAN: [Yes]. [. . .] I had some of the *Merck Indexes*. I had maybe, when I left Varian, a dozen books on mass spectrometry, and several of those were modern. I had this Harrison, *Chemical Ionization*, book.[81] I had, of course, all of the Watson books. I had [Francis W.] Karasek's GC/MS book down here.[82] [I had] a book by John [F. J.] Todd on quadrupole ion trap technology, and that was about it.[83] The rest of it I built in those fifteen years, and [this year], — 2007, there'll be ten or twelve books published on mass spectrometry.

BOHNING: Is it that diverse now, that you can still sell ten to twelve different books in one year?

SPARKMAN: Apparently so. How many they sell [. . .] of any given volume, [I don't know]. One of the problems that we run into though, is publishers are not necessarily very ethical. [. . .] There's a book. [. . .] See this book? I reviewed this book. The closing line [of my review] was, "The best thing that I can say about this book is it is a testament to the fact that the First Amendment to the United States Constitution is alive and well." [laughter]

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[81] Alex G. Harrison, *Chemical Ionization Mass Spectrometry* (Boca Raton, FL: CRC Press, 1983).
[82] Francis W. Karasek, *Basic Gas Chromatography-Mass Spectrometry: Principles and Practice* (Amsterdam: Elsevier, 1988).
[83] Raymond E. March, Richard J. Hughes, and John F. J. Todd, *Quadrupole Storage Mass Spectrometry* (New York: Wiley & Sons, 1989).

BOHNING: This is *GC/MS* by [Marvin C.] McMaster.[84]

SPARKMAN: This guy has had a more eclectic career than I have. He's an adjunct professor of chemistry at the University of Missouri, St. Louis, a consultant with MCM Scientific, a network systems technician with Washington University Medical School, St. Louis, and a freelance minister. [laughter] The book was just terrible. I hammered it.[85] [. . .] The review was about five journal pages long, but all of the problems with it, and I pointed all of that out. Now this book was published by Wiley. [. . .] The acquisition editor sent me a proposal from this guy to publish this book right here on LC/MS.[86] Now the proposal indicated that this book was going to be worse than this book and I told them this. [87]

They sent the proposal unsolicited to a friend of mine, who read it, and then wrote a similar letter to them. Then he called me and said, "Have you ever heard of this guy? What do you know about him?" He said, "I couldn't believe this." And they published this, because that title will sell two thousand copies in today's market, and it doesn't matter that it's a [badly written book with incorrect information]. Of those two thousand, a thousand of them will go on shelves and nobody will ever look at them. Another group of them will [. . .] go into libraries. Then there'll be people who try to learn something from these and are going to be seriously harmed.

BOHNING: I thought Wiley would be a little more concerned about things like that.

SPARKMAN: [There was a time when publishers did care about quality. They employed scientific editors to review manuscripts for correctness as well as clarity. There were copyeditors who would check typeset galleys against edited manuscripts. Today, the scientific editors and copy editors are gone. There is an acquisition editor who has a degree in English, journalism, or library science, but who knows nothing about and cares nothing about science, just how many copies will this catchy title sell. These acquisition editors never look at the galleys; they are sent to the author for proofing. If the author does not do this, the book is then printed with gross editing errors introduced by type setters in India. I have had first-hand experience with this.]

[. . .] I have even told them that I felt that they should take [the McMaster's book] off the market. The people at Chichester blame it on the people in New York. Then the people in New

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[84] Marvin McMaster and Christopher McMaster, *GC/MS: A Practical User's Guide* (New York: John Wiley & Sons, 1998).
[85] O David Sparkman, "A Review of *GC/MS: A Practical User's Guide* by Marvin McMaster" *Journal of the American Society of Mass Spectrometry*, 10 no.4 (1999): 364-6; O David Sparkman, "A Review of *GC/MS: A Practical User's Guide*, 2nd ed., by Marvin McMaster," *Journal of the American Society of Mass Spectrometry*, 19 no. 9 (2008), R1-R6.
[86] Marvin McMaster, *LC/MS: A Practical User's Guide* (New York: John Wiley & Sons, 2005).
[87] McMaster, *GC/MS*.

York say, “Oh well, that acquisition editor no longer works for us.” There’s a lot in this publishing industry that really makes it tough today and these companies are really [just] out for the profits.

BOHNING: What would a book like that cost?

SPARKMAN: Those are about seventy-five [to a hundred and twenty-five dollars].

BOHNING: They’re not cheap.

SPARKMAN: [That’s right]; they’re not cheap.

BOHNING: So [if] you sell two thousand copies, you’ve paid for the costs, and made something on top of it.

SPARKMAN: That’s right. It’s just really bad. [. . .] Here’s another [example of badly written books]. These people right here. These are some [people who were at reputable places in the US like Vanderbilt University, Brown University, and the Rhode Island Hospital in Providence, Gudzinowicz and Gudzinowicz, a father-son team. They wrote two multiple book series on chromatography and mass spectrometry chromatography that were published by Marcel Dekker, who was believed to be a reputable publisher. They’re just terrible. There is enough incorrect information that if these had been written in response to an assignment in one of my classes, the authors would have received a failing grade. You never see them cited.][88]

You read through these things, and you find yourself shouting, and your dogs are running around, barking, and so on. So that’s a problem that exists, and it’s so important. One of the things I do is I write a lot of reviews because I think it’s important to give people the true perspective of the book.

[88] Sparkman notes: Series 1 consists of three volumes published one at a time: Benjamin J. Gudzinowicz, Michael J. Gudzinowicz, MJ, and Horace F. Martin, Fundamentals of Integrated GC/MS (Chromatographic Science Series vol. 7), part 1 Gas Chromatography, part 2 Mass Spectrometry, part 3 The Integrated GC/MS Analytical System (New York, Marcel Dekker, 1976–1977); and Series 2 is a seven-volume set: Benjamin J. Gudzinowicz and Michael J. Gudzinowicz, eds,. Analysis of Drugs and Metabolites by Gas Chromatography Mass Spectrometry, vol. 1 Respiratory Gases, Ethyl Alcohol, and Related Toxicological Materials, vol. 2 Hypnotics, Anticonvulsants, and Sedatives, vol. 3 Antipsychotics, Antiemetics, and Antidepressant Drugs, vol. 4 Central Nervous System Stimulants, vol. 5 Analgesics, Local Anaesthetics, and Antibiotics, vol. 6 Cardiovascular, Antihypertensive, Hypoglycemic, and Tiered-Related Agents, vol. 7 Natural, Pyrolytic, and Metabolic Products of Tobacco and Marijuana, New York: Marcel Dekker, 1977–1980).

BOHNING: Well, you've given me a pretty thorough explanation of your library, that's for sure, and it's very impressive.

SPARKMAN: Again, I have to say that I am really proud of it. I also have books that are included in that thousand on spectrometric identification of organic compounds, like this is the latest edition of Silverstein and Bassler.[89]

BOHNING: I was going to ask you if you had the first.[90]

SPARKMAN: Oh, yes. I have the first. [laughter]

BOHNING: [. . .] I'm sure you do. [laughter]

SPARKMAN: Unfortunately, the one that I had when I took the course had [been] left behind [long ago] someplace, but yes, I have all of the editions of this. Of course, Bassler has now passed on.

BOHNING: How many editions are there?

SPARKMAN: Seven. [Yes], this is the seventh edition, just came out, and that book has sold over thirty-five thousand copies.

BOHNING: I remember it. It was certainly an excellent book.

SPARKMAN: But the thing you remember about it is the IR and the NMR. Mass spectrometry is in there. Even when they taught the course, the only thing they used mass spectrometry for was to determine the molecular weight. [. . .] With the molecular weight, then you could identify [a compound from the NMR and IR spectra]. They treated [mass spectrometry more as a stepchild]. They show things about fragmentation mechanisms, but they don't get into it deeply, [and what they show is not very good].

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[89] Robert M. Silverstein, Francis X. Webster, and David Kiemle, *Spectrometric Identification of Organic Compounds*, 7th ed. (Hoboken, NJ: John Wiley & Sons, 2005).
[90] Robert M. Silverstein and G. Clayton Bassler, *Spectrometric Identification of Organic Compounds* (New York: John Wiley & Sons, 1963).

Here's the first McLafferty book, of course.[91] [McLafferty produced an edited book in the same year.[92] Of course, he was the author of *Mass Spectral Correlation* published by the ACS in the same year.[93] It is interesting to note that *MS Correlations* and *MS of Organic Ions* show him at the Dow Chemical Eastern Research Laboratory in Framing, Massachusetts and the Interpretation books shows him at Purdue].

Here's a book that was written by a guy named Steve Schrader, who did a PhD under Don DeYoung at the University of Detroit. [. . .] His father had a lot of money and set him up in a mass spectrometry consulting laboratory [in Detroit], and he still has that laboratory today. Djerassi was at that university.

BOHNING: Wayne State [University].

SPARKMAN: Wayne State. Thank you. Terrible when you get old. [laughter]

BOHNING: Oh, I'm lucky I remembered that one. Djerassi was the clue. I didn't interview him, but Arnold Thackray did interview him many years ago and I edited the interview, before Djerassi saw it, but just reading that interview was fascinating.

SPARKMAN: You know about this business of six degrees of separation? [. . .] Well, here's one. The guy that was my boss at that first job I had at the Western Company of North America, his wife before he was married was a technician in Djerassi's lab at Wayne State. [laughter] So we're all connected very, very closely.

Just one last thing. These are some interesting books that were published. This was a little monograph and there were hundreds of these. [. . .] There's no references, no citations.

BOHNING: Are those the ones from Methuen?

SPARKMAN: Yes.

BOHNING: Yes. I know there's a whole series of those.

[91] McLafferty, *Interpretation of Mass Spectra*, 2nd ed.
[92] Fred W. McLafferty, ed., *Mass Spectra of Organic Ions* (New York: Academic Press, 1963).
[93] Fred W. McLafferty, *Mass Spectral Correlations* (Washington, DC: American Chemical Society, 1963).

SPARKMAN: They're really fascinating, because you can get a very good story and, see, there's a very nice photograph that's in there.[94]

BOHNING: What was the year on this?

SPARKMAN: I think that's [1954].

BOHNING: [. . .] Rockefeller University. [. . .] Kinetics Department, School of Medicine, Stanford University, and then there's a book plate from the Rockefeller University.

SPARKMAN: Rockefeller University. I got a lot of books from there [through] some outfit in New Jersey. [. . .] I think Rockefeller just threw the books away. They went and hauled them off and then they were on AbeBooks for a long time, selling them, and they sold them really [cheaply]. I got quite a few from them.

All right. Anything else that I can tell you. Any questions that you have unanswered?

BOHNING: Let me go get my notes. I have a question list. I think we've covered most of it.

No, it looks like we've pretty much answered [my questions]. We asked about what are the most prized books in your collection. We talked about that, talked about where the books are going. [. . .] I think we've covered my agenda pretty well. And we did get a nice survey of your career, which I think is important, because it helps explain this collection at the same time.

SPARKMAN: [. . .] I keep seeing little things here. These are little pamphlets that manufacturers created telling us what mass spectrometry is and the first one that came out, that I saw, was this one. I thought, "Wow. What a unique, original idea," and [these were] published by ASMS.[95] Then what I did was I found these two which predate [the first ASMS *What is Mass Spectrometry*], so they [ASMS] copied the idea from somebody else [Finnigan and VG].[96] [laughter]

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[94] A. J. B. Robertson, *Mass Spectrometry*, Methuen's Monographs on Chemical Subjects (London: Methuen and New York: John Wiley & Sons, 1954).

[95] *What is Mass Spectrometry?* American Society for Mass Spectrometry, 1989; *What is Mass Spectrometry?*, American Society for Mass Spectrometry, 1995; *What is Mass Spectrometry?* American Society for Mass Spectrometry, 1998. Citation provided by interviewee.

[96] *Introduction to Mass Spectrometry and Glossary of Mass Spectrometry Terms* (San Jose, CA: Finnigan Corporation. 1988); David S. Millington, New Mass Spectral Techniques for Organic & Biochemical Analysis (Cheshire, UK: VG Micromass, undated). Sparkman notes: Millington is credited as Applications Manager, VG Organic Ltd. All citations in this undated publication are from the mid-1970s. Citation provided by interviewee.

BOHNING: [. . .] That's a nice slick one.[97] These are sort of plain Janes.[98] [. . .]

SPARKMAN: Right, and ASMS got even slicker as time went on. [. . .] Unfortunately, manufacturers do less of this now. Now you see this thing right here? [Pointing at a framed four-panel display on the wall]. This is a French [language] version of this, which is a handy pocket quick reference guide to help you in the interpretation of mass spectra.[99] When I went to work for Varian, I came up with this idea. [. . .] I came [into Varian in] October and, in February, I was going to be teaching this course at Pittcon [with Jack Watson. We always] had to have people turn back and forth to read [different tables in the manuals when we would have do exercises]. I came up with this and I sketched it out on a piece of 8½ by 11 paper and took it over to the graphics arts people in Varian. One week later, we had ten thousand copies of that. Since then, Varian has printed a total of fifty thousand copies [printed] in English, and they printed five thousand in French, German, and Spanish. [. . .] Because Varian never copyrighted it, several other organizations have published it also.

BOHNING: Do you get any credit for that, or do you get any royalties from it?

SPARKMAN: No, now, there's no royalty because they're handouts. They're give-aways. Now they have mine and Jack's name on it. That's the only [credit I get]

BOHNING: But even if they're handouts, you should [get something].

SPARKMAN: Yes, but you know, [. . .] it's another thing [that I contribute to the greater good [of mankind and mass spectrometry].

BOHNING: Right. Right.

SPARKMAN: Okay, now let's see. Let me get my pen. [. . .] Where's that book?

BOHNING: It's under here.

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[97] *What is Mass Spectrometry?* 1989.
[98] *Introduction to Mass Spectrometry and Glossary of Mass Spectrometry Terms*; Millington, *New Mass Spectral Techniques for Organic & Biochemical Analysis*.
[99] *Saturn GC/MS Mass Spectra Interpretation Quick Reference Guide* (Walnut Creek, CA: Varian Associates, 1990). Sparkman notes: This is a four-panel accordion foldout printed on both sides to give a total of eight panels, one of which was the front cover, the others containing useful information for the interpretation of EI mass spectra.

SPARKMAN: Okay.

BOHNING: Thank you very much [for signing it]. I certainly appreciate that. And my tape is about running out on this side, [so] I'll say thank you very much for spending this time with me this morning. It's been wonderful. We've covered some good territory.

SPARKMAN: Well, thank you. And thank you for taking the time to do this [oral history], and thank you for taking the time in doing [all of] these [for the Bolton Society]. [. . .]

[END OF AUDIO FILE 1.7]

[END OF INTERVIEW]

Appendix: Notes from the Interviewee, 2012

Epilogue: Five Years Later

It has been over five years since I was interviewed for this oral history. A number of events have since occurred that would have been included if they had happened at the time of the interview. Being that this oral history is yet to be published, I would like to add these events as a preamble.

In April of 2011, I published a book through Elsevier (Amsterdam: Academic Press) with Zelda E. Penton entitled *Gas Chromatography and Mass Spectrometry: A Practical Guide*, second edition. The first edition was written by Fulton G. Kitson, Barbara S. Larsen, and Charles N. McEwen, all at the DuPont Experimental Station in Wilmington, Delaware. Much of the material in that first edition was from Kitson's practical experience. I was asked by Elsevier in 2005 if I would write the second edition, because Kitson had retired and Larsen and McEwen no longer were interested in the topic. I agreed under the condition I could coauthor it with a former Varian colleague, Zelda Penton. The book final went to press in April of 2007. A new, GC/MS Division of Bruker Daltonics bought five hundred copies and had them imprinted with the Bruker logo. They provide a copy of this with every GC/MS that they sell.

On July 5, 2011 I lost my wife to a two-year fight with multiple myeloma, a blood-bone cancer. Not only was she my wife, my best friend, and an unbelievable mother to her children, she was a professional colleague. She edited all my writing. She worked on this last book project, regardless of the pain of her illness, until the book finally went to print in April of 2011. This was, by far, her most difficult editing task of her career due to gross incompetence of the typesetters in India used by Elsevier on this project. Their attempts at editing bordered on the criminal. Just as one example, I had a sentence that read, "Any compound containing carbon, hydrogen, oxygen and nitrogen will have an odd nominal mass." They changed it to read, "Any compound containing C, hydrogen, O_2, and N will . . ."

Another great sadness in my life is that my close friend and colleague of nearly forty years, Jack Watson (J. Throck Watson) contracted glioma, a brain cancer. As of a few days ago (September 2012), the chemotherapy he had been receiving has stopped working. This has been a great loss to me and will continue to create another significant void in my life.

On a somewhat lesser note, in February of 2011, I had to put down our dog of fourteen years, Maggie. The reason I mention this is because she was in the dedication of a number of my writings, and I always showed her picture at the beginning of my courses. I would talk about how smart she was and how much she enjoyed working on mass spectrometry problems. She was a full-blood Doberman with her ears and tail intact. I still have our second dog we got in 2005, Chili, who is a mix between a Doberman and Beagle and is just as hard of a worker in the field of mass spectrometry.

In 2012, at the age of seventy, I continue to teach at the University of the Pacific in Stockton, California, and manage the Pacific Mass Spectrometry Facility. I also continue in

writing and editing of books and grow my mass spectrometry library which is still destined to go to CHF.