

CHEMICAL HERITAGE FOUNDATION

HAROLD M. MCNAIR

Transcript of Interviews
Conducted by

Michael A. Grayson

at

Blacksburg, Virginia

on

6 and 7 November 2011

(With Subsequent Corrections and Additions)

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HAROLD M. MCNAIR

1933 Born in Miami, Arizona, on 31 May

Education

1955 BS, University of Arizona, Chemistry
1957 MS, Purdue University, Analytical Chemistry
1959 PhD, Purdue University, Analytical Chemistry

Professional Experience

Eindhoven Technical University, Eindhoven, The Netherlands
1960 Fulbright Postdoctoral Fellow
Esso Research and Engineering, Linden, NJ
1960 Research Chemist
F&M Scientific Division of Hewlett-Packard, Amsterdam, Holland
1961-1964 Technical Director, General Manager
Aerograph Division of Varian Associates, Walnut Creek, California
1967-1971 Director of International Operations
Virginia Polytechnic Institute and State University, Blacksburg, Virginia
1968-1971 Associate Professor of Chemistry
1971-2002 Professor of Chemistry
1990-1992 Department Head, Chemistry Department
2002-present Professor Emeritus

Honors

1951-1955 University of Arizona, Phelps Dodge Scholarship
1951-1955 University of Arizona, Dean's List
1955 University of Arizona, Freeman Medal (Outstanding Male Graduate, 1955)
1955 University of Arizona, President's Scholarship Cup
1955 University of Arizona, Merck Chemistry Award
1955-1959 Purdue University, President, Phi Lambda Upsilon, member Sigma Xi;
Procter and Gamble Research Fellowship
1960 Perkin-Elmer Fellowship, Eindhoven Technical University Fellowship.
1972 Honorary Membership, O.D.K., Va. Tech Chapter
1975 I.R.-100 Award Winner; Co-inventor of Cira GC/IR System
1976 Fisk Medal, Fisk University for ten years' service in teaching short courses at Fisk
1976 Fellowship from "Troisième Cycle" of Swiss Universities for a Visiting Professorship at the University of Neuchatel, Neuchatel, Switzerland

- 1977 One joint paper with former student received NASA Langley Research Center H.J.E. Reid Award for NASA research recognition (more than four hundred reprint requests).
- 1979 Chosen United National Consultant to Graduate Programs in Analytical Chemistry in Brazilian Academy of Sciences Committee to Review Analytical Chemistry Programs at NBS (three years)
- 1981 Philips Electronics Fellowship for research study leave, Eindhoven Technical University, Eindhoven, The Netherlands
- 1982 Certificate of Appreciation from The American Industrial Hygiene Association for support of training programs, A.I.H. Conference
- 1983 VaTech Alumni Teaching Award: Outstanding Undergraduate Teacher First awardee (out of 1200 faculty members)
- 1986 Colacro Gold Medal for outstanding contributions to Chromatography in Latin America, Rio de Janeiro
- 1989 Eastern Analytical Symposium Award in Chromatography
- 1990 HP Corporate Gift, for Chromatographic Research
- 1990 Science Advisor, Research Labs, R. J. Reynolds, Winston Salem, NC
- 1991 K. P. Dimick Award in Chromatography
- 1991 Special Achievement Award, ACS, 25 years of short courses
- 1993 Twsett Medal of Chromatography, Russian Academy of Sciences, Riva del Garde
- 1994 Honorary Faculty Member, School of Pharmacy, University of Concepción, Concepción, Chile
- 1997 "Merit Award In Chromatography" from the Chicago Chromatography Discussion Group
- 1998 Invited by the Swedish Academy of Sciences to nominate for the Nobel Prize in Chemistry
- 2000 Analytical Division of ACS, J.C. Giddings for Outstanding Contributions to Education
- 2001 Stephen Dal Nogare Award, Pittsburgh Conference, March 2001, Outstanding Contributions to Separation Science
- 2003 Horváth Medal, Connecticut Separation Science Council
- 2004 Easter Analytical Society, Award in Analytical Chemistry
- 2008 Outstanding Alumni Award, Dept. of Chemistry, University of Arizona
- 2009 Lifetime Achievement Award in Chromatography, LC/GC Magazine, Pittsburgh Conference

ABSTRACT

Harold McNair grew up in Miami, Arizona, one of two sons. His parents worked in the local copper mines; they were not highly educated, but they valued education and encouraged Harold. He did well in school but also loved sports, playing tennis especially well. He won a tennis scholarship, Elks Club award, and a Phelps Dodge Scholarship to the University of Arizona where he majored in chemistry and minored in physics. He found his professors very challenging and interested in their students. McNair won more honors, including being a Rhodes Scholar alternate. McNair entered Purdue University's PhD program and continued to work in industry during the summers. Fascinated by instrumentation, he met A. J. P. Martin at Amoco and cemented his interest in gas chromatography (GC). At a GC meeting J. J. Van Deemter encouraged him to build Purdue's first gas chromatograph. McNair's next stop was Eindhoven, the Netherlands, for a Fulbright Scholarship, working with A. I. M. Keulemans. In addition to learning a great deal he met his future wife. He returned to the United States to a job at Esso, studying rocket fuels for the US Department of Defense. In addition to his regular duties McNair wrote *Basic Gas Chromatography*. After a year he left Esso for F&M Scientific, and they moved back to Amsterdam. There they had three successful years before McNair went to Varian, Inc., to be director of European operations. The next four years were spent in California, with frequent travel to Europe, now with three children.

McNair was recruited by two of his former Purdue professors to take a professorship at Virginia Polytechnic Institute and State University (Virginia Tech). While continuing his regular teaching and research, he expanded the short course program he had begun at Varian. The quality of life and science at Virginia Tech persuaded him to remain there rather than return to industry as he had originally planned. With some of his students McNair established COLACRO (Congress in Latin America about Chromatography), which has taught short courses and introduced GC into almost all of the countries in Latin America. Although he is retired now he continues to teach an occasional short course and to do some work on bomb residues for the FBI. He is also interested in food science and is working on a study of the relationship between cows' diets and milk.

McNair remains extremely enthusiastic about separation science, especially GC, which he says is still an important tool of analysis, especially in the biomedical and health fields. He discusses the evolution of instrumentation in GC, talks about liquid chromatography, and praises both his mentors and his students. He gives his wife much credit for her help, especially with foreign students. He is proudest of his supernetwork, "McNair's Mafia," from undergraduates through colleagues. He believes that his most significant contribution is his *Basic Gas Chromatography*. He says that among the pioneers of GC, A. J. P. Martin, Steve Dal Nogare, and A. I. M. Keulemans were his most important mentors; they taught him chemistry but also how to live and laugh.

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<p>Grew up in Miami, Arizona; one older brother. Family background. Parents uneducated but regarded education as important. Loved sports as well as school; very good tennis player. No money for college.</p>	
College Years	6
<p>Phelps Dodge Scholarship, tennis scholarship, Elks Club award; chose University of Arizona. Gave up tennis to concentrate on studies. Chemistry major, physics minor. Class routine and curriculum. Also liked political science and anthropology. Professors very good and interested in teaching. Speaks number of languages. Phi Beta Kappa as junior, as well as other honors. Rhodes Scholar alternate. Summer employment in copper mines. Phillips Petroleum for summer after graduation.</p>	
Graduate School and Postgraduate Years	18
<p>Chose Purdue University on Alec Kelley's recommendation; very good offer. Culture shock; weather. School difficult and competitive. Worked summers in industry - Phillips; American Cyanamid; Amoco; DuPont; Esso - fascinated by instrumentation. Master's thesis on coulometry. Met A. J. P. Martin at Amoco; cemented desire to work in gas chromatography (GC). Learned to make tea. Met J. J. Van Deemter at gas chromatography (GC) meeting; built Purdue's first gas chromatograph. Probably first PhD thesis on GC in United States. Fulbright Scholarship to Technische Universiteit in Eindhoven, Netherlands. Studied with A. I. M. Keulemans. Developed TRIS. Became assistant professor, taught in Dutch. Met Marijke, future wife. Some anecdotes about DuPont, Stephen Dal Nogare, founding of F&M Scientific, Marcel Golay, James Lovelock. Flame-ionization detector. Capillary columns. Sir Dennis Desty. Fused silica. Report for Fulbright.</p>	
Settling Down	58
<p>Began permanent job with Esso. Married Marijke. Worked on rocket fuels for US Department of Defense. Helped F&M make flame ionization detectors for Esso. Several publications. Wrote textbook, <i>Basic Gas Chromatography</i>. Turned down promotion to management at Esso; left for F&M Scientific to be technical director in Europe. Settled in Amsterdam, set up sales forces around Europe. Left F&M to become director of European operations at Varian, Inc. Beginning of liquid chromatography (LC). Moved back to California, travelled to Europe often. Also developed market in Western Hemisphere. Began teaching short courses as marketing tool; expanded into United States. Four years at Varian.</p>	
Back to Academia	81
<p>Warren Brandt and Alan Clifford, both on his committee at Purdue, now at Virginia Polytechnic Institute and State University (Virginia Tech); offered him</p>	

job. Non-compete clause complications; taught short courses. Courses in GC most useful to industry; then government; academia; no biomedical applications until liquid chromatography. Developed Pellisieve. Andrei Kiselev and Yuri Kazakevich. Term for chromatographies now separation science. Micellar electrokinetic chromatography (MEKC); electrophoresis; James Jorgenson and Henry Rasmussen. How capillary zone electrophoresis (CZE) works. Jeff Bowermaster invented temperature-programmed LC. Several groups working on LC. Quality of life and scholarship at Virginia Tech.

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Funding. Good relationship with US Food and Drug Agency. Taught at Federal Bureau of Investigation; worked on bomb residues. Mainly worked on drugs of abuse. Dramatic increase in number of women in chemistry. Retired; research money used up. Still teaches short courses, still does some backup for bomb work. Consortium with other schools. Special connection with Latin America; summers in Mexico City, Mexico; also has taught short courses in most Latin American countries. Marijke's important role in aiding foreign students. Coinventor of CIRA, a GC-infrared system. Established COLACRO, like PittCon, highly successful. Many awards. Asked to nominate someone for Nobel Prize.

More Thoughts 126

Innovation: GC first; then capillary columns; digital electronic integrators; high performance liquid chromatography (HPLC); bonded phases for pharmaceutical products; CZE. In his group: liquid phases; detectors. Landmark publication: polynuclear aromatic compounds by HPLC. Better limits of detection; improved detectors and methodology. Bowermaster's temperature-programmed LC. Importance of increased precision and automation. GC probably nearly all developed but not necessarily simple.

Summing Up 129

Working with small group on diets of cows and quality of milk. Still teaches some short courses with Lee Polite. Proud of his many students; glad to have had undergraduates. McNair's Mafia: supernetwork. Decline of chemistry. Most significant contribution his text, *Basic GC*. Description of columns. Discussion of being department chair. Pioneers of GC: Martin, Keulemans, Golay, Desty, R.P.W. Scott; Dal Nogare; Lovelock. All brilliant, but all splendid people, inspired him to pass on knowledge. Mentoring in good living as well as importance of chemistry. Evolution of instrumentation. Future of separation science assured: many difficult problems, especially now in biomedicine and food and health.

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