Reilley, Charles Norwood [1]

Reilley, Charles Norwood

by Maurice M. Bursey, 1994

2 Mar. 1925–31 Dec. 1981

Charles Norwood Reilley, chemist and educator, was one of the world's guiding lights of the renaissance in analytic chemistry after World War II [2] and only the second analytic chemist in modern times elected to the National Academy of Science. He was born in Charlotte [3], the son of Eugene Holmes Reilley, a representative of the American Seating Company, a manufacturer of school furniture, and Marie Norwood Reilley; when he was a boy his father died from injuries received in World War I [4], and he was raised by his mother, a public school teacher. Charles became fascinated with radio and electrical things while he was in grammar school, and his introduction to science in high school so seized his imagination that he could never turn his eyes away again.

He was graduated from The University of North Carolina [5] with a B.S. in chemistry in 1947, winning undergraduate awards sponsored by Alpha Chi Sigma as a sophomore, junior, and senior; and the Archibald Henderson [6] medal in mathematics and election to Phi Beta Kappa as a junior. After college he joined the faculty at Queens College [7] in Charlotte and for years afterwards told stories about standing in the hallway, simultaneously teaching three laboratories in three subjects and answering questions from all three rooms at the same time.

In 1949 he began graduate work at Princeton University [8] with Professor N. H. Furman, one of the most distinguished analytic chemists of that generation. Furman's group included a number of brilliant scientists who would in the next few years create a revolution in analytic chemistry, bringing the development of analytic electronic instrumentation within the province of the analytic chemist; Reilley was a leader among this number from the beginning. He received an M.A. in 1951 and a Ph.D. in 1952, winning the national competition for the prestigious Merck Award in 1951.

Returning to his alma mater in 1951 as instructor, Reilley was promoted to assistant professor in 1953 and associate professor in 1956. In 1957, at the urging of nominators across the country, he was awarded an unsolicited and unrestricted grant from the Research Corporation to further his interests. The novelty of such an unrestricted award captured the imagination of the press; newspapers quoted spokesmen: "If Professor Reilley feels that buying a convertible automobile will further his research, he may use the money to buy the convertible automobile." He used the money in traditional ways, however.

In 1961 he became professor and won a Guggenheim Fellowship to study at Basle for the year. In due time, when the grand old man of American analytic chemistry, Izaac M. Kolthoff, retired from the University of Minnesota [9] and colleagues there asked him to prepare a full list of persons to invite to succeed to his chair, Kolthoff replied, "There is only one: Charles Reilley." But Reilley would not be moved from Chapel Hill [10], either for this signal honor or for many others that were offered to him throughout his career. In 1963, at age thirty-eight, he was named Kenan Professor.

Honors continued to crowd upon him. He was invited to present distinguished lectures at Notre Dame, West Virginia, Iowa, Pittsburgh, Louisville, Colorado, Kansas, Stockholm, Virginia Polytechnic, and Cornell. The American Chemical Society [11] honored him with its Fisher Award in Analytical Chemistry (1965), Herty Medal (1968), and Stone Award (1971). He won the ANACHEM Award in Analytical Chemistry in 1972, the Manufacturing Chemists Association College Teacher Award in 1975, and the Kolthoff Award in Analytical Chemistry in 1979. In 1977 he was elected to the National Academy of Sciences, the first analytic chemist in nineteen years and the first after Kolthoff himself.

Indeed Reilley was preeminently, after Kolthoff, the world's renaissance man of analytic chemistry. His early interests were in electrochemistry, and one of his earliest studies, setting forth the correct theoretical model of high-frequency titrimetry, set the tone for teaching the fundamentals of electrochemistry across the world for fifteen years; his concept of response function additivity stimulated an enormous amount of work by other scientists, and his theoretical and experimental studies of galvanic membrane electrodes led to a simple, inexpensive method of measuring dissolved oxygen in rivers and lakes. At the same time he developed theory and innovative methods for the study of multidentate metal complex chemistry; he developed a reagent for the titration of calcium in the presence of magnesium that is used today in many clinical laboratories, and he was responsible for articulating the nature of the "chelate effect," the exceptional stability of metal complexes in which the ligands have several sites from which electrons may be donated to the metal ion. His application of nuclear magnetic resonance spectrometry to these complexes broke ground from which sprang years of others' works on the dynamics of the formation and breaking of chemical bonds between sites in the ligand and the metal ion.

His clarity in explaining his concept of microscopic protonation equilibria guided many other workers in further development of theories of bond formation in these complexes, and his definitive work on the origins of chemical shifts in nuclear magnetic resonance spectra of metal complexes paved the way for the development of shift reagents, some of

the most valuable tools of the chemist in probing the structures of these complexes in solution. His early contributions in chromatography on sequential and mixed-bed columns in gas-liquid chromatography ultimately became so pervasive in analysis that, to most workers, their origins have become lost; his thoughts about detector response provoked the development of inverse chromatography.

Reilley was one of the first to think about how computers could simplify the interpretation of analytic data, and his pioneering work on the application of pattern recognition techniques to the interpretation of mass and infrared spectra of organic compounds in order to deduce their structure was the origin of the discipline of chemometrics. His last major work was in the application of microcomputers to chemical analysis, and their impact is still to be fully felt. After the Manhattan project, analytic chemistry had lost some of its impetus and even its respectability in academic institutions; when there were chemists who would push analytic chemistry back into the dreary world of old-fashioned volumetric and gravimetric procedures and call all the rest the province of other branches of the discipline, Charles Reilley pointed out that "analytical chemistry is what analytical chemists do" and let his own creations, and what they engendered, stand as testimony to the new vibrancy of his discipline.

A teacher of prodigious vision, Reilley earned the Manufacturing Chemists Association Award not only for his profound influence in graduate education through his research, but also for his genius in revising the classical undergraduate curriculum in chemistry at Chapel Hill, so that the university was recognized in the late 1960s and 1970s as the major national innovator in chemical education. The program of instruction proved so exciting to young science students that for 80 percent of the years following its installation, Chapel Hill ranked first in the nation in the number of degrees granted to baccalaureate chemists.

As a teacher and scholar he was also sought by many chemical and instrumentation producers as a consultant and by many government agencies as a member of distinguished advisory panels. He served as coeditor of *Advances in Analytical Chemistry and Instrumentation*, as secretary-treasurer and then chairman of the Division of Analytical Chemistry of the American Chemical Society, and on the Advisory Council on College Chemistry.

Reilley never married. He was survived by his mother, whom he cared for until his sudden death in Chapel Hill; a brother, Eugene Holmes Reilley, Jr., of Atlanta; and two sisters, Miriam Reilley Bell of Wilmington [12] and Marie Reilley Ridgeway of Tacoma, Wash.

References:

Maurice M. Bursey, *Carolina Chemists* [13] (1982).

Chapel Hill Newspaper, 3 Jan. 1982.

Durham Morning Herald, 17 Feb. 1957.

T. L. Isenhour, *Analytical Chemistry* (1982).

Raleigh *News and Observer*, 2 Jan. 1982.

Additional Resources:

Delahay, Paul, and Charles N. Reilley. *New instrumental methods in electrochemistry: Theory, instrumentation, and applications to analytical and physical chemistry. With a chaper on high-frequency methods. Foreward by I.M. Kolthoff.* New York: Eiley. 1966. http://hdl.handle.net/2027/mdp.39015003716506 [14] (accessed August 19, 2014).

Golby, Robert L., Gary P. Hildebrand, and Charles N. Reilley. *Direct titration of Calcium in blood serum.* Washington, D.C.: United States Air Force, Office of Scientific Research. 1957. https://www.worldcat.org/title/direct-titration-of-calcium-in-blood-serum/oclc/244485356 [15] (accessed August 18, 2014).

Murray, Royce. *Charles Norwood Reilley: March 2, 1925-December 31, 1981.* Washington, D.C.: National Academy Press. 2006. http://www.nasonline.org/publications/biographical-memoirs/memoir-pdfs/reilley-charles.pdf [16] (accessed August 18, 2014).

Reilley, Charles N., and J.H. Hollowway. *Stability of metal-tetraethylenepentamine complexes.* Washington, D.C.: United States Air Force, Office of Scientific Research. 1957. https://www.worldcat.org/title/stability-of-metal-tetraethylenepentamine-complexes/oclc/256473794 [17] (accessed August 18, 2014).

Reilley, Charles N., and Donald T. Sawyer. *Experiments for instrumental methods; [a laboratory manual].* New York: McGraw-Hill. 1961. http://hdl.handle.net/2027/mdp.39015016082078 [18] (accessed August 19, 2014).

University of North Carolina (1793-1962). *University of North Carolina catalogue [serial].* [Chapel Hill, N.C.: University of North Carolina at Chapel Hill]. 1956. https://archive.org/details/universityofnort19561957 [19] (accessed August 19, 2014).

Subjects:
Biographies [20]
Educators [21]
Science, technology, and innovations [22]

Scientists & Inventors [23]
Authors:
Bursey, Maurice M. [24]
Origin - location:
New Hanover County [25]
Wilmington [26]
Mecklenburg County [27]
Charlotte [28]
Orange County [29]
Chapel Hill [30]
University of North Carolina at Chapel Hill[31]
From:
Dictionary of North Carolina Biography, University of North Carolina Press.[32]

1 January 1994 | Bursey, Maurice M.
