

*At a meeting of the FACULTY OF ARTS AND SCIENCES on April 7, 2015, the following tribute to the life and service of the late Paul Mead Doty was spread upon the permanent records of the Faculty.*

## **PAUL MEAD DOTY**

BORN: June 1, 1920

DIED: December 5, 2011

During the second half of the twentieth century, Paul Doty had a major impact on science and international affairs at Harvard and in the world through his research, mentoring, and institution building. He led the development of molecular biology in this Faculty in the 1960s and 1970s and founded the Center for Science and International Affairs, now the Belfer Center for Science and International Affairs in the Kennedy School of Government.

Paul Mead Doty, Mallinckrodt Professor of Biochemistry, *Emeritus*, was born in Charleston, West Virginia, on June 1, 1920. When he was seven the family moved to Chicora, Pennsylvania, a town with about a thousand inhabitants. Given a chemistry set at age nine, he set up a home laboratory and by the time of high school had set his sights on a career in chemistry. Upon graduation, he entered Pennsylvania State College (now University), receiving a B.S. in chemistry in 1941.

Accepted for graduate work at Columbia, Harvard, and Princeton, Doty chose Columbia. During freshman year he attended courses offered by Enrico Fermi, Joseph Mayer, I. I. Rabi, Harold Urey, and Edward Teller. By the end of the academic year all of them had left teaching for war work except Mayer, with whom Doty did his dissertation research, publishing three papers on electron affinities and bond energies. While still at Columbia, apparently following a suggestion of Peter Debye, Doty and fellow graduate student Bruno Zimm began theoretical and experimental studies of light scattering by high polymers in solution.

At about that time, Doty and Zimm were offered instructorships by Herman Mark at the Brooklyn Polytechnic Institute, where Mark was assembling an outstanding Department of Polymer Science. Doty's research there was on the use of light scattering for the determination of the size and shape of synthetic polymers and of tobacco mosaic virus. After two years at Brooklyn Polytechnic, Doty was awarded a Rockefeller Fellowship to spend a year in Cambridge, England, where he was particularly influenced by Max Perutz, one of the founders of molecular biology. After a year at the University of Notre Dame, Doty was appointed Assistant Professor of Chemistry at Harvard in 1948 and full professor in 1956.

Doty's laboratory became a leading world center for the application of light scattering and other physical chemical methods to the study of the size, conformation, and helix-coil transformations of proteins and nucleic acids, attracting many outstanding graduate students and postdoctoral fellows. Doty's seminal contribution to science was the demonstration in late 1950 that the separated strands of bacterial DNA in solution can be reunited by slow cooling, regaining specific biological activity and the double-helical structure of native DNA. This was a discovery of great importance, making possible many procedures at the center of nucleic acid research, including primer-initiated DNA sequencing and the polymerase chain reaction for DNA amplification. Subsequent work in the Doty laboratory elucidated the structure of single-stranded RNA molecules in solution, determined the direction in which messenger RNA is translated, and demonstrated that protein synthesis in bacteria is initiated with formylmethionine, coded by the methionine codon AUG on the messenger RNA.

In the 1970s and 1980s work in the Doty laboratory returned to an earlier interest in collagen, which had been the subject of Helga Boedtker's doctoral dissertation. She had worked in Doty's laboratory and they had subsequently been married. The experiments, largely carried out by Boedtker, led to the isolation of the collagen messenger RNA in 1974 and the characterization of the collagen gene in 1981. Doty retired from the Department of Biochemistry and Molecular Biology in 1988.

In the 1950s and 1960s, Doty played a leading role in establishing molecular biology as a field of teaching and research distinct from traditional biology and chemistry at Harvard. As the previously formed Committee on Higher Degrees in Biochemistry, a graduate program leading to the Ph.D. degree in biochemistry, could not determine curricula or initiate appointments, he proposed the creation of a new department, presenting the case to a meeting of the Faculty of Arts and Sciences, which by unanimous vote approved the creation of the Department of Biochemistry and Molecular Biology on April 11, 1967, with Doty as the first chairman.

In 1957 Doty was elected chairman of the Federation of American Scientists and in that capacity participated in a meeting of American, British, and Soviet scientists in Pugwash, Nova Scotia. Invited to visit Moscow the following year, he began what became a lifelong friendship with several of the most senior Soviet scientists. As one of the few American scientists who had come to know such individuals, Doty was invited to join a committee under MIT President James Killian to advise President Eisenhower on matters of arms control. This began what became a long series of high-level science advisory positions, mainly in the area of nuclear arms control. These included membership in President Kennedy's Science Advisory Committee and leadership of an informal but influential advisory group to President Nixon's National Security Advisor, Henry Kissinger, a close friend of Doty from Kissinger's days at Harvard.

Doty's premise in these matters was that nuclear weapons are not for war-fighting or preemption but solely for deterring nuclear attack, a view that was by no means accepted by officials on both sides during the early days of the Cold War. With support from the Ford Foundation, Doty founded Harvard's Center for Science and International Affairs, later renamed the Belfer Center, and its journal, *International Security*. Many of its alumnae went on to become influential academics or senior government officials. Doty's style as director there, as in the laboratory, was one of questioning, encouraging, and caring more about finding answers than about promoting his own prestige. His large physical presence and jovial disposition belied his commitment and perseverance to achievement in science and human affairs.

Paul Doty died at home on December 5, 2011; he left a son, Gordon, from his first marriage and three daughters, Marcia, Rebecca, and Katherine, from his marriage with Helga Boedtker, who died in 2001.

Respectfully submitted,

Matthew Meselson  
Henry Rosovsky  
Guido Guidotti, Chair

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The following source was consulted for the preparation of this Minute:

Ferguson, Raymond C., *Interview with Paul M. Doty*, Harvard University, (November 17, 1986), Philadelphia, PA: Chemical Heritage Foundation, Oral History Transcript # 0062.