E. Bright Wilson FREE

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Physics Today **46** (5), 80 (1993);
https://doi.org/10.1063/1.2808916

OBITUARIES

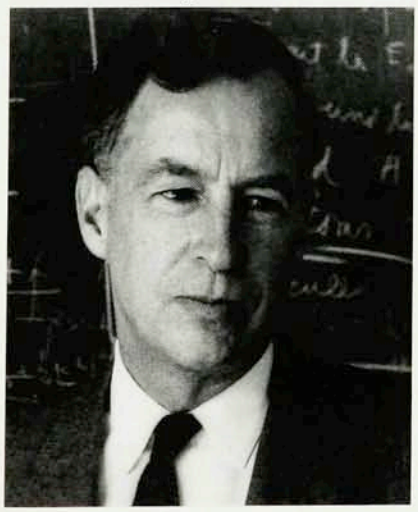
E. Bright Wilson

E. Bright Wilson, who died on 12 July 1992, had a highly productive scientific career that spanned 60 years, most of them at Harvard University. He was the model of a university professor, excelling in the two essentially interwoven university functions, research and education. When called upon, he effectively and unstintingly fulfilled his societal responsibilities.

Wilson was born in Tennessee in 1908. He earned his BS in 1930 and his MA at Princeton University and his PhD at Caltech in 1933, each in the field of chemistry. After earning his doctorate, Wilson became a junior fellow in the Society of Fellows at Harvard. He went on to become a professor in the chemistry department.

A founder of chemical physics, Wilson in particular led the development of molecular dynamics and spectroscopy, bringing to the field both a thorough theoretical foundation and a practical bent toward the implementation of spectroscopic methods for the effective treatment of general polyatomic molecules. Wilson was a pioneer who placed nuclear dynamics and spectroscopy of polyatomic molecules on a rigorous foundation of both quantum mechanical ideas and general principles that do not depend on particular mechanical models. To achieve this model-independent basis, he rigorously exploited the dynamical constraints required by the symmetry of molecules. Wilson characterized the electronic, vibrational, rotational and nuclear spin components of the complete molecular wavefunction in a penetrating group theoretical approach. This work, like much of Wilson's, laid a permanent foundation that has endured to the present.

E. Bright Wilson



The fundamental theory of polyatomic spectroscopy was effectively laid out in Wilson's basic works of the mid-1930s. His deep physical insight, coupled to his conviction that molecular spectroscopy must be useful to a broad scientific audience, led him to a relatively complete development of the rotation–vibration theory of molecules for small-amplitude oscillations. His breadth of understanding of molecular structure, in particular the nature of chemical bonds and valence forces, enabled him to formulate molecular dynamics in terms of the internal molecular coordinates, thus allowing him to make use of the regularity of molecular structural units. His classification of molecular vibrations and his reduction of the Hamiltonian using the irreducible representations of the molecular point group then allowed quantitative analysis of complex systems to be made in the precomputer age. Wilson's methods became the standard treatment for the vibrations of polyatomic molecules. In addition, Wilson and his research group at Harvard developed a number of experimental methods for vibrational spectroscopies during the 1930s.

Wilson's work during World War II was on the assessment of underwater naval explosives. He also did much to develop the field of operations research while serving in the Department of Defense in 1952–53. In these activities Wilson demanded valid empirical data and unambiguous analysis, paralleling his rigorous approach to chemical physics.

In the late 1940s and 1950s Wilson worked on microwave spectroscopy of polyatomic molecules, the theory of which was based in large part on his fundamental work of the 1930s. Efficient experimental techniques were required for the application of microwave spectroscopy to the broad variety of polyatomic molecules of chemical interest. The Stark-modulated spectrometer, which Wilson invented with Richard Hughes, became the workhorse of the trade until the recent development of time-domain methods.

Wilson exploited the exceptionally high resolution of microwave spectroscopy for the study not only of overall rotational energy levels but also of large-amplitude tunneling motions that produced spectral line splittings. A frequently occurring example of nonrigidity in molecular systems is the internal rotation about carbon–carbon single bonds. Wilson developed the theory required for the analysis of the anharmonic tunneling motions in such systems, allowing the quantitative characterization of the factors that determine the potential energy for internal rotation. The results of Wilson's work were applied extensively in chemistry and other fields.

Wilson made no separation between teaching and research. His lectures, textbooks and research papers were models of unpretentious logical clarity. His three textbooks, *Introduction to Quantum Mechanics* (with Linus Pauling), *Molecular Vibrations* (with Jack Decius and Paul Cross) and *Introduction to Scientific Research* are classics that remain in print today.

While Wilson gave public service generously—he served both in the Federal government and on numerous committees concerned with societal consequences of technology—his devotion remained steadfastly with the creation of scientific knowledge. In his work, he was scrupulously honest and totally unselfish. Generous in spirit and in ideas, he was a scientist who helped all in the advancement of science. Much of the pleasure of molecular spectroscopy and chemical physics is a consequence of the style of science that he set.

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Hugh P. Kelly

Hugh P. Kelly died on 29 June 1992, at the age of 60, after a long and brave struggle with cancer. Characteristically, he taught and carried on research in physics until his last few days. The wide circle of people who met Hugh through his research activities in theoretical atomic physics and through his administrative tasks at the University of Virginia will remember him as one of the rarest of personalities.

Hugh received his AB from Harvard in 1953 and his MSc from UCLA a year later. He then served in the US Marine Corps for three years. After that, he returned to graduate school at the University of California, Berkeley, where he received his doctorate in 1963. Between 1963 and 1965, Hugh did postdoctoral work with Keith Bruckner at the University of California, San Diego, where he mastered methods that Bruckner had initially developed to deal with the nuclear many-particle problem and that now could be used with great effectiveness in atomic theory. Their work allowed them to handle complex electron correlation effects and thus achieve substantially higher preci-