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Historical Notes

*Dudley R. Herschbach honors the memory of
Edgar Bright Wilson*

The following is the text of the remarks Dr. Herschbach delivered on the occasion of the memorial service for the late E.B. Wilson at Memorial Church, Harvard on October 16, 1992. A short biography of EBW was published in this column in January, 1993 (The NUCLEUS, 71, #6, p.11).

EBW, Beloved Mentor

To those privileged to know him, Bright Wilson was a joy, a wonder. As a scientist, teacher, mentor, colleague, and citizen, he was greatly admired; as a man, greatly beloved. He exemplified in his life and work the best qualities humanity can attain.

Years ago, when I accompanied Bright to a memorial service for another colleague, he remarked afterwards that he valued most the anecdotes. He said this was because the stories, like snapshots in a family album, not only revealed the person more vividly, but also often gave thought-provoking historical perspective.

So I want to tell a few stories about Bright, some favorites of his, some of others who loved him. The first has to do with how he came to choose science as a career. He was born in Gallatin, Tennessee, but grew up in Yonkers, New York. His mother came from a family with deep Southern roots. His father was a lawyer, and served in the State Legislature before

Bright arrived. As a youngster, Bright undertook chemical experiments at home, built radio receivers, and obtained an amateur radio license in his early teens. Such interests were unprecedented in his family. He told of his excitement when, as a high school boy of 15, he discovered in the town library a new book, the now classic text on thermodynamics by Lewis and Randall, published in 1923. This book first revealed to Bright the grand scope and logical beauty of science, which he pursued ardently thereafter. To appreciate how remarkable this episode is, you need to know that the Lewis and Randall book and its clones or descendants have over the intervening seven decades been used strictly as a graduate-level text. Today it seems amazing that a high school lad could be captivated by such a book—and that a town library would acquire it. That is as instructive as the fact that Bach wrote his cantatas (aside from the solo parts) to be sung, unrehearsed, by the ordinary folk of the congregation.

After earning B.S. and M.S. degrees in Chemistry at Princeton, and publishing several experimental papers, Bright headed west in 1931 to Cal Tech to work with the brilliant young theorist, Linus Pauling. The trip was made with a couple of friends in a sturdy touring car. It had to be sturdy for, as Bright liked to emphasize, in those days the long road across the southwestern desert consisted of logs laid crosswise in the sand. But after his bumpy journey on that corduroy road, Bright soared at Cal Tech. He completed his Ph.D. in just 2 years, while also teaching freshman chemistry sections and assisting Pauling with his quantum mechanics course.

Bright did encounter a significant bump, however. His thesis project was a quantum theoretical calculation for the lithium atom. The Cal Tech Chemistry Department had a rule, not rescinded until some years later, that

required every Ph.D. thesis to include experimental work. This produced a story that I heard several times from Bright and once from Pauling, with an instructive difference in emphasis. To honor the rule, Bright measured at Pauling's suggestion the magnetic susceptibilities of several nitroso compounds. His results proved to be in drastic disagreement with Pauling's predictions, an aspect not mentioned in Pauling's rendition but cheerfully stressed by Bright as a cautionary tale for his graduate students.

The Cal Tech rule reflected the strong cultural bias most chemists then had against mathematical theory. For instance, the *Journal of Physical Chemistry* refused to accept purely theoretical papers until the late 1940's; *Chemical Abstracts* often dismissed such papers with a four-letter entry: "math." Undaunted in facing such a cultural desert, with many professorial heads buried in the sand, Bright set out to build his own intellectual highway to the beckoning frontier of chemical physics.

Bright arrived at Harvard in 1934 as one of the first Junior Fellows elected to the newly endowed Society of Fellows. He became an Assistant Professor in 1936 and was promoted to tenure only 3 years later, at the early age of 30. Then as later he was remarkably productive in research. He did pioneering work with symmetry analysis and developed definitive theoretical treatments of molecular vibrational and rotational dynamics. With his graduate students, he devised key experimental methods in molecular spectroscopy.

Yet Bright was also fully devoted to teaching in all its aspects. A characteristic instance was told to me by Don Hornig. As a sophomore in 1937, he took Bright's physical chemistry course. In those days, the course dealt largely with thermodynamics, but Don had discovered the recently published text, *Introduction to Quantum Mechanics*, by Pauling and Wilson. This superb book, the most accessible ever written on the subject, had evolved from notes taken by Bright when he served as Linus' assistant.

When Don asked Bright for help with one of the problems in the book, Bright volunteered to meet with him on Saturday morning, and kept up this informal tutorial regime for much of the academic year. Bright was then only in his second year on the faculty, untenured, teaching two courses, and intensely involved in research. Thus this episode says a lot about his attitude to teaching, and also about his keen judgement, for Don was destined to become one of the most distinguished of Bright's students.

Bright likewise was exceptionally engaged with his faculty colleagues. Above all, he and George Kistiakowsky enjoyed many adventures together over a span of nearly fifty years. As well as scientific collaborations at Harvard, this teamwork included four years of work on explosives during World War II. Bright assumed responsibility for developing techniques for measuring the performance of explosives underwater, particularly depth charges, work hosted by the Woods Hole Oceanographic Institution. One of Kisty's favorite stories about Bright pertains to this work; it appears in a biographical article in the 1979 Wilson Festschrift issue of the *Journal of Physical Chemistry*. Kisty relates that "Even Bright's gentleness seemed to depart at times... One day at sea Bright saw a novice test crew member about to connect an ohmmeter in a way that would have detonated—very prematurely—the 500-lb. depth charge hanging overboard. With moments at his disposal before the lethal bang, Bright in one smooth motion reached for an oar and laid flat that innocent beginner." Kisty also on occasion would tease Bright about the wicked pleasure that Bright used to take in escorting certain visiting dignitaries (including Kisty) "in the foulest weather, to demonstrate this or that new twist in test technology while his cold and drenched audience wallowed in choppy seas."

My own first meeting with Bright came in 1955, when I arrived as a graduate student. Like many other budding scientists, I'd been hooked on quantum mechanics by the Pauling and Wilson

book. Already I was intrigued with molecular dynamics and hoped to join Bright's research group. After my first conversation with him, I wrote in my diary: "EB's a great guy! Really loves science, not just publishing papers." We graduate students of course never called him Bright but rather EB, which seemed more respectful, or sometimes EBW when slightly more respect was called for. Luckily, that Fall I had the opportunity to take a course EB gave only once. It was called *Molecular Vibrations* and was based on his just published book with Decius and Cross, which remains today the definitive treatment.

It was also an exciting time in Bright's research group, which was developing an elegant new way to determine barriers to internal rotation in molecules from microwave spectra. This exploited the tunnel effect, one of the most striking of quantum mechanical phenomena. I learned invaluable lessons from working with EB and his extremely able group. EB's wholehearted commitment, high standards, and passion for lucidity and integrity had great impact on his students. He also gave strong emphasis to mapping out the big questions and to coupling theoretical studies with experiments. His third book, *Introduction to Scientific Research*, beautifully presents EB's precepts. Published in 1952, and also still in print, it is unabashedly evangelical about methods of operational research, crammed with wise, practical advice and whimsical stories. For instance, the index lists: Gremlins, 128; Haircut story, 266; Savage love nest story, 9; Three chickens story, 46; Tobacco juice story, 128... and many more! Whenever I became frustrated in the lab by experimental glitches, I took a few minutes off to read EB's book; it always got me laughing and the problem then became easier to solve.

Bright served as mentor to 90 Ph.D. students and some 60 postdoctoral fellows and to legions of others by way of his books. Furthermore, research students from other groups and undergraduates as well as faculty here and elsewhere all naturally sought out his advice and help. His efforts to

foster the careers of young people were acknowledged in two ways that probably pleased him as much as the many awards and honorary degrees he received. First, the Chemistry Department baseball team has long called itself the "E. Bright Stars" and enjoyed presenting EB with their monogrammed shirts and caps. Second, ten years ago his students and colleagues endowed the Wilson Prize Lectureship, awarded each year to a young chemist of outstanding promise. There is no restriction as to subfield, although the criteria were stretched slightly for the inaugural award. Bright's eldest son Kenneth was invited to tell of his work in theoretical physics and the lecture scheduled for mid-December, near Bright's birthday. The event had to be postponed because Kenneth and the whole Wilson clan took a slightly unanticipated trip to Stockholm. The inaugural Wilson Lecture was appropriately rescheduled for Valentine's Day.

I have been multiply blessed to be a student, colleague, and friend of

Bright and thereby to know Thérèse and their family for the past 37 years. It is a family that bubbles over with affectionate play as well as enterprising, creative work. As Bright's bodily health sadly declined in recent years, the intense love of Thérèse and his children buoyed him through those foul and choppy seas and across that last corduroy road.

I want to close by returning to the Yonkers public library with Bright at age 15, to the grand opening sentences that he found in the preface of the book by Lewis and Randall: *There are ancient cathedrals which, apart from their consecrated purpose, inspire solemnity and awe. Even the curious visitor speaks of serious things, with hushed voice, and as each whisper reverberates through the vaulted nave, the returning echo seems to bear a message of mystery.* There are also mortal people who inspire us to strive for lofty ideals and whose message of mystery reverberates in our hearts and minds. Bright Wilson was such a one.

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