News of MRS Members/Materials Researchers

In Memoriam

William O. Baker, president of Bell Labs from 1973 to 1979, died October 31, 2005, in Chatham, N.J. He was 90.

For nearly two decades, Baker's leadership at Bell Labs created the model for modern industrial research laboratories. During his tenure as president, Bell Labs researchers received Nobel Prizes in physics both for the improved understanding of the electronic structure of glass and magnetic materials and for the discovery of background radiation remaining from the "big bang" that created the universe billions of years ago.

"Dr. Baker was a guardian of the country's technological leadership as well as a true global statesman of science," said Jeong Kim, president of Bell Labs. "Bill will be deeply missed by everyone he touched, particularly those at Bell Labs who had the opportunity to work with him. He will always be remembered for his enthusiasm, knowledge, and commitment to the country's scientific excellence."

In his early research, Baker focused on the development and application of polymer chemistry, resulting in crucial advancements in the development of synthetic rubber. During his career, Baker was granted 11 patents for this work.

Baker was honored with the Presidential Medal of Science; the Presidential National Security Award; the Lifetime Achievement Award from the Marconi International Fellowship Foundation; the Franklin Institute's Fahrney Medal; 27 honorary doctorates; and numerous professional awards from such organizations as the American Chemical Society, the American Institute of Chemists, the National Science Foundation, and the Materials Research Society (MRS). Baker was the first person to hold membership in all three National Academies: Sciences, Engineering, and the Institute of Medicine.

Baker was the second recipient of the MRS Von Hippel Award, the Society's highest honor, which recognizes those qualities most prized by materials scientists and engineers—brilliance and originality of intellect combined with vision that transcends the boundaries of conventional scientific disciplines. He was recognized, in 1978, with this award for leading "research into solid-state materials and macromolecules; dielectric and dynamic mechanical properties of crystals and glasses; information processing technology; and plastics, fibers, and natural and synthetic rubbers." The citation further read, "He nurtured and oversaw the development of one of the world's preeminent laboratories."

"The one word that seems most appropriate to describe Dr. Baker and his many contributions to humanity is 'revered,'" said Michael Noll, professor at the Annenberg School for Communication at the University of Southern California and Baker's archivist. "His counsel, wisdom, leadership, and guidance were so significant that all the many people who knew him—in science, in government, at Bell Labs, in universities, and on governing boards—had the highest respect for and devotion to him.

"Dr. Baker was a true 'diplomat of science'—a 'science patriot'—because of his significant contributions to the nation, and a 'science humanist' because of his advocacy of the use of science for the benefit of humanity," said Noll.

Baker served as an advisor to most of the U.S. presidents in the second half of the 20th century, including Truman, Eisenhower, Kennedy, Johnson, Nixon, and Ford. Baker's impact on the country was particularly felt through the information-gathering technologies used by the intelligence community during the Cold War, including the use of special computers and satellite reconnaissance. In 1959, at the request of President Eisenhower, Baker developed the plan for the establishment of the Defense Communications Agency, which was eventually implemented in 1961 under President Kennedy. Baker served as a member of the President's Science Advisory Committee (PSAC), and also served on the President's Foreign Intelligence Advisory Board (PFIAB) from 1957 to 1977 and again from 1981 to 1990.

After receiving his doctorate degree in chemistry from Princeton University in the summer of 1938, Baker joined Bell Telephone Laboratories the following May as a member of technical staff. He became head of the Polymer Research and Development Department in 1948. From 1951 to 1955, he was assistant director of chemical and metallurgical research. Baker became vice president of research in 1955, after a short period as director of physical sciences research. He was elected president of Bell Labs in 1973 and served until 1979. He retired in 1980 but continued his many activities in advising various foundations, academic institutions, and government agencies.

Awards and honors have been established in his name, including the William O. Baker Professorship in Computer Science at Princeton University, the William Oliver Baker Award of the Security Affairs Support Association, the National Academy of Sciences Prize for Initiatives in Research, the Baker Family Scholarship at Drew University, and the William O. Baker Graduate Fellowships at Rockefeller University by the Andrew W. Mellon Foundation.

In Memoriam

William (Bill) Tenley Oosterhuis, team leader for condensed-matter physics and materials chemistry in the Division of Materials Sciences and Engineering, Office of Basic Energy Sciences, U.S. Department of Energy, died November 16, 2005, in Baltimore, Md., from complications associated with a kidney transplant procedure. He was 65.

Bill was born in Mount Vernon, N.Y., on March 28, 1940, and was raised in Platteville, Wis. He earned his bachelor's degree at the University of Wisconsin, Platteville, majoring in physics, chemistry, and mathematics. He was also a model student–athlete at UW–Platteville, where he played on the varsity basketball team. Bill earned his master's and doctorate degrees in physics at Carnegie Mellon University in 1964 and 1967, respectively. After completing his NSF-sponsored postdoctoral research in Mössbauer spectroscopy at the Atomic Energy Research Establishment in Harwell, England, Bill accepted a faculty position at Carnegie Mellon in 1969. During his brief academic career at Carnegie Mellon (1969–1974), he carried out research on magnetic and paramagnetic materials and iron transport proteins, and published more than 30 papers.

He joined the Division of Materials Research (DMR) at the National Science Foundation in 1974, only two years after DMR was created. Bill had an important influence on the evolution of the division, particularly in the areas related to solid-state physics, instrumentation, and user facilities, including the National Magnet Laboratory. While at NSF, he was a major force in the development of synchrotron radiation facilities at Cornell University, the University of Wisconsin, and Stanford University, and in launching the DMR instrumentation program. He was detailed by NSF to the Division of Construction, Environment, and Safety at DOE in 1985–1986 for the specific purpose of learning how large facilities were built. During this time, he also played a key role in the review of several major facility construction projects at DOE. He was assigned to the White House Office of Science and Technology Policy in 1986, where he was concerned with issues involving materials research. Subsequently, Bill served as section head for condensed-matter physics at NSF from 1987 to 1990. During this period, Bill also helped guide the NSF Science and Technology Centers program in its early stages, and his wide-ranging experience helped to further strengthen interagency cooperation after he moved to DOE in 1991.

After 17 very productive years at NSF, Bill accepted a position as the branch chief for solid-state physics and materials chemistry in the Office of Basic Energy Sciences at DOE. New programs that were developed and grew under Bill's vision and leadership in his tenure at DOE included x-ray and neutron scattering, theoretical and computational materials physics, biomolecular materials, and the Operations of Basic Energy Sciences user facilities (which later evolved into the Division of Scientific User Facilities within DOE–BES).

Bill had an abiding excitement for innovative science and was especially interested in the magnetic, electronic, and superconducting behavior of inorganic and organic materials; phase transformations; and biomolecular materials. His great passion for magnetism and magnetic materials was vividly reflected in his occasional remark, "I never met a magnet I didn't like." He was highly esteemed by his colleagues for his ability to recognize original scientific ideas and for his support of them, regardless of whether they conformed to currently popular approaches or trendy topics.

His professional recognitions included being elected a fellow of the American Physical Society in 1999 and the American Association for the Advancement of Science in 2002. Both of these honors were in recognition of his steady support for materials research, condensed-matter physics, and the construction of large national user facilities. He also received the Distinguished Alumnus Award from UW–Platteville in 1986 and the Exceptional Service Award from DOE in 1993.

His colleagues recall him as a man with a positive outlook and as an inspiring yet realistic optimist. Bill was an avid golfer and had a great interest in the fine arts, including classical music, drama, and stage shows. He will be greatly missed for his passion for materials research, dedication to scientific excellence, keen sense of and sharp vision for revolutionary discoveries, and most of all, for his ultimate optimism. Bill has left a remarkable legacy, both as a scientist and a federal program manager, after more than 30 years of service to the materials research community.

ARVIND KINI
U.S. Department of Energy,
Washington, D.C.

ROBERT J. GOTTSCHALL
Bethesda, Md.

W. LANCE HAWORTH
National Science Foundation,
Arlington, Va.

In Memoriam

Ernest O. Kirkendall died August 22, 2005, at the age of 91. One of the most widely-recognized names in the field of materials science and engineering, Kirkendall's seminal work as a graduate student at the University of Michigan, and later as an instructor at Wayne State University, elegantly and unequivocally proved that diffusion in solids occurs not by a direct exchange of atoms but rather by the movement of vacancies. This discovery—now known as the Kirkendall effect—has a tremendous impact in numerous applications of materials science, ranging from welding to integrated circuits.

The Spring/Summer 2000 on-line edition of *Michigan Engineer* (www.engin.umich.edu/alumni/engineer/00SS/difference.html) recognized Kirkendall as an "alumni who made a difference." In this publication, Ronald Gibala, the Frances E. Van Vlack Professor of Materials Science and Engineering at the University of Michigan, said that Kirkendall "developed a simple but eloquent technique utilizing diffusion 'couples' of dissimilar metals which demonstrated unequivocally that the individual component atoms in a solid alloy diffuse at different rates. The Kirkendall experiments proved not only that diffusion by direct interchange of atoms—the prevailing idea of the day—was incorrect, but also that a less-favored theory, the vacancy mechanism, must be correct."

Kirkendall's theory was so unpopular that his seminal publication with co-author Alice Smigelskas was delayed for several months—by a critic who thought the theory was incorrect—before it was finally published in 1947 in *Transactions of the AIME* (American Institute of Mining, Metallurgical, and Petroleum Engineers) **171**, p. 130.

Kirkendall was a careful, consistent, and meticulous man whose pragmatism and dedication to his family persuaded him to set aside his academic successes and love of teaching for a seemingly more stable position in industry. He served as a metallurgical engineer, then as vice president of manufacturing and research, for the American Iron and Steel Institute. He founded the *Journal of Metals* and served as a mentor to young materials scientists throughout his life.

When E.O. Kirkendall passed away this past August, he was 91 years old and had lived in an assisted living home in Alexandria, Va. for the past 20 years.

The materials science community inspired Kirkendall to make his famous discovery. Many in this community were similarly inspired by him and his work.