

Her legacy of extraordinary service and dedication to her community shines clearly through the many people she affected, as well as through her children's unfailing efforts to uphold their mother's progress. I have seen this firsthand as two of Carmen's children, Maria and Raul, served in the Office of the Connecticut Attorney General during my tenure as attorney general.

Carmen is known by many of us throughout Connecticut as an invaluable supporter of Hartford's best interests and a fearless leader of the Puerto Rican community. Her passion to use politics to initiate change has left her town—as well as the entire State—with great hope for the future.

My wife, Cynthia, and I extend our deepest sympathies to Carmen's family during this difficult time, particularly to her 7 children, 15 grandchildren, and 8 great-grandchildren. May their many wonderful memories of Carmen provide them solace and comfort in the days ahead.●

#### REMEMBERING CHARLES PENCE SLICHTER

● Ms. DUCKWORTH. Mr. President, today I wish to pay tribute to the remarkable life of Charles Pence Slichter, a University of Illinois professor emeritus of physics and of chemistry, who died on Monday, February 19, 2018, in Boulder, CO, at the age of 94.

Slichter was a pioneer in the development and application of nuclear magnetic resonance, NMR, spectroscopy to elucidate the structure and behavior of matter at the atomic scale and a renowned expert on superconductivity. Slichter's seminal contributions to the fields of condensed matter physics and chemistry have been recognized with numerous awards, including the 2007 National Medal of Science.

Slichter is revered at the University of Illinois, where he served on the faculty for 57 years, for his fostering of the "Urbana style," a way of tackling longstanding scientific problems by a combination of theory and experiment that emphasizes close interdisciplinary collaboration and mutual respect. Known by everyone for his brilliant smiles, infectious enthusiasm, and trademark bowties, Slichter exemplified science at its finest: creative, rigorous, curious, and scrupulously honest. His inspired teaching trained generations of American physicists and chemists and, through them, enabled a host of modern technologies.

NMR studies atomic nuclei by probing them with radio waves and measuring their response. The nuclei respond only when the radio waves are tuned to specific resonance frequencies, which depend on both the properties of the nuclei and their local magnetic field. The measured spectrum of resonance frequencies, as well as the time dynamics of the resonance response, gives information about the local environment of the nuclei. Mag-

netic resonance imaging, MRI, widely used in medicine, is an extension of NMR that enables 2D and 3D images to be reconstructed from NMR spectra.

Slichter pioneered many fundamental techniques in NMR. He was a codiscoverer, with H.S. Gutowsky and D.W. McCall, of indirect spin-spin coupling, known as J-coupling, in molecules. This phenomenon enables structural information about molecules to be deduced from their NMR spectrum and is a key analytical tool in modern chemistry. With T.R. Carver, Slichter performed the first dynamic polarization of nuclei using electron spins. Dynamic nuclear polarization can be used to increase the sensitivity of NMR dramatically, enabling the study of more complex molecules and smaller samples. Extensions of the technique are used to determine aspects of molecular structure or to provide a method of operation for the three-level maser, a microwave-frequency precursor to the laser.

Slichter and his student L.C. Hebel performed the first NMR studies on superconductors, materials in which electric current can flow without resistance. This was a major feat in itself because superconductors exclude the magnetic fields and radiowaves used to perform NMR spectroscopy. The results of their experiments are recognized as the first proof of the electron-pairing concept central to the Bardeen-Cooper-Schrieffer, BCS, theory of superconductivity, which was developed concurrently, also at the University of Illinois, and was honored with the 1972 Nobel Prize in Physics. Slichter conceived of the experiment while listening to a presentation from Bardeen, and the analysis was carried out with substantial collaboration from the BCS authors, even while they raced to prepare their own theoretical work. This strong collaborative interaction between theory and experiment typified the "Urbana style" of research, and Slichter played an important role in setting this tone for colleagues. Another research "first" of Slichter's, the measurement of the Pauli spin susceptibility, came after a chance hallway meeting with colleague David Pines, who had just derived a more precise theoretical model for the effect, but lamented to Slichter that "no one can measure it." Slichter, who had worked on some related problems as a graduate student, replied, "David, I know how to measure it," and the experimental results were published shortly thereafter.

Other notable research achievements include discoveries on the behavior of high-temperature superconductors, fundamental studies of metal surfaces for catalysis, the introduction of phase sensitive detection to pulsed NMR, the theory of chemical exchange and its effects on NMR spectra, studies of charge density waves and the Kondo effect, and the theory of chemical shifts in fluorine.

At the University of Illinois, Slichter directed the research of 63 doctoral stu-

dents and more than 15 postdoctoral researchers, including Nobel laureate Sir Peter Mansfield, coinventor with Paul Lauterbur of MRI. Slichter's textbook, *Principles of Magnetic Resonance*, now in its third edition, has trained students around the world for nearly 60 years. Slichter said in 2004, "I really love doing physics; the personal connection is the way I love to do it. If I were not in a university setting, I would have to find students to work with."

Slichter's contributions to science were not limited to the laboratory and the classroom. He served the Nation with distinction as a member of the President's Science Advisory Committee from 1965 to 1969; the President's Committee on the National Medal of Science from 1969 to 1974; the President's Committee on Science and Technology Policy in 1976; and the National Science Board from 1975 to 1984. In 1975, Slichter chaired a delegation of U.S. solid-state physicists selected by the National Academy of Sciences in an initiative to open scientific exchanges with the People's Republic of China. On this trip, he met his future wife, Anne Fitzgerald, who worked for the National Academy of Sciences and acted as translator for the U.S. delegation.

In academia, Slichter served for 25 years from 1970 to 1995 as a fellow of the seven-member Harvard Corporation, Harvard University's highest governing body, including 10 years as senior fellow. He chaired the selection committee that chose Neil Rudenstine as the president of Harvard in 1991. Slichter was the president of the International Society of Magnetic Resonance from 1986 to 1989. His service to U.S. industry included membership on the board of directors of Polaroid from 1975 to 1995, and on science advisory committees to IBM from 1978 to 1993, and United Technologies from 1972 to 1982.

Among his many honors and awards are the National Medal of Science in 2007; the Comstock Prize, shared with E.L. Hahn, of the National Academy of Sciences in 1993; the Irving Langmuir Prize in Chemical Physics in 1969 and the Oliver E. Buckley Prize in Condensed Matter Physics in 1996 from the American Physical Society; the Citation for Chemical Breakthrough Award, shared with H.S. Gutowsky and D.W. McCall, from the American Chemical Society in 2016; and the Triennial Prize of the International Society of Magnetic Resonance in 1986. He received honorary doctor of science degrees from the University of Waterloo in 1993 and the University of Leipzig in 2010 and an honorary doctor of laws degree from Harvard University in 1996. He was elected a member of the National Academy of Sciences in 1967, the American Academy of Arts and Sciences in 1969, and the American Philosophical Society in 1971.

Sir Anthony J. Leggett, Nobel laureate and the John D. and Catherine T.

MacArthur Professor and Center for Advanced Study Professor of Physics at the University of Illinois, described Slichter as “a towering figure in condensed matter physics, on both the national and international stage. He was a warm and supportive figure in the Urbana physics department right up to his last years.”

University of Illinois emeritus professor Gordon Baym said, “Charlie was a remarkable colleague, one of the last of the great physicists of the postwar generation. He was always intellectually curious and remarkably wise. At the same time he was a great human being, amazingly encouraging and supportive of his colleagues, students, and friends, whether young or old. Just seeing his warm smile would brighten everyone’s day.”

Head of the University of Illinois Department of Physics and professor Dale Van Harlingen said, “Charlie Slichter was a legend, a role model, and a friend to everyone who ever had the opportunity to meet him. His passion for good science, his contagious kindness, and his remarkable energy has inspired me throughout my career, and I think everyone else at the University of Illinois and beyond. In many ways, Charlie has best defined the Urbana style that characterizes the culture and spirit of the Department of Physics at Illinois through his stellar contributions in NMR that have significantly impacted our understanding of condensed matter physics, especially superconductivity, and the chemistry of materials, his excellence in teaching and mentoring of students, and his unparalleled warmth and friendliness. He is truly one the great scholars and gentlemen of our generation. Charlie has made a lasting impression on all of us—he will be missed but never forgotten.”

Slichter was born on January 21, 1924, in Ithaca, NY, to Sumner Huber Slichter, a labor economist who became the first Lamont University Professor at Harvard University, and Ada—nee Pence—Slichter. Slichter was named after his paternal grandfather, Charles Sumner Slichter, a noted professor of applied mathematics and dean of the graduate school at the University of Wisconsin. His maternal grandfather, William David Pence, was a professor of railway engineering at the University of Wisconsin. From a young age, Slichter was interested in science and mathematics. It was his senior-year physics course at the Browne & Nichols School in Cambridge, MA, that made it clear, without a doubt, that he wanted to be a physicist.

Slichter studied physics at Harvard University, receiving his A.B. in 1946; M.A. in 1947; and Ph.D. in 1949 degrees there. During World War II, while an undergraduate at Harvard, he worked as a research assistant at the Underwater Explosives Research Laboratory at Woods Hole, MA, where he constructed oscilloscopes, an experience that prepared him for his doctoral re-

search with Edward Purcell, who led the group at Harvard that codiscovered nuclear magnetic resonance. Slichter was his third graduate student, beginning research with Purcell shortly after that discovery.

Slichter came to the University of Illinois in 1949 as an instructor, recruited by then-department head F. Wheeler Loomis as an integral part of an effort to build a world-class faculty in the emerging field of solid-state physics. Slichter was appointed assistant professor 2 years later and quickly rose through the ranks to full professor in 1955. At Illinois, he held additional professorial appointments at the Center for Advanced Study from 1968 to 1997 and the Department of Chemistry from 1986 to 1997. After his retirement in 1996, Slichter maintained an active research program at Illinois, holding an appointment as research professor of physics and continuing to advise graduate students from 1997 to 2006.

Slichter is survived by his wife, Anne FitzGerald Slichter, of Champaign, IL; by his children William Almy Slichter of Minneapolis, MN; Jacob Huber Slichter of Brooklyn, NY; Ann Thayer Slichter of Los Angeles, CA; Daniel Huber Slichter of Boulder, CO; and David Pence Slichter of Binghamton, NY; and by his grandchildren, Sarah Thayer Slichter of Kingston, NY; Thayer Ellery Slichter and Lila Mackinnon Slichter of Minneapolis, MN; and Trevor Hagar Slichter and Isabela Hagar Slichter of Boulder, CO. He was preceded in death by his son Sumner Pence Slichter, policy director for U.S. Senator Russ Feingold. He is also survived by his first wife, Gertrude Thayer Almy of Mitchellville, MD, who is the mother of Sumner, William, Jacob, and Ann.●

#### MESSAGES FROM THE PRESIDENT

Messages from the President of the United States were communicated to the Senate by Ms. Cuccia, one of his secretaries.

#### EXECUTIVE MESSAGES REFERRED

As in executive session the Presiding Officer laid before the Senate messages from the President of the United States submitting sundry nominations which were referred to the appropriate committees.

(The messages received today are printed at the end of the Senate proceedings.)

#### MESSAGE FROM THE HOUSE RECEIVED DURING ADJOURNMENT

##### ENROLLED BILLS SIGNED

Under the authority of the order of the Senate of January 3, 2017, the Secretary of the Senate, on March 9, 2018, during the adjournment of the Senate, received a message from the House of Representatives announcing that the Speaker pro tempore (Mr. UPTON) had signed the following enrolled bills:

H.R. 294. An act to designate the facility of the United States Postal Service located at 2700 Cullen Boulevard in Pearland, Texas, as the “Endy Nddiobong Ekpanya Post Office Building”.

H.R. 452. An act to designate the facility of the United States Postal Service located at 324 West Saint Louis Street in Pacific, Missouri, as the “Specialist Jeffrey L. White, Jr. Post Office”.

H.R. 1208. An act to designate the facility of the United States Postal Service located at 9155 Schaefer Road, Converse, Texas, as the “Converse Veterans Post Office Building”.

H.R. 1858. An act to designate the facility of the United States Postal Service located at 4514 Williamson Trail in Liberty, Pennsylvania, as the “Staff Sergeant Ryan Scott Ostrom Post Office”.

H.R. 1988. An act to designate the facility of the United States Postal Service located at 1730 18th Street in Bakersfield, California, as the “Merle Haggard Post Office Building”.

H.R. 2254. An act to designate the facility of the United States Postal Service located at 2635 Napa Street in Vallejo, California, as the “Janet Capello Post Office Building”.

H.R. 2302. An act to designate the facility of the United States Postal Service located at 259 Nassau Street, Suite 2 in Princeton, New Jersey, as the “Dr. John F. Nash, Jr. Post Office”.

H.R. 2464. An act to designate the facility of the United States Postal Service located at 25 New Chardon Street Lobby in Boston, Massachusetts, as the “John Fitzgerald Kennedy Post Office”.

H.R. 2672. An act to designate the facility of the United States Postal Service located at 520 Carter Street in Fairview, Illinois, as the “Sgt. Douglas J. Riney Post Office”.

H.R. 2815. An act to designate the facility of the United States Postal Service located at 30 East Somerset Street in Raritan, New Jersey, as the “Gunnery Sergeant John Basilone Post Office”.

H.R. 2873. An act to designate the facility of the United States Postal Service located at 207 Glenside Avenue in Wyncote, Pennsylvania, as the “Staff Sergeant Peter Taub Post Office Building”.

H.R. 3109. An act to designate the facility of the United States Postal Service located at 1114 North 2nd Street in Chillicothe, Illinois, as the “Sr. Chief Ryan Owens Post Office Building”.

H.R. 3369. An act to designate the facility of the United States Postal Service located at 225 North Main Street in Spring Lake, North Carolina, as the “Howard B. Pate, Jr. Post Office”.

H.R. 3638. An act to designate the facility of the United States Postal Service located at 1100 Kings Road in Jacksonville, Florida, as the “Rutledge Pearson Post Office Building”.

H.R. 3655. An act to designate the facility of the United States Postal Service located at 1300 Main Street in Belmar, New Jersey, as the “Dr. Walter S. McAfee Post Office Building”.

H.R. 3821. An act to designate the facility of the United States Postal Service located at 430 Main Street in Clermont, Georgia, as the “Zack T. Addington Post Office”.

H.R. 3893. An act to designate the facility of the United States Postal Service located at 100 Mathe Avenue in Interlachen, Florida, as the “Robert H. Jenkins, Jr. Post Office”.

H.R. 4042. An act to designate the facility of the United States Postal Service located at 1415 West Oak Street, in Kissimmee, Florida, as the “Borinqueneers Post Office Building”.

H.R. 4285. An act to designate the facility of the United States Postal Service located at 123 Bridgeton Pike in Mullica Hill, New