



Solomon J. Buchsbaum

SOLOMON JAN BUCHSBAUM

1929–1993

BY ROY W. GOULD

SOLOMON JAN BUCHSBAUM, senior vice-president, technology systems, AT&T Bell Laboratories, and adviser to the administrations of five U.S. presidents, died of multiple myeloma on March 8, 1993, at the age of sixty-three.

Sol, as he was known to his friends, was born in Stryj, Poland, on December 4, 1929. He lost both parents and a sister in the holocaust, and his early life was difficult. He emigrated to Canada in 1947 and received his bachelor's and master's degrees from McGill University in 1952 and 1953, respectively. He received his Ph.D. degree in physics from the Massachusetts Institute of Technology (MIT) in 1957. In 1955 he married Phyllis Isenman, and they had three children, Rachel Joy, David Joel, and Adam Louis. Sol became a U.S. citizen in 1963.

Sol cared deeply about the health of the U.S. technical enterprise, including the universities, government, and private research and development laboratories that compose it. His contributions were always distinguished by his personal enthusiasm, energy, and competitive spirit and by an uncompromising devotion to technical excellence and personal integrity. As a leader and adviser for large scientific-technological programs, he brought keen insights into technical issues and policy matters alike, quality judgment, and an ability to apply reason to very complex and difficult situations. He was remarkably able to convey his insights to others. He made many friends.

Sol's service to the technical community and to the U.S. government was recognized by his selection for two of the highest American honors in engineering and science: the President's National Medal of Science in 1986 and the National Academy of Engineering's Arthur M. Bueche Award in 1990. The former is given annually by the President of the United States to individuals deserving special recognition by reason of their outstanding contributions to knowledge in the physical, biological, mathematical, or engineering sciences. Sol was given the Bueche Award for his "leadership in promoting mutual understanding concerning science and technology among leaders in universities, industry, and government, and for rendering insightful technical advice to five U.S. presidents."

When Sol came to MIT as a graduate student, he joined the plasma dynamics group with William P. Allis and Sanborn Brown. They were applying microwave techniques, which were highly developed during World War II, to the experimental studies of gaseous discharges. Sol did his doctoral work in this area. At the MIT Graduate House, where he lived for a time, he became known as the "expert" on Morse and Feshbach (methods of theoretical physics) problem sets. During this time he began a collaboration with Allis and, later, Abraham Bers, which resulted in the monograph *Waves in Anisotropic Plasmas*, published in 1962.

In 1958 Sol joined AT&T Bell Laboratories as a member of the technical staff, where he continued studies in microwaves and plasmas. That same year the Fusion Energy Program, a worldwide effort, was declassified, and many of the physics issues that faced the program were disclosed. It became clear how little basic plasma processes were understood. Many new researchers were attracted to the field. Sol was very well prepared to tackle some of these fundamental issues, and he was a leader in this period of rapid advance in plasma physics. In his early years he tackled and solved a number of fundamental questions involving plasma heating, guided waves in plasmas, and resonances associated with normal modes. He was elected a fellow of the American Physical Society and served as the chairman of its Plasma Physics Division in 1968. While he did not

work on fusion energy research directly, his original contributions to the underlying plasma phenomena and his general expertise and excellent judgment led to his selection as a program adviser early in his career. He remained an effective advocate of fusion energy throughout his professional career.

At Bell Laboratories, Sol also became interested in solid-state plasmas and made original and significant contributions to helicon wave propagation and damping, and Alfvén waves in solid-state plasmas. He became the department head for solid-state and plasma physics research in 1961 and director of the Electronics Research Laboratory in 1965. During this early period he published thirty-eight scientific papers of a fundamental nature, many of which were pioneering. He received eight patents for electronic and optical communications devices. He served as associate editor of *Physics of Fluids* (1963–1964), *Journal of Applied Physics* (1968–1970), and *Review of Modern Physics* (1968–1976).

Sol's scientific work was recognized by his election to the National Academy of Engineering (NAE) in 1973 "for his technical contributions and leadership in research on solid-state and gaseous plasmas and their applications." He was also elected to the National Academy of Sciences in 1974 and to the American Academy of Arts and Sciences in 1975.

Sol was appointed to his first advisory post in 1965 as a member of the U.S. Atomic Energy Commission's Standing Committee on Controlled Thermonuclear Fusion Research. His scientific qualifications for this post were the highest, and no doubt the post provided him with an opportunity to hone his skills in technical leadership. Thus began an important aspect of Sol's career: service to the U.S. government. In 1970 he was appointed to President Nixon's Science Advisory Committee (PSAC) when Lee DuBridge was the President's science adviser. PSAC enjoyed tremendous prestige in the technical community. In Sol's words, "The early days were full of promise and we did some good work, but the environment deteriorated rapidly so that effective advice was not possible. . . . partly because some members of PSAC were not in tune with the administration's policies." President Nixon disbanded

PSAC at the beginning of his second term. Sol liked to say that, strictly speaking, he was not fired because he served his term until it came to a natural end.

The end of the 1960s had already marked a turning point in Sol's career as he accepted responsibility for larger and more diverse programs at Bell Laboratories. He also became increasingly involved in advising the federal government on a wide variety of its research activities and operations.

In 1968 Sol became vice-president for research at the Sandia Laboratories of the Sandia Corporation, an organization operated by Western Electric for the U.S. government. Sandia was engaged primarily in research and development on ordnance phases of nuclear weapons design, together with a variety of nonweapon projects of national interest. In 1971 he returned to Bell Laboratories as executive director of research, Communications Principles Division, and that same year he was named executive director of research, Communications Sciences Division, where he led one of the largest and finest research efforts in communications sciences and technology in the world.

Sol's responsibilities at AT&T Bell Laboratories continued to grow. In 1976 he became vice-president for network planning and customer services, and in 1979 he became senior vice-president for technology systems, the position he held until his death. In that capacity he was responsible for product realization planning and engineering, government systems, and architectural framework for AT&T products, systems, and services. Altogether he spent thirty-five highly productive years at Bell Laboratories. During that time he supervised projects dealing with fiber-optic communications, digital signal processing, advanced satellites, computers, software, military systems, and high-definition television. In 1987 he received the Institute of Electrical and Electronics Engineers' Frederik Philips Award for outstanding accomplishments in the management of research and development resulting in effective innovation in the electrical and electronics industry.

Buchsbaum's advice on government programs was widely sought. In 1972 he was appointed chairman of the Defense Science Board, serving as chairman until 1976 and as a member

until 1980. In 1977 he received the Secretary of Defense Award for Outstanding Public Service. In 1978 he was appointed chairman of the Department of Energy's Energy Research Advisory Board and served as chairman until 1981 and as a member until 1984. In 1981 he received the Secretary of Energy Award for Exceptional Public Service. He was a consultant to the Office of Science and Technology Policy between 1976 and 1982, during the Carter administration. In 1982 he was appointed chairman of the White House Science Council and served until 1989, during the Reagan administration. From 1990 until 1992, he was a member of President Bush's Council of Advisers on Science and Technology. He advised on technical aspects of defense systems, energy systems, and communications systems, and especially on the resource allocation and technical management issues. He also served on boards, too numerous to cite here, of U.S. national laboratories and universities. Sol was a member of the Council of the National Academy of Engineering between 1980 and 1986 and a member of its Executive Committee from 1984 to 1986. He also chaired the NAE's Nominating Committee in 1986 and 1987.

Sol was a very effective participant on each of the boards and committees on which he served. He will be greatly missed by his many friends.