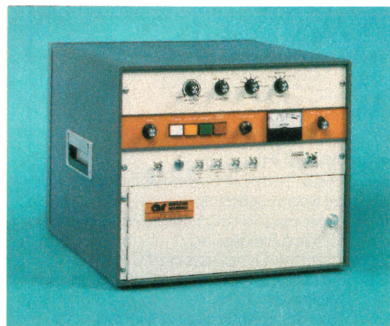


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Enrico Fermi Institute). There Sugarman used chemical techniques to study how 100-MeV to 400-GeV particles interact with heavy nuclei. He concentrated on establishing the momentum characteristics of the products of such reactions as a way of finding out about the mechanisms of their production. For example, he used the differences in kinetic energies and angular distributions of the reaction products to determine whether they were the result of nuclear fission into two fragments of nearly equal mass, or the residues of the emission of many light particles (spallations and evaporation).

Sugarman's high standards and enthusiasm for his research were carried over into an outstanding concurrent teaching career at both the undergraduate and graduate levels.

ANTHONY TURKEVICH  
*University of Chicago  
Chicago, Illinois*

## William P. Slichter

William P. Slichter, a retired executive director at AT&T Bell Laboratories, died of cancer at his home in Chatham, New Jersey, on 25 October 1990. He had maintained an active interest in his profession to within days of his death at the age of 68.

Slichter was born in Ithaca, New York, but he grew up in Cambridge, Massachusetts. He received his undergraduate education at Harvard University, where his father was the Lamont University Professor of Economics. Upon graduation in 1943 Slichter served in the US Army as an artillery officer in the Pacific Theater. Returning to graduate studies at Harvard in 1946, he studied molecular beams under George B. Kistiakowsky and was awarded his PhD in chemical physics in 1950. Exciting opportunities were then opening up in interdisciplinary areas that were soon to be known as materials science, and Slichter entered upon a career in this field at Bell Telephone Laboratories.

During the ensuing decade Slichter established an enduring reputation through his contributions in both semiconductor physics and polymer physics. His exceptional gifts as a research administrator also became apparent, and he was appointed head of Bell Labs's chemical physics research department in 1958. He advanced to the position of chemical director in 1967 and became the executive director of the materials science and engineering division in 1973. He retired in 1987.

Slichter's initial role at Bell Labs was in an expanding program in polymer research. However, he was temporarily diverted to assist a group studying the control of dopant levels in semiconductor crystals grown from the melt. The classic Burton-Prim-Slichter equation, which describes how equilibrium distribution coefficients are modified by transport processes accompanying finite crystallization rates of rotating crystals, was published in 1953 in a seminal paper by Slichter, Joseph A. Burton and Robert C. Prim. This analysis, which included transient effects resulting from abrupt changes in melt composition, found immediate application in the fabrication of crystals for use in transistors and contributed significantly to the development of solid-state electronics. Slichter played a key role in the experimental work underpinning the model that was chosen for analysis and later in confirming predictions based upon it.

Returning to polymeric materials, Slichter began an extensive investigation of their structure and properties in the solid state. He recognized that the newly available technique of nmr spectroscopy, which could characterize states of molecular motion, afforded an exceptional opportunity to study states of order in semicrystalline polymers. Slichter was the pioneer in exploring the potential of nmr spectroscopy not only for this application but also for studying molecular mechanisms underlying dielectric and molecular relaxation in polymeric materials in general. He did systematic studies of homologous series of polymers of different chemical classes, many of which he himself had synthesized, and he performed parallel investigations by x-ray diffraction. His papers reveal elegant planning and execution of experiments, as well as a characteristic lucidity and incisiveness in interpreting and discussing his observations. During this phase of his career, Slichter was actively involved in the leadership of the division of high-polymer physics of The American Physical Society, and in 1970 he was awarded the society's High-Polymer Physics Prize.

As a research manager, Slichter was quick to recognize that the design and fabrication of advanced communications equipment was becoming increasingly reliant on chemical processing and on new, often polymeric materials. He was instrumental in building interdisciplinary groups of wide-ranging expertise, which were able to respond strongly to the needs of the time. Later as executive director of materials science and engineer-



## WE HEAR THAT



William P. Slichter

ing, Slichter assumed responsibility for the entire range of AT&T's materials activities, extending from basic research to engineering support to design, manufacturing and operations. Among the many notable innovations that were successfully pressed forward under his guidance were the introduction of optical-fiber technology for long-range communication and the development of resists for the production of integrated-circuit masks by electron lithography.

Bill Slichter exemplified his own watchword, "pursuit of excellence." Yet he will be remembered as much for his humanity as for his notable professional achievements. He led others with a light touch, embellished by quick wit and good humor. Always friendly and considerate, he showed joy in the success of others, and he had a special gift for building morale among his colleagues. His example of the human spirit at its best will long outlast the grief attending his death.

H. DOUGLAS KEITH  
University of Connecticut  
Storrs, Connecticut

DEAN C. DOUGLASS  
AT&T Bell Laboratories  
Murray Hill, New Jersey

## Hiroshi Yoshinaga

Hiroshi Yoshinaga died on 26 November 1989. Born in Japan on 23 March 1912, he resided in the Osaka-Kyoto area throughout his life. However, he was recognized by the physics community as both a national and international leader.

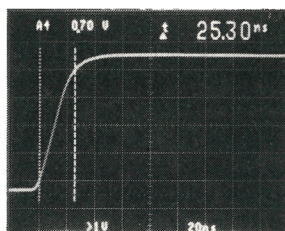
Yoshinaga received a BS degree in physics from Kyoto Imperial University in 1935 and a doctor of science degree from the same university in 1942. Upon receiving his undergraduate degree, he joined the physics

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