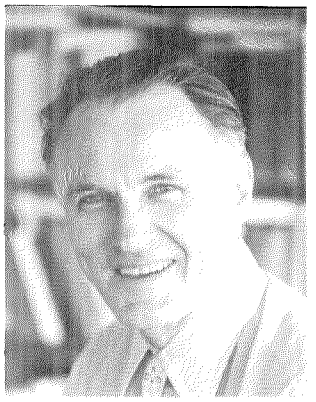
Emeritus Professors — 1985



Robert B. Leighton

ROBERT B. LEIGHTON has been a Techer for almost half a century. He entered the Institute as a junior in 1939, and received his bachelor's degree in 1941, his MS in 1944, and his PhD in 1947. He spent the next two years as an Institute research fellow, was appointed assistant professor of physics in 1949, and professor of physics in 1959. From 1970 to 1975 he served as chairman of the Division of Physics, Mathematics, and Astronomy. He was a staff member of the Hale Observatories from 1963 to 1980, and has been a staff member of the Owens Valley Radio Observatory since 1976. In 1984 Leighton was named the William L. Valentine Professor of Physics.

Leighton has made significant contributions to several scientific disciplines. Working with Nobel laureate Carl Anderson in the 1950s, Leighton built a trailer-mounted cloud chamber, which was operated at an altitude of 10,000 feet near White Mountain to capture a maximum number of the elusive "V-particles" found in cosmic rays. In 1960 Leighton developed two cameras that led to great advances in solar physics. He used the Zeeman camera to detect and map magnetic field patterns around sunspots and the Doppler-shift camera to reveal the large network of convective currents — the "supergranulation" — flowing across the sun's surface.

During the early 1960s, Leighton collaborated with Gerry Neugebauer in designing and building an innovative infrared telescope. This telescope revealed, for the first time, youthful stars hatching out of dark molecular clouds as well as aging red giants on the verge of collapse. During this time, he was also the team leader for a series of television experiments performed on some of the Mariner missions to Mars. More recently, Leighton has been pursuing millimeter and sub-millimeter wave astronomy. In collaboration with other Caltech researchers, he designed and built the three radio telescopes at Owens Valley. And together with Thomas G. Phillips, he designed another such "dish" that's currently being installed on Mauna Kea in Hawaii.

Leighton has been elected a member of the National Academy of Sciences and a Fellow of the American Academy of Arts and Sciences. He edited the first volume of *The Feynman Lectures in Physics* and is the author of *Principles of Modern Physics* and *Introductory Lagrangian and Quantum Mechanics* in addition to numerous scientific articles. □

HANS W. LIEPMANN has been at Caltech just about as long as Bob Leighton. After receiving his PhD at the University of Zurich, Liepmann came to Caltech as a research fellow in 1939. He was appointed assistant professor in 1945, associate professor in 1946, and professor in 1949. Since 1972 Liepmann has been the director of the Graduate Aeronautical Laboratories at Caltech (GALCIT). In 1976 he was named the Charles Lee Powell Professor of Fluid Mechanics and Thermodynamics and in 1983 he was named the first Theodore von Kármán Professor of Aeronautics.

Liepmann is recognized as one of the world's outstanding researchers in the field of fluid mechanics and as a notable contributor to modern aviation. During the 1940s, he and his students studied questions of boundary layer flow stability and transition, turbulent shear flow, and trans-sonic flow and shock waves. In the 1950s he performed pioneering studies of aircraft buffeting, magnetohydrodynamics, and plasma physics, work that was important in the development of supersonic aircraft. More recently his research has concentrated on problems of turbulent mixing, which is leading to the development of a new generation of engines with more efficient combustion, and to the development of high-energy chemical lasers.

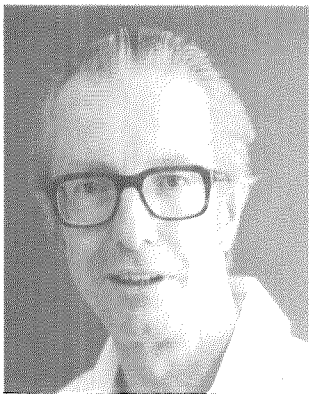
Liepmann is renowned for his teaching abilities, and was the recipient of the ASCIT Award for Excellence in Teaching in 1976. His salutary influence on the graduate students who studied with him is demonstrated by the fact that 10 of his PhD students are members of the National Academy of Engineering and two are also members of the National Academy of Sciences. Liepmann himself has been elected to membership in the NAE, the NAS, and the American Academy of Arts and Sciences, and is an honorary member of the Indian Academy of Sciences. Among his many other honors and awards are the Ludwig Prandtl Ring from the German Society for Aeronautics, the Monie A. Ferst Award from Sigma Xi, and the Michelson-Morley Award from the Case Institute of Technology. □

JULIUS MIKLOWITZ received his BS, MS, and PhD degrees from the University of Michigan. After serving as a research engineer for the Westinghouse Research Laboratories, as an assistant professor of mathematics and engineering at the New Mexico Institute of Mining and Technology, and as a consultant for the Naval Undersea Warfare Center, Miklowitz came to Caltech as an associate professor of applied mechanics in 1956. He was named professor of applied mechanics in 1962.

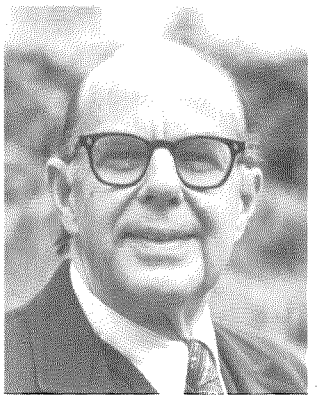
Throughout his career, Miklowitz's research has concentrated on the pro-

Hans W. Liepmann

Julius Miklowitz



Herbert J. Ryser



Nicholas W. Tschoegl

perties of elastic waves propagating through solids. He uses an analytical method he developed to solve non-separable elastodynamic problems involving the dynamic response of elastic waveguides, wedges, and the quarter plane. Such information is important in the fields of seismology, analytical and structural mechanics, and earthquake engineering.

In one study, for example, Miklowitz investigated the effects of a nearby nuclear explosion on underground shelters or missile silos. Such an explosion produces a powerful shock wave traveling at thousands of miles an hour that radiates in all directions through the air and ground. As the ground wave sweeps around and past a subterranean cavity, it imparts its energy to the cavity wall. Part of this energy is converted into the short-period, intense waves known as Rayleigh waves, which circle the cavity walls at high velocities. This "bell-ringing" effect persists longer than the original shock wave and the reverberations can damage walls, instruments, and other structures attached to walls.

Miklowitz is the author of over 50 scientific papers as well as the book *The Theory of Elastic Waves and Waveguides*. He is the co-editor of the book *Modern Problems in Elastic Wave Propagation* (the proceedings of an IUTAM symposium) as well as the editor of an ASME monograph entitled *Wave Propagation in Solids*. He has been chairman of the Applied Mechanics Division of the American Society of Mechanical Engineers and has served as a member of the U.S. National Committee of Theoretical and Applied Mechanics, representing ASME. □

HERBERT J. RYSER died on July 9 of this year, a few days before his 62nd birthday and shortly before he was to assume emeritus status. Ryser grew up in Milwaukee, Wisconsin and received his BA, MA, and PhD degrees from the University of Wisconsin. He spent a year at Princeton's Institute for Advanced Study before joining the faculty of Ohio State University. He became a professor at Syracuse University in 1962 and moved to Caltech in 1967, to become professor of mathematics.

Ryser was a major contributor to the field of combinatorics. He is best known for proving a theorem that has come to be called the Bruck-Ryser theorem. This is a classic result about sets and their intersections. He proved many other theorems as well, and his monograph *Combinatorial Mathematics* was in part responsible for a renaissance in this field of study.

Ryser was widely regarded as an excellent teacher. He taught courses in combinatorics and matrix theory at the graduate and advanced undergraduate level. His well-organized lectures and his genuine concern for his students earned him two ASCIT Awards for Excellence in Teaching. □

NICHOLAS W. TSCHOEGL was born in Zidlochovice, Czechoslovakia in 1918 from Austro-Hungarian parents and received BSc and PhD degrees from the University of New South Wales in Sydney, Australia. After serving short stints at the University of Wisconsin and the Stanford Research Institute, Tschoegl joined the Caltech faculty in 1965 as associate professor of materials science. In 1967 he was appointed professor of chemical engineering.

Tschoegl's research interests focus on the relationship between the physical properties of polymers and their chemical and physical structures. Part of his research is concerned with novel kinds of rubbers called "block copolymers," which are two-phase systems containing a hard, glassy polymer embedded in a rubbery matrix. He and his group have taken measurements of the dynamic mechanical properties of block copolymers and have determined the superposition of the effects of time and temperature on such two-phase systems. Tschoegl has also determined the factors governing the superposition of time, temperature, and pressure effects in conventional rubbers. As a result of this work, the behavior of a rubber can now be predicted at any pressure if, in addition to certain material parameters, its behavior at atmospheric pressure is known.

But Tschoegl's interests go well beyond the horizons of chemical engineering. He has long been interested in languages, especially the Chinese pictographic language. Archaeology is another of his passions. He has delighted several Caltech audiences with talks on these subjects. One of the most popular was a Watson lecture on the archaeological reality behind the legend of Atlantis.

Tschoegl is the author of many scientific papers and was the recipient of the Senior U.S. Scientist Award from West Germany's Alexander von Humboldt Foundation. □