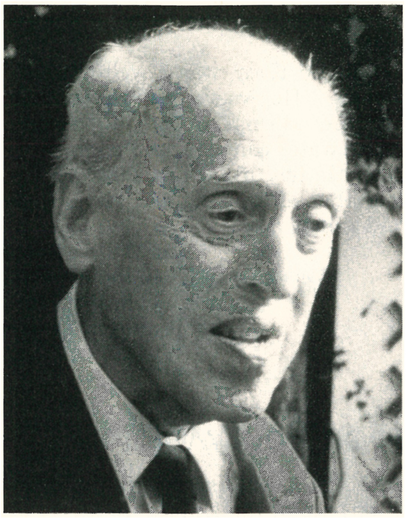

Jean Paul Mathieu

veloped for crystals, studying the modifications of the vibrational spectra related to changes of symmetry of the molecules or of their environment, studying their bandwidth and checking their intensity. The very precise measurements he made with Poulet of the intensities of the same band in different geometries in ZnS led them to discover that the electric field associated with longitudinal phonons in piezoelectric crystals was a possible source of Raman activity.

Mathieu played an important role in establishing Raman spectroscopy as a technique to understand the properties of matter and to characterize materials in physics, chemistry and later biology. His pharmaceutical training had taught him how to grow crystals, and whenever possible he would insist that he and his coworkers grow their own crystals to study.

Mathieu had an encyclopedic knowledge of classical physics and was a remarkably clear lecturer. He wrote many important textbooks for students, including a complete series on classical physics with Paul Fleury and a complete dictionary of physics with Fleury and Alfred Kastler.

Long before it became fashionable, Mathieu was a dedicated fighter for human rights, liberty and freedom. He was a *résistant* during World War II and later fought for the freedom of scientists, particularly in Eastern Europe and in the former Soviet Union.

Regretably, Mathieu never visited the US. Early in the McCarthy era, his request for a visa was denied, and he never reapplied.

Mathieu was know for his exceptional courtesy and hospitality to visitors to his laboratory. He was an intellectual in the best, classical sense of the term: fluent in English and German, widely read in general literature as well as science, and extremely fond of chamber music. Transcending these qualities was his human and direct contact with colleagues and friends, for whom his influence will remain as an abiding and happy memory.

ROBERT PICK
HENRI POULET
Université Pierre et Marie Curie
Paris, France
ELIAS BURSTEIN
University of Pennsylvania
Philadelphia, Pennsylvania
JOSEPH L. BIRMAN
City College of the City University of New York

Leo J. Neuringer

Leo J. Neuringer

Leo J. Neuringer, a highly successful research physicist and a pioneer and organizer of biomedical research, died of cancer on 4 May 1993. He was 64. In recent years Leo had been the leader of the molecular biophysics group and the director of the NIH Comprehensive NMR Center for Biomedical Research at the Francis Bitter National Magnet Laboratory at MIT.

Leo received his PhD in physics from the University of Pennsylvania in 1957. He then became a staff scientist at Raytheon, where he remained until 1963. His work at Raytheon included a comprehensive analysis of the performance of infrared detectors, growth of single crystals of GaP and GaAs, design and construction of superconducting magnets and basic experimental investigations of magnetotransport and magneto-optical properties of semiconductors and semimetals.

In 1963 Leo became a staff scientist at the Bitter Laboratory, where he worked until he retired, shortly before his death. During his first decade there he initiated and led a number of research efforts that took advantage of the lab's unique high-field facilities. Leo performed some of the earliest measurements and analyses of the effect of spin–orbit scattering on the upper critical fields of high-field superconductors. With Larry Kaufman he studied magnetic freezeout in InAs. With Ray Milward he studied far-infrared absorption due to photon-induced hopping in silicon. With Yaacov Shapira he did the first study of ultrasonic propagation in high-field superconductors. He initiated work on low-temperature thermometry in high magnetic fields, which was later expanded by Larry Rubin and Howard Sample.

In the mid-1970s Leo changed the course of his scientific career, organizing and leading the nuclear magnetic resonance and biomedical research effort at the Bitter Lab. In this large effort Leo's many exceptional talents—leadership, energy and practicality—became even more apparent. He was able to create a major interdisciplinary research and technology center where researchers and students from leading hospitals and universities in the Boston area do biomedical studies in close proximity with designers and builders of large superconducting magnets for magnetic resonance imaging or of advanced nmr spectrometers. Under Leo's leadership pioneering studies were directed toward understanding the structure and function of biomolecules and cells.

Leo was an open and warm person. Enthusiastic, optimistic and inspiring, he acted as a mentor to many students and young scientists. He was a connoisseur of many aspects of Jewish culture, from which he derived considerable inspiration. His wisdom, humanity and enjoyable company will be remembered by the many people whose lives he enriched.

YAACOV SHAPIRA
Tufts University
Medford, Massachusetts
LARRY RUBIN
Francis Bitter National Magnet Laboratory
Massachusetts Institute of Technology
Cambridge, Massachusetts
DAVID HOLTZMAN
Children's Hospital
Boston, Massachusetts

Wallace B. Miner

Wallace Miner died on 10 April 1993 in DeKalb, Illinois at the age of 84.

Miner taught physics for 64 years. His long career included dedicated service at the high school, college and university levels.

Miner earned a bachelor's degree in mathematics in 1929 from Indiana Central College (now the University of Indianapolis) and a master's degree in physics from Indiana University in 1933. Upon graduation Miner taught in two Indiana high schools and then at Indiana Central College, Indiana University and Bradley University in Peoria, Illinois.

In 1948 Miner joined the faculty of Northern Illinois University, where he remained until his death. After his so-called retirement in 1976 he continued to teach weekend and summer workshops for teachers, including one the weekend before his death.

All three of Miner's sons and one grandson followed him into physics teaching. Together they have reached thousands of high school and college students, many of whom have become physicists. There is a saying in Illinois that "the Miners have made a major contribution to physics education."

THOMAS ROSSING
Northern Illinois University
DeKalb, Illinois

Raymond Pepinsky

Raymond Pepinsky, a professor of physics at the University of Florida since 1968, passed away on 7 May 1993. Ray had been ill for several months following his slow recovery from Guillain–Barré syndrome.

Ray is very well known for his contributions in crystallography, his discoveries in ferroelectricity and his pioneering work applying computer techniques to the study of biological molecules. Particularly notable was his seminal work on developing analog computer techniques for transforming x-ray crystallographic data into intelligible molecular pictures.

Ray obtained his doctorate in crystallography at the University of Chicago in 1940, and joined the Alabama Polytechnic Institute as a faculty member in 1941. During World War II he took leave from API to join a group of distinguished scientists at the MIT Radiation Laboratory working on problems of national interest, including the development of radar. He returned to Alabama as a research professor of physics after the war. In 1949, he accepted the directorship of the Crystal Research Laboratory and Growth Institute at Pennsylvania State University. It was there that Ray carried out his studies in crystallography.

Ray came to Florida in 1963 to head the department of physics at Florida Atlantic University and was the Distinguished Professor of Chemistry and Physics at FAU until 1965. He was the Robert Law Professor of Physics and Chemistry at Nova University in Fort Lauderdale until 1968, when he joined the University of Florida as a professor of physics and metallurgical and materials engineering.

Ray also served on several committees of the National Academy of Sciences, on the National Committee on Crystallography, on the advisory panel of the National Bureau of Standards and on the governing board of the the American Institute of Physics.

In addition to his career in crystallography Ray is remembered for his culture, especially his appreciation of music. He brought University of Florida listeners a special treat with his weekly hour-long radio program, "The Art of Song", which featured performances of poetry sung to music. He taught courses on both biophysics and the art of song in the university honors program. His students had a great appreciation for his courses and the depth of understanding that he showed.

NEIL SIMON
University of Florida, Gainesville

Inge Lehmann

Inge Lehmann died in Copenhagen on 21 February 1993, three months short of age 105. Born in Østerbro, Denmark, Lehmann graduated in 1920 from the University of Copenhagen with a degree in mathematics and physical science. In 1928, she was appointed chief of the newly formed seismological department of the Danish Geodetic Institute, a post she held until her retirement in 1953.

In 1936 she discovered the Earth's inner core. Her proposal, published in the *Bureau Central Seismoloque International, Travaux Scientifique* (**14**, 87, 1936), was intended to avoid difficulties that arose in interpreting the observed arrival times of seismic core waves when one assumed only a single terrestrial core.

A two-shell Earth with a liquid core gives rise to refraction phenomena analogous to the optical caustic formed by a spherical lens. It was known by the middle 1930s that the seismic-wave caustic came at approximately 145° epicentral distance, that is, the angle between the earthquake center and the recording seismograph, subtended at the Earth's center, yet core waves could be clearly observed on seismograms from the antipodes back to distances smaller than 145°. Lehmann was in an excellent situation to observe those waves, because the seismographs of her far-flung Danish network were located at such epicentral distances from large earthquake sources in the South Pacific. Her observations with the network enabled her to make the necessary imaginative jump.

In effect, Lehmann proved an existence theorem: namely, that one can find a plausible tripartite structure for the Earth that explains the main features of the observed core waves. The inverse problem was to use the observed travel times to estimate statistically the inner-core parameters that satisfied them within the measurement uncertainties. This final step was done in 1938 by Beno Gutenberg and Charles F. Richter and, independently, in 1939 by Harold Jeffreys, who had shown already in 1926 that the (outer) core is liquid. In the next few years, arguments by Frances Birch and Keith Bullen established that the increase in P-wave velocity at the Lehmann inner-core boundary was such that the inner core had to be solid if the pressure-induced gradient in elastic incompressibility was to be realistic.

Lehmann's retirement opened up a new active period of research. One of the research centers she enjoyed visiting during this period was Lamont Geological Observatory (now Lamont–Doherty Earth Observatory), in Palisades, New York. She explored in particular the structure of the upper mantle, using both P and S waves from underground nuclear explosions and earthquakes. Her work with nuclear explosions was important at a time of much associated political controversy over the validity of monitoring criteria for a comprehensive test ban, not so much because she found something new but because her stature and integrity provided high respectability and credibility to the independent studies she supported.

The pioneering work of Inge Lehmann was a product of several qualities of a remarkable woman. Those of us who were fortunate to know her as friends and colleagues will always think of her as a strong and independent person, with great physical energy (exemplified by many mountaineering trips to the Alps) and personal warmth.

BRUCE A. BOLT
Department of Geology and Geophysics
University of California, Berkeley ■