

mechanics and wave mechanics; the Stieltjes integral representation for linear functionals on the space of continuous functions (1909); the theory of L^p spaces (1910); the first systematic discussion of analytic functions of operators (1913); the definition and properties of general completely continuous operators (1916); and the foundation of the theory of partially ordered vector spaces (1928). In 1952 there appeared the "Leçons d'analyse fonctionnelle", written jointly with B. Sz. Nagy, and easily the most readable introduction to functional analysis that has yet appeared.

Riesz constantly strove to simplify the presentation of the theory of the Lebesgue integral; he introduced the systematic use of step functions (1912), and he proved (1931) the famous 'rising sun lemma', which leads to an easy proof of the differentiability almost everywhere of a monotone function.

He was one of the creators of the theory of subharmonic functions. Other fields to which he contributed include the theory of functions analytic in the unit circle, orthonormal series, inequalities and ergodic theory. He gave several proofs of the fundamental spectral theorem in Hilbert space. An early paper (1908) on topology contains ideas (bicomactness, the filter theory of limits) that had to wait until the late 1930's for their full development.

Riesz's work is characterized throughout by simple and powerful ideas and by lucidity of presentation; his papers are always easy to read. He never generalized for generalization's sake; his aim was always to put the main ideas in a setting that would illustrate their significance and their power as vividly as possible.

F. SMITHIES

Dr. Eugene C. Crittenden

EUGENE CASSON CRITTENDEN, formerly associate director of the United States National Bureau of Standards and for many years chief of its Electrical Division, died in Garfield Hospital, Washington, D.C., on March 28 at the age of seventy-five.

After graduating in 1905 and a period of post-graduate work and teaching, all at Cornell, Dr. Crittenden joined the National Bureau of Standards in 1909 and was assigned to the photometric laboratory, where he was afterwards to make many important contributions towards the establishment of modern photometric units, standards and methods of measurement. During 1921-46 he was chief of the Electrical Division and thus also became responsible for work which, in collaboration with other national laboratories, led to the replacement of the obsolescent system of international electrical units by the present system of absolute electrical units. Under his leadership the Division expanded substantially, and sections for research in radio and electronics were established which eventually became major organizational units of the Bureau—for example, the Central Radio Propagation Laboratories at Boulder, Colorado, and the former Ordnance Development Division, now the Diamond Ordnance Fuze Laboratories of the Department of the U.S. Army. In 1933 Dr. Crittenden was made assistant director of the Bureau and became concurrently responsible for supervision of its over-all research and testing activities; and in 1946, when the title was changed to associate director, he assumed the full-time responsibilities of this post, which he held until he retired in 1950. For his outstanding services to the Bureau he was awarded in 1949 one of the

first Gold Medals of the Department of Commerce for Exceptional Service. He continued to act as a consultant to the Director of the Bureau until the onset of his last illness a few months ago.

Dr. Crittenden is best known both in his own country and internationally for his many activities and services which, combined with those already mentioned, played an important part in the developments which led to the international adoption in 1948 of the present electrical and photometric units and standards. He was vice-president of the International Commission on Illumination during 1939-48 and president of its U.S. National Committee from 1928 until 1935. During 1946-54 he was the member for the United States on the International Committee of Weights and Measures, of which he was vice-president from 1950 until 1954, and he had been a member of this Committee's advisory body for electricity and photometry since 1933. He also participated in the work of the International Organization for Standardization and the International Committee of Legal Metrology. Dr. Crittenden was for many years on the Standards Council of the American Standards Association, of which he was chairman during 1945-48, and in his time he served as president of the Illuminating Engineering Society, the U.S. National Committee of the International Electrochemical Commission and the Optical Society of America, as well as associate editor of the *Review of Scientific Instruments*. He also participated in the work of the American Society for Testing Materials, the American Institute of Electrical Engineers, the American Institute of Physics and the National Research Council.

Dr. Crittenden will long be remembered by his former colleagues on international committees, for he always brought to their deliberations wise counsel based on great knowledge and experience and expounded with good humour. Photometry was the primary interest which eventually led him to become a renowned exponent of international collaboration in all matters concerned with metrology. He is survived by his wife, formerly Norma M. Snyder, a daughter and a son.

H. BARRELL

Dr. A. L. Stern

ARTHUR LANDAUER STERN died suddenly on April 26 at Chorley Wood at the age of eighty-eight. He was born on May 6, 1867, the eldest of seven children of Moritz and Fanny Stern, of Birmingham. At King Edward VI High School he was a Foundation Scholar; and in 1887 from Mason College he obtained honours B.Sc. (London). He was then Tangye Research Scholar and personal assistant under Sir William Tilden, working on compounds of phosphorus. After that, under Dr. Cornelius O'Sullivan, he worked on chemical problems of fermentation and brewing, and soon became chemist and brewer at Messrs. Bass, Ratcliffe and Gretton, under O'Sullivan. An early piece of work was to show that glucose from various sources was the same substance, and thus he helped to lay one of the foundation stones of modern organic chemistry. He obtained his D.Sc. (London) in 1894.

On the death of O'Sullivan in 1906, Stern succeeded him as head brewer at Bass's New Brewery. He reorganized the research, with prescience concentrating on the biological side (Dr. Arthur Slator was then his chief assistant). Under his direction, the rate of multiplication of yeast cells was shown to be