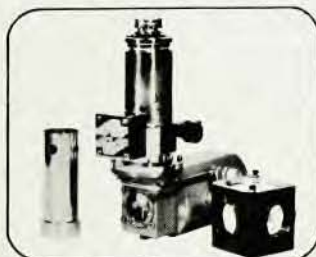


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high-temperature, high-luminosity stars.

From 1968 through 1971, Chalabaev was a member of the radiophysics faculty at Tomsk University, Siberia. He joined the Moscow University faculty of physics in 1971 and stayed there until 1975, when he moved to the Astrophysical Institute of Alma-Ata and the Sternberg Astronomical Institute, both in Moscow. There, he worked on his doctoral degree until leaving for France in 1980.

Madore was presented with \$8500 by the AAS to perform research on the use of infrared techniques to calibrate the distance of Cepheid variable stars, which are important in determining the distances to nearby galaxies. Infrared wavelengths, which are less affected by scattering, absorption and other blanketing phenomena as well as cyclic variations in brightness, should provide a simpler method to calibrate the distances to the Cepheids through their period-luminosity relation.

Madore is currently associate professor of astronomy at the University of

Toronto. He was awarded his BS degree by the University of Southern California and his MS and PhD degrees (1974) in astronomy by Toronto. From 1974 to 1978, Madore was a research assistant at Cambridge University. He returned to Toronto in 1978.

in brief

Wayne M. Polyzou, of the MIT Center for theoretical physics, has become assistant professor of physics, and **Steven R. Spangler**, formerly at the National radio Astronomy Observatory, has become assistant professor of astronomy, both at the University of Iowa.

Chia-Wei Woo is the 14th president of San Francisco State University. In addition to his administrative duties, he will continue his research on phase transitions and low-temperature physics. He will also remain an adjunct professor of physics at the University of California at San Diego.

obituaries

Gregory Wannier

Gregory Wannier died suddenly at the age of 71 on 21 October 1983 in Eugene, Oregon, where he was emeritus professor in the physics department of the University of Oregon. He was one of the most profound and original of the pioneers of theoretical condensed-matter physics. Although he was also one of the least recognized through formal honors in relation to his achievement, his work was always highly valued by his colleagues in the field. Among his collaborators, scientific friends and associates were a remarkable number of physicists now well known in very diverse fields: for example, A. N. Holden, Erich Vogt, Elizabeth A. Wood, Charles W. Misner, Elliott Montroll, P. A. Piroué and Conyers Herring, in addition to those mentioned below.

Characteristically, Wannier's contributions involved deep and elegant mathematics as well as unexpected physical insights. The mathematics often survives in the methodology of the field even after the physics has been superseded. For instance, his paper on "Wannier excitons," the main reason his name is remembered, also introduced the immensely fruitful idea of the "Wannier function" and provided the first example of the ubiquitous "effective mass" theory of defect and excitonic states. In the course of this work, he developed his less well-known generalized treatment of the



WANNIER

Coulomb functions, which was later mined by Thomas Kuhn and John H. Van Vleck, and by Frank Ham, as the basis of the quantum defect: norm-conserving pseudopotential methods of band theory.

Perhaps his most remarkable achievement was overshadowed by its stimulation of an even more remarkable one: the Onsager solution of the two-dimensional Ising model. In 1941, three years prior to Lars Onsager's solution, Wannier, with Hendrik Kramers, pioneered the transfer matrix methods used by Onsager and later workers, locating the critical point and correctly conjecturing its symmetrical, logarithmic nature. In 1949 he gener-

alized Onsager's solution to the "frustrated" case of the triangular lattice and calculated perhaps the only rigorous zero-point entropy of a non-trivial system.

Although his foray into gas-phase atomic and molecular physics was brief, he made two seminal contributions, both published in 1953. His theory of the transport properties of ions in gases stood for 20 years as the best and most utilized description of ion mobilities and diffusion coefficients. His classic work on the threshold behavior for ionization of atoms by electron impact is still relevant today, and, to quote Wannier, "more carefully reasoned than other papers of mine which are more popular."

In his later years he was engrossed in the problem of energy bands in the presence of electric and magnetic fields. Although it was unfashionable at the time, his efforts led to deep mathematics which have become very much a subject of the hour, as one of the first known examples of the "devil's staircase" type of anomaly in physics. It was this field that stimulated the mind of his best-known student, Douglas Hofstadter.

I have not begun to exhaust the number of deep, elegant and seminal mathematical insights, all springing from genuine roots in experimental physics, that grace Wannier's career. His output was relatively brief only because he disdained piecemeal publication and trivial results.

Wannier was born 30 December 1911 in Basel and received his PhD under Ernst Stueckelberg at the University of Basel in 1935. He retained a love for his city, for Switzerland, and for their history to the end of his life. An exchange fellowship at Princeton with Eugene Wigner in 1936 brought him to the US. After a year in Bristol in 1938-39, where he worked with Kramers and with Nevill Mott and his associates, he returned to the US for the war years. After academic jobs in Texas and Iowa and a brief stay at Socony-Vacuum Oil Company, he went on in 1949 to the Bell Telephone Laboratories, where he spent eleven of his most productive years (interrupted by a year's return to Geneva). In addition to his own work at Bell, he was a valued consultant to the physical-electronics experimentalists. In 1961 he went on to the University of Oregon, where he settled for the remainder of his life.

Wannier had a true sense for the really fundamental problems. I am indebted to him for the recognition of the experimental existence of the localization problem, in a little paper of 1949 called the "Band Structure of Insulators": what he called the "wiggly band" problem.

I remember Wannier with deep per-

sonal affection and gratitude for molding my early career in physics, when we were colleagues and friends at Bell. It was a great pleasure and honor to attend and speak at his very successful "70th birthday" (actually nearer his 71st) celebration at Eugene last spring, at which keynoted talks were delivered by his astrophysicist son Peter and by Douglas Hofstadter. Among other participants were Gerald Mahan, Marvin Cohen, and David Thouless, all of whom spoke on work stimulated by Wannier's ideas. The uniformly high intellectual level and the pleasant and informal atmosphere will remain a treasured memory.

PHILIP W. ANDERSON
AT&T Bell Laboratories, Murray Hill
and Princeton University

Alfred Kastler

Alfred Kastler, the eminent French physicist, died on 7 January 1984 at the age of 81.

Kastler was born 3 May 1902 in Guewiller, Alsace, then a part of Germany. He received his early education in Colmar, where he developed an interest in science and where his teachers helped him gain admission to the Ecole Normale Supérieure. At the Ecole Normale Kastler was introduced to quantum physics by his teacher Eugene Bloch, and he read with particular interest Arthur Sommerfeld's *Atombau und Spektrallinien*. He was particularly impressed by the principle of the conservation of angular momentum during interactions between electromagnetic radiation and atoms and by the new applications of this principle by A. Rubinowicz and Wilhelm Hanle to interpret experiments on resonant and Raman scattering of light by atoms and molecules. As a thesis topic Kastler chose to study the stepwise excitation of atomic states of the mercury atom, a phenomenon that stimulated much contemporary interest. The thesis was published in 1936. During the course of this work, Kastler states, he was struck by the fact that "the population obtained in the course of a stationary irradiation in the first excited state may become a non-negligible fraction of the population of the ground state, despite the weak intensity of the monochromatic light sources available at that time."

Kastler continued his work on atomic physics at the Ecole Normale during the German occupation of France, and he encouraged his first student, Jean Brossel, who had just completed a three-year stay in the laboratory of Samuel Tolansky in Manchester, England, to spend another year abroad at MIT with Francis Bitter, who wanted to find ways to extend I. I. Rabi's

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