RECENT DEATHS

Louis S. Jaffe, 63; professor of epidemiology and environmental health, George Washington University; 24 July.

Riojun Kinosita, 84; retired chairman of experimental pathology, City of Hope Medical Center; 7 September.

John V. Lagerwerff, 56; soil scientist, Agricultural Research Service, U.S. Department of Agriculture; 12 September.

Edith M. Lincoln, 86; former clinical professor of pediatrics, New York University School of Medicine; 28 August.

Paul Nawiasky, 94; dye chemist and former director of research, G.A.F. Corporation; 6 September.

J. Winthrop Peabody, Sr., 94; former professor of respiratory diseases, Georgetown University; 6 September.

Bernard S. Wolf, 65; chairman of radiology, Mount Sinai School of Medicine; 16 September.

Erratum: The article by Kenneth Giles that reported the effects of altered fungal strains on pine seedlings ("Genetic engineering . . . long-distance rumor," 28 Oct., p. 388) was originally scheduled for the June issue of *Plant and Soil*; however, its publication was delayed and it has not yet appeared.

RESEARCH NEWS

The 1977 Nobel Prize in Physics

The Royal Swedish Academy of Sciences has awarded the 1977 Nobel Prize in Physics to Philip W. Anderson, Bell Laboratories and Princeton University, Nevill F. Mott, Cambridge University, and John H. Van Vleck, Harvard University, for their fundamental theoretical investigations of the electronic structure of magnetic and disordered solids.

The field of solid-state theory owes its rapid and very successful development to a relatively small number of individuals who have had a decisive influence in opening new lines of thought and in establishing dynamic schools and research groups. The names that immediately come to mind among those active before World War II are M. Born, N. F. Mott, and R. E. Peierls in Great Britain, L. D. Landau in the Soviet Union, H. Bethe, F. Bloch, and E. Wigner first in Europe and later in the United States, and J. C. Slater and J. H. Van Vleck in the United States. This very illustrious group was joined after World War II by an equally influential set of younger men, mostly students of this first group, among whom we find J. Friedel in France, M. H. L. Pryce in Great Britain, a fairly large number of Landau's students in the Soviet Union, R. Kubo in Japan, and P. W. Anderson, J. Bardeen, H. Brooks, C. Kittel, W. Kohn, F. Seitz, W. Shockley, and C. Zener in the United States. The third and subsequent generations are already too numerous to include here.

There are many Nobel laureates in this very select list, yet the winners of the 1977 prize seem to fill a void. Although the Swedish Academy has focused on specific major contributions of Anderson, Mott, and Van Vleck, it is generally believed that it is their integrated contributions that support the awards for the three men. Their influence has reached practically every area of the physics of condensed matter.

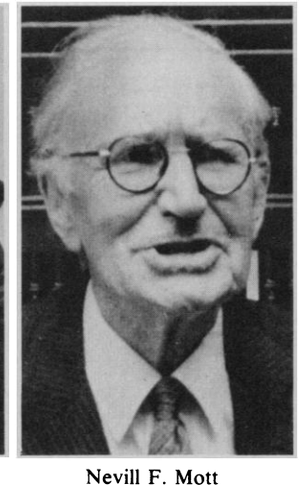
John Hasbrouck Van Vleck (A.B., University of Wisconsin, 1920; Ph.D., Harvard University, 1922) was active in physics before the emergence of modern quantum mechanics. His 1926 monograph (*1*) on quantum principles and line spectra according to the old quantum theory "appeared at a moment when the new quantum mechanics had just been born. This new theory, together with the notion of the spinning electron, provided exact derivations of the semi-empirical rules of the older theory and made the celestial mechanics type of perturbation calculus superfluous" (*2*). This monograph remains today as a most enlightening exposition of the powers and limitations of the old quantum theory.

As pointed out by Van Vleck, "American theoretical physics reached maturity with the great breakthrough of quantum mechanics, when American theorists could start from scratch on equal terms with their European colleagues" (*2*). Certainly Van Vleck was, with the late J. C. Slater, a leading protagonist in this new development. His work in the late 1920's and early 1930's was focused on what was to become his main field of research, in which he made his most enduring contribution—dielectric and magnetic susceptibilities. This culminated in the publication in 1932 of a still popular book, *The Theory of Electric and Magnetic Susceptibilities* (*3*).

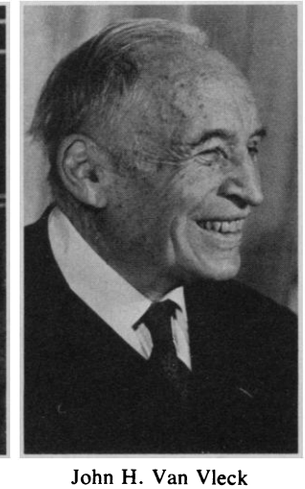
Van Vleck is deservedly known as "the father of modern magnetism." His work has been the foundation for understanding the behavior of foreign ions and atoms in a crystal or in a cluster in solution. His important discoveries and ideas are too numerous to be covered in a short review, but some of his major contributions are summarized below.

Van Vleck introduced the concepts of the crystal field and the ligand field—the electric fields experienced by the electrons in a foreign atom or ion because of the presence of other ions or atoms in their immediate environment. Crystal

Philip W. Anderson



Nevill F. Mott



John H. Van Vleck