show. Scientific advances are certainly one of the causes of present socioeconomic problems in medicine; without the scientific advances of the past century and a half, the problems of medicine today would be different. Medical science, however, is international. Diphtheria and our knowledge of it are the same here as elsewhere in the world, or would be were it not for varying socioeconomic conditions, both of medicine and of the public generally. If current problems were simply the result of the development of medical science, they would be the same throughout the world. Manifestly they are not. The problems of medicine in America today, Wood states, are largely social. Social medical problems have social as well as scientific causes, and in this book social causes are not explored historically. In his analysis of present problems, Wood does not delve into the social, economic, institutional, or political background of why medical education and medical practice are organized in this country as they are. There is no comparative analysis of the social organization of medicine in the United States and, say, Denmark, where, as Wood notes, life expectancy is higher and doctors are fewer. No one can deny the effect of advances in medical science. But by failing to analyze or to illustrate historically the social background, Wood has given us a one-sided and meager "historical perspective."

JOHN B. BLAKE
National Library of Medicine, Bethesda, Maryland

Immunologic Phenomena

Introduction to Immunochemical Specificity. William C. Boyd. Interscience, New York, 1962. viii + 158 pp. Illus. $8.

As a short, informal, and authoritative account of the development of immunochemical theory, William Boyd's new book deserves attention, particularly by students and teachers. The subject matter was initially presented in 1959 as a series of lectures in Moscow. In his preface, Boyd states that the published form contains many additions and revisions, although much of the "lecture" style persists. Once recognized, the style need not present serious disadvantages. Indeed, the freewheeling informality, along with a generous offering of tables and illustrations, makes for good reading as well as for clarity and precision.

The first three of the book's ten chapters are devoted to theory and definitions. The points discussed are well illustrated by the classic experiments of Landsteiner, Goebel, Kabat, and others, including the author's own contributions.

A general introduction to the human blood groups provides the background for much of the remainder of the book. Naturally occurring, red-cell agglutinins (lectins) from plants have been one of Boyd's main interests. Two chapters deal with this fascinating though somewhat specialized subject. While such substances have proven most valuable to serologists for typing individuals for red cell antigens and to immunochemists in their investigation of the chemical nature of the antigenic determinant groups, no one has come up with a convincing notion of the role of the lectins in the plant. It seems certain that their specificity for blood group antigens is an accident of nature, but Boyd holds that their ability to combine with certain carbohydrate structures is vital to the life processes of the plants themselves.

The chemistry of the blood group antigens and the genetic control of the specific antigenic sites have certainly provided a fertile field for the investigation of immunochemical specificity. The works of Morgan and his coworkers and of Kabat and his collaborators stand out as landmarks of creative research in this field, and Boyd's treatment of the subject is well illustrated and clear. Chemists specializing in carbohydrates will find this discussion most interesting.

There is only cursory treatment of protein antigens in Boyd's book. This omission is perhaps understandable, since there have been relatively few successful attempts to identify the chemical nature of the antigenic determinants of native proteins. Cebra's experiments with silk fibroin are mentioned, and Landsteiner's classic work with amino acid and peptide haptens on conjugated antigens are discussed in some detail.

As soon as it became apparent that antigens and specific antibodies combine in a firm chemical union, physical chemists and immunochemists proceeded to determine the physical constants of the reaction in order to establish the nature of the chemical bonds. Recently many elegant approaches have been devised. There is an impressive agreement among investigators as to the order of magnitude of the thermodynamic values for immunochemical reactions. Boyd presents some of the highlights of these efforts along with an elementary discussion of thermodynamics principles as they are applied by the immunochemist.

Although the specialist should be attracted to this book for the organization of the material and for some of the more recent details, the book is directed primarily toward those who wish to have an introduction to immunochemistry. For this purpose it is highly recommended.

CURTIS A. WILLIAMS
Rockefeller Institute, New York

Molecular Biology

Polyelectrolyte Solutions. A theoretical introduction. Stuart A. Rice and Mitsuru Nagasawa. Academic Press, New York, 1961. xv + 568 pp. $16.50.

In this period when physics, chemistry, and the life sciences are becoming increasingly intertwined, the appearance of a book on a combination of research fields is a welcome one. In this particular case, the authors have produced a volume that will be definitive for many years to come.

All phases of the theory of polyelectrolyte solutions, at least in the Debye-Hückel approximation, are covered. In addition to providing a comprehensive account of the results of the theory, the authors very clearly discuss the approximations that are customary in polyelectrolyte theory and point out the places at which they are likely to be inadequate to the problems treated. Some of the topics covered are the equilibrium properties of dilute electrolyte solutions, including a rather extensive account of the Poisson-Boltzmann equation, its solutions and the limitations of approximate solutions, the equilibrium properties of solutions of rigid polyelectrolytes, configurational problems relating to the structure of chain polyelectrolytes, the electrostatic free energy of polyelectrolytes, and many other aspects of the theory. Recent statistical mechanical attempts to derive corrections to the Debye-Hückel theory are not mentioned, but at the present time this is not too much of a