of the organism, hormonal activity, antimetabolites, and diet ingredients.

Some basic requirements for immunogenicity are assumed. These include the presence of specific (antibody-like) receptors on antigen-reactive cells, functional differentiation between various types of immunocompetent cells, cooperation between cells to trigger the immune response, and the involvement of a carrier. It is also assumed that "one cell produces only one immunoglobulin." Unfortunately, the possibility of the existence of a certain multipotential cell and step in the development of the immune response is not discussed.

It is interesting to mention some of the conclusions arrived at in the book. It is considered that probably all macromolecules can elicit antibody formation if given in the proper dose and schedule (chapter 1). This conception implies a great variety in the responsiveness of the immunocompetent system. It is claimed that the induction of antibody response or tolerance is directly related to the number of cell receptors. It is stated that the relative importance of molecular size and shape of antigens in determining immunogenicity varies greatly from one antigen to another (chapter 2). The dose and route of antigen administration determine not only immunogenicity but also the type of immune response elicited, that is, humoral versus cellular, affinity, and type of antibodies (chapter 3).

In connection with the action mechanism of adjuvants, it is of interest to mention the concept of "built-in" adjuvanticity for the antigen carrier and the possible action of adjuvants as surface-active agents and labilizers of lysosomal membranes (chapter 4).

Various hypotheses are proposed concerning the role of macrophages and cell cooperation in the induction of the immune response. The most appealing for the authors is that of the antigen functions as an inducer of protein biosynthesis (chapter 10).

The ability of histocompatibility antigens to provoke proliferation of immunocytes is postulated to be of utmost importance in determining the immune response of the host toward tumor cells. The possibility that some of the human lymphomas and leukemias are monoclonal, as are cases of multiple myelomatosis, is considered worthy of further investigation (chapter 16).

The book contains detailed chapters on various particulate antigens and on the evolution of immunological potential. The last chapter is devoted to some interesting predictions on the role of immunology in the future. In conclusion, the book fills a need in bringing together detailed information on factors governing immunogenicity.

S. BEN-EFRAIM
Department of Human Microbiology, School of Medicine, Tel-Aviv University, Tel-Aviv, Israel

Membrane Biophysics

Biophysics and Physiology of Excitable Membranes. WILLIAM J. ADELMAN, JR., Ed. Van Nostrand Reinhold, New York, 1971. xvi, 516 pp., illus. $24.50.

This book, based on a series of lectures to summer trainees at Woods Hole, should be in the library of every person with a serious interest in excitable membranes. The book's uniqueness among publications in this field lies partly in the variety of approaches to understanding membrane excitability it presents and partly in the clearly conscious effort that is made throughout to pass on information that will be useful to a beginning investigator. Perhaps the epitome of this effort is a full FORTRAN IV computer program for simulating the squid axon via the Hodgkin-Huxley model.

It should be noted that the 18 contributors to this volume were free to expound from their own points of view. The reader who has been working on membranes will automatically adjust for this, but the student who is using the book as an introduction should be warned not to be dismayed by differing viewpoints elsewhere in the literature, or in fact in this book, as when in the chapter beginning on page 379 he encounters a model of excitability that he has been warned to consider "suspect" on page 139. But that's all right, as long as he understands that his task is not to choose sides but to synthesize some more comprehensive picture from the most significant work that has been done—and on balance this book is an excellent representation of that work.

However, I would have liked there to be just one extra chapter somehow placing this body of work in the larger context of physiology. If the sum total of all the work of this volume's contributors and the people they cite were merely to understand resting and action potentials in the nerve axon, then this would indeed be a great deal of effort for not much profit. Although there are a few references to other preparations, the student will not get from this book any idea of the extent to which its subject matter has been extended to help develop concepts of function at the membrane level for such things as receptors, synapses, and muscles. This is a crotchet of mine, but it seems to me that to keep reminding students of such perspectives is one of the things that makes the difference between training them to be scientists and training them to be technicians. Besides, the extension to other membranes of the electrophysiology that has been developed for the axon is a lively research endeavor, of which students should be made aware. But the lack of such a chapter does not detract from what the book is—namely, the best available survey, at a level of detail suitable for a beginning or ongoing researcher in the field, of the variety of techniques that are being brought to bear on the problem of understanding membrane excitability.

ERIC JAKOBSSON
Department of Physiology and Biophysics, University of Illinois, Urbana

Crystal Structures

The Crystal Chemistry and Physics of Metals and Alloys. W. B. PEARSON. Wiley-Interscience, New York, 1972. xx, 806 pp., illus. $34.95. Wiley Series on the Science and Technology of Materials.

W. B. Pearson is already well known for his two-volume *Handbook of Lattice Spacings and Structures of Metals.* Those volumes, which are a compilation of the structures formed by various alloy phases, are nicely complemented by the present volume, which is both a systematic description of the more than 600 crystal structures found in metals and a critical review of theoretical work on the problem of structural stability.

Most of the structures are described in terms of the stacking of close-packed layers. This system has the considerable advantage over those based only on crystal symmetry that structural similarities and differences are unambiguously exposed. (It is possible for two compounds belonging to the same space group, having the same site-set occupation, with values of free atomic