

materials, ultramicrotomy, as well as such applications of the electron microscope as those in histology, cytology, bacteriology, and studies of biological macromolecules. The printing is very good and the many microphotographs are excellent illustrations of the fields represented.

Heidenreich's book is an excellent workmanlike presentation of transmission electron microscopy, and I would like to quote from the author's preface: "My rather ambitious intent is to develop a coherent, physical approach to the understanding of contrast in electron microscope images whether the objects are plant cell walls or crystals containing stacking faults."

After a 15-page historical introduction, the author discusses the ideal or Gaussian images, different aspects of electron scattering in the object, and continues with electron diffraction and a diffraction-induced contrast in the electron microscope image. The aim of the author, to produce a unified viewpoint for the description of contrast both in the amorphous and crystalline media, is an extremely laudable one. The question may be raised how far he succeeds in that attempt. I, for one, would like to encourage him to persevere because I do not believe that he really entirely covered the ground. I may be wrong in believing that for the time being all amorphous substances are still best described by the scattering or what Heidenreich calls "mass thickness" approach. Since he presents both approaches very adequately, the reader has the choice of the approach he prefers to use for his own data.

Before reading Heidenreich's book I was convinced that Pashley gave the best presentation of the whole field of diffraction contrast. Now I have to modify that opinion. Both have done excellent jobs and for those who prefer a condensed version I would recommend Pashley's work; for the more extended treatment Heidenreich is the proper place to look.

A few minor things may be criticized in the book. The general references are limited in their entirety to English-language presentations. Much later in the text, reference is made to some non-English literature. This is a

little regrettable, because I believe that the references to the monumental work of Glaser, to that of von Laue, and to the excellent encyclopedia article of Leisegang really belong in the general references. I fail to understand figure 11-11 on page 58. The caption is inadequate to distinguish which are the elastic and inelastic curves and the notation " Q_n " is not explained. The footnote on page 103 refers to photons and not to electrons. These are such minor blemishes that they do not at all mar an excellent book. I would like to mention one more thing which pleased me no end in reading this book. It is dedicated to the memory of C. J. Davisson. All of us who have known Davisson, his wonderful contributions to physics, and his extremely lovable personality, will greet this dedication as a most fitting tribute to his memory.

An Introduction to Modern Physics. H. Messel and S. T. Butler, eds. 273 pp. St. Martin's Press, New York, 1964. \$5.00. Reviewed by Robert L. Weber, *The Pennsylvania State University*.

According to a note on the dust jacket (there is no Preface), this book is a record of a series of lectures given to science teachers by world experts at the *third** Nuclear Research Foundation Summer School in Australia. It is not mentioned that all of the chapters were previously published (1961) by the Shakespeare Head Press, Sydney, Australia, in *Space and the Atom*, a record of the *fourth** Nuclear Research Foundation Summer School for Science Teachers held at the University of Sydney in January, 1961, which also included a chapter on particle accelerators and sections on radio astronomy and aeronautics. The St. Martin's Press has apparently chosen to make their book smaller and more coherent by omitting these six chapters.

Professors S. T. Butler and H. Messel, of the University of Sydney, present in seven chapters a conventional, nicely organized introduction to the Rutherford atom, radiation, relativity, and nuclear reactions. Professor E. E. Salpeter, of Cornell University, starts

*According to St. Martin's Press, their dust-jacket note is in error. Both books refer to the *fourth* summer school. ED.

his three chapters with the remark "Most laymen who are acquainted with modern physics shudder at the mere mention of the words Quantum Mechanics." Then in relatively easy steps he explains the significance of Planck's constant, the empirical concepts of wave mechanics leading to "the famous Schroedinger wave equation, written out in its full glory", and applied to the hydrogen atom. In three short chapters, Professor C.B.A. McCusker, of the University of Sydney, discusses present views on stable particles, mesons, strange particles, and force fields. He points out that "in the end we have had to interpret the particles in terms of fields, which, though quantized, are continuous. And fields pass through the most complete vacuum. In fact, the atoms are not sharply bounded and the void has a definite structure. So it seems that the argument [is matter continuous or discontinuous?] is being resolved as we resolved the argument as to the wave and particle nature of light. We must combine both ideas to make sense of the experiments." Professor W. Boas, of the University of Melbourne, deals with solid-state physics in chapters on crystals and the properties of solids, conduction of electricity, and crystal defects and the strength of materials.

The authors are not at all condescending toward the science teachers for whom these lectures were prepared. Yet the demands made upon them are not unreasonable. The reward should be a substantial understanding of the concepts and methods of modern physics. Throughout the book there is a clarity and coherence especially to be commended in a multiple-author project.

The Mathematics of Physics and Chemistry, Volume 2. By Henry Margenau and George Moseley Murphy. 786 pp. Van Nostrand, Princeton, N.J., 1964. \$15.00. Reviewed by J. Gillis, *Weizmann Institute of Science*.

Volume 1 was a systematic exposition of mathematical techniques with physics and chemistry merely providing illustrative examples. Volume 2 is completely different in spirit, being, in fact, rather a collection of short monographs in theoretical physics.