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scant statement of the problem along with references to some literature. Likewise, the very last section of the book describing x-ray diffraction results for some bio-macromolecules provides a teaser in six brief pages taken up mostly by diagrams.

In spite of the drastic condensation of material the eleven contributors have presented a convenient description of techniques for the uninitiated. Also, explicit and practically useful material on Surface Films, Absorption and Chromatography, Electrophoresis, and on Electrical Potential Differences is especially commendable. The inclusion of Magnetic Methods is noteworthy since these promise to become increasingly important in the study of the solid and liquid states of living matter.

Even where the essayists have confined themselves to broad outlines they manage to raise stimulating questions as they go along. For instance, Sacks points out that the observed effect of isotope mass on reaction rate is far less than predicted (p. 53). This presents an intriguing physical problem whose bases are not discussed in the text. Or, in another direction, Rothen describes how a 100-A-thick Formvar film, or monolayers of proteins, can shield antigen molecules against inactivation by alpha particle bombardment. The loss of alpha particle energy in such a thin layer seems to be negligible, yet the startling fact is that the layer causes the particles to lose their damaging effect. These two examples are but minor aspects of the larger picture. The material as a whole should prove stimulating to those trying to find new ways of approaching the ramifications of the living process.

The experienced reader will see how the subject matter could be expanded into many volumes, like Aberhalden's *Handbuch der Arbeitsmethoden*. In its present form it is a concise, well-documented survey. The pictures and diagrams are good. There are excellent author and subject indices. The book is a welcome addition to the libraries of workers in biology and its borderland sciences.

**Transport Processes in Applied Chemistry.** By R. C. L. Bosworth. 387 pp. John Wiley & Sons, Inc., New York, 1956. \$12.00. Reviewed by I. Amdur, Massachusetts Institute of Technology.

Dr. Bosworth has extended to a wide variety of transport processes the unified presentation which was developed earlier in his *Heat Transfer Phenomena*. Thus all transport processes and certain scalar processes, such as chemical reaction, are described in terms of a driving force, flux, resistance, and rate of dissipation of energy. As might be anticipated, this presentation permits the liberal use of simple electrical analogues in treating relatively complicated transport phenomena.

Three of the concepts treated in the book seem to merit special mention: the concept of a carrier to help elucidate the detailed mechanism of the transport process; the coupling of transport processes under conditions when a process proceeding at a given point in

space results in another transport process either at the same or at another point; and the replacement of a series of such coupled transport processes by a proper equivalent process which the author calls the Grand Transport Process. Although these concepts are not entirely original with Dr. Bosworth, he has presented and illustrated them in a stimulating manner.

*Transport Processes in Applied Chemistry* is a very unusual book. Its range of topics extends from elementary electrical circuit or gas kinetic theory to the economic and sociological aspects of industrial chemical operations. It includes discussions of feedback mechanism, irreversible thermodynamics, anisotropic transport, even the wave nature of particles. In short, its coverage is somewhat encyclopedic. As a result the treatment of certain topics is thin; for example, gaseous transport processes at low pressures. The book cannot serve, nor does it seem to have been intended, as a source book on the molecular fundamentals of transport processes and related topics. More than eight hundred references, conveniently placed at the end of appropriate chapters, enable the reader to find such fundamental treatments elsewhere. What the book does do is to suggest a new phenomenological approach to applied transport problems which, although not always easy to formulate in the manner proposed by Dr. Bosworth, seems to be a distinct improvement over the older empirical approaches.

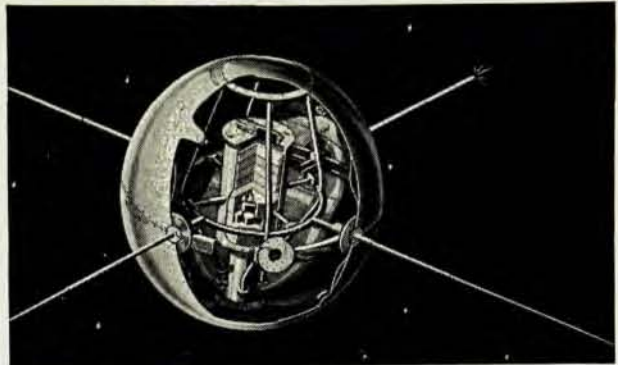
Readers with backgrounds in physics, chemistry, or chemical engineering should find various portions of the book provocative and enjoyable.

**Introduction to Solid State Physics** (2nd Revised Edition). By Charles Kittel. 617 pp. John Wiley & Sons, Inc., New York, 1956. \$12.00. Reviewed by R. W. Hellwarth, Hughes Aircraft Company.

Those familiar with the first edition of Kittel's *Introduction to Solid State Physics* will appreciate the appearance of the second edition which extends not only the subject matter of the first edition but also the treatment and discussion of basic theory and concepts. Of the additional 200 pages in the second edition about half are devoted to new topical material on metallurgical applications, semiconductors, imperfections in crystals, photoconductivity, and luminescence. Although topical coverage is extensive, the new edition is still not, nor is it intended to be, a general reference book. Many quite active branches of solid-state physics are not discussed, e.g., thermoelectricity, phase transformations, cathode coatings, surface phenomena, and plastics.

The extended theoretical treatment of such basic concepts as bands and statistics increases the depth as well as the range of appeal, making the discussions easier for the beginning student on one hand and of more value to workers in the field on the other. New helpful diagrams and pictures have been added to the already copious number in the earlier edition. These serve to further amplify old topics as well as illustrate the new

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