our way to attaining understanding" (p. 96).

The attempt to simplify is frequently accompanied by the failure to make sharply the necessary distinctions. The result is often harder for the beginning student to understand than it would be if a more "difficult" but precise treatment had been offered.

DONALD J. LEWIS
Northwestern University

Electrochemistry in Biology and Medicine. Theodore Shedlovsky, Ed. Wiley, New York; Chapman & Hall, London, 1955. xii + 369 pp. Illus. $10.50.

The contributions to the symposium on Electrochemistry in Biology and Medicine held by the Electrochemical Society in April 1953 have been assembled in this volume. The 18 papers include both reviews and specialized presentations but fall rather naturally into four groups, depending on the relationship of the electric phenomenon under discussion to the chemical mechanism that produces it.

The first five chapters deal with situations in which the electric parameters can be discussed with some certainty in terms of specific equilibria and ionic transport systems. These are largely concerned with the properties of membranes and, as such, form an excellent, although not systematic, introduction to the following five chapters. In these the essence of the discussion is the identification of the equilibria, transport systems, and enzymatic mechanisms that underlie the transmission of the nerve impulse and other bioelectric phenomena.

There follow four chapters in which electrochemistry is chiefly discussed as a tool for the investigation of simple electrolytes, proteins, and the interaction between proteins and small ions. The final group of four chapters considers electric phenomena, the molecular basis of which is so poorly understood that it is scarcely discussed. The observations on electroencephalograms, for example, are described in terms of their reproducibility and their empirical correlation with physiological factors.

If a justification must be sought for the inclusion of so wide a variety of content in a single volume, it can be found only in the interest that chapters outside the reader's special competence may arouse. Judged in this way the book should prove useful to many. The chapters are stimulating and indicate the emphasis in current research while avoiding in most cases the restricted viewpoint of journal articles.

ROBERT C. WARNER
College of Medicine,
New York University

The Roger Adams Symposium. Wiley, New York; Chapman & Hall, London, 1955. ix + 140 pp. Illus. + plates. $3.75.

This book contains the papers presented at a symposium in honor of Roger Adams at the University of Illinois (3–4 Sept. 1954). In addition to a biographic sketch by Ernest H. Volwiler, the following accounts are given in this historically significant book: "Steric effects in dyes," by Wallace R. Brode; "The structure of gliotoxin, a sulfur-containing antibiotic substance," by John R. Johnson; "The structure of nepetalic acid," by Samuel M. McElvain; "Chemistry of flavylium salts; reactions with amines," by Ralph L. Shriner; and "Some chemical studies on viruses," by Wendell M. Stanley.

These are a selected few of the distinguished students of Adams. The papers given by them are, as one might have expected, excellent, up-to-date presentations by masters in their respective fields. The diagrams, tables, flow sheets, and illustrations are used effectively. Chemists generally are also indebted to C. S. Marvel and his symposium committee and to the publishers for making available a splendid work of this kind.

It is an altogether fitting tribute to Adams, whose classical studies in organic chemistry have been so inspirational and whose pronounced influence on chemists and chemistry generally have endeared him to so many.

HENRY GILMAN
Iowa State College

Antimetabolites and Cancer. A symposium. Cornelius P. Rhoads, Ed. American Association for the Advancement of Science, Washington, D.C., 1955. vi + 312 pp. Illus. $5.75; AAAS memb. $5.

This volume contains 18 contributions to a symposium presented in December 1953 at the Boston meeting of the AAAS. The variety and abundance of the findings in this area of research are impressive. C. P. Rhoads describes the development in the field of cancer research and professes some optimism in considering the probability of the discovery of specific therapeutic agents for neoplastic diseases by extension of the manufacture and screening of antimetabolites.

D. R. Ginder considers viruses as possible therapeutic aids in the treatment of neoplasms, and R. Hertz performs a similar service for hormones. Both men conclude that the lack of knowledge of the mechanisms of action and intermediary metabolism of viruses and hormones obscures any contemporary view of these agents as antimetabolites. S. Weinhouse finds that the high rate of glycolysis in neoplasms first demonstrated by Warburg is supplementary to other, more efficient metabolic processes that are similar to those demonstrable in normal tissues. Some interesting examples of the inhibition of microbial growth by normal metabolites are given by B. D. Davis, and L. G. Nickell cites numerous compounds that affect plant growth. M. M. Nelson writes of the production of abortions and/or congenital anomalies in rats with antimetabolites of pyridoxine, riboflavin, and folic acid. D. W. Woolley presents studies on the possible oncolytic properties of certain synthetic analogs of 1,2-dimethyl-4,5-diaminobenzene, a precursor of vitamin B_{12}.

It is revealing that 10 of the 18 papers in the book deal with antimetabolites of such precursors of nucleic acids as folic acid, leucovorin, purines, and pyrimidines. G. H. Hitchings explains the biochemistry involved and indicates probable sites of action of various antimetabolites with great clarity and precision. E. M. Lansford, Jr., and W. Shive discuss the action of aminopterin on bacteria and describe a microbiological assay method for thymidine. D. W. Visser presents some results on the action of substituted nucleosides in *Neurospora* and bacteria. J. R. Totter finds that aminopterin inhibits the uptake of C^{14}-formate into desoxyribonucleic acid in rabbit bone marrow *in vitro*. C. A. Nichol and A. D. Welch have discovered that A-methopterin inhibits the conversion of folic acid to folinic acid in *S. faecalis*, and they discuss some possible mechanisms of drug resistance in leukemic cells (including data on cell-free extracts suggesting the importance of cell permeability). H. E. Skipper considers resistance in leukemic cells to 8-azaguanine and A-methopterin in terms of alternate metabolic pathways.

The actions and metabolism of 8-azaguanine are thoroughly reviewed in two papers, one by R. E. Parks, Jr., and the other by H. G. Mandel. G. B. Brown describes the empirical testing program of the Sloan-Kettering Institute for the detection of nucleic acid derivatives with carcinocidal or carcinostatic activity. The only clinical essay in the book, a description of the treatment of acute leukemia, is contributed by J. H. Burchenal. He presents figures on the 50 percent survival time of children with acute leukemia in months: untreated, 3.9; treated with A-methopterin and steroids, 8.9; treated with mercaptopurine, A-methopterin, and steroids, 12. Each paper has a bibliography, and the volume ends with an 11-page discussion of the papers. There is no index.

This book is a good exposition of much of the empirical work and many of the theoretical concepts formulated in the