volume is an abbreviated version of the important points of discussion pertaining to each section, edited by the chairmen of the respective sessions (section 2, on central neurons, is far too brief), and finally a résumé of a few related papers published subsequent to the symposium.

Although both Malmfors and Thoenen speak English quite well, it is the native language of neither editor, and the book would have been improved by a careful reading to eliminate the frequent errors in spelling, style, and typesetting. These detract slightly from the readability but not at all from the general utility of the book, which will close gaps in the knowledge of even the best-informed specialist. For research workers who tamper casually with catecholamines it will prove more reliable and comprehensive than a telephone call to the nearest pharmacologist for the best recipe to extinguish adrenergic function. Both the methodology and the functional results pertaining to an important research tool are collected as well as possible in this volume, and the importance and breadth of the material included are greater than the title may imply.

LUCAS S. VAN ORDEN III
Department of Pharmacology, University of Iowa, Iowa City

Antimalarial Agents

Chemotherapy and Drug Resistance in Malaria. W. PETERS. Academic Press, New York, 1970. xviii, 876 pp., illus. $39.50.

Studies carried out about a decade ago demonstrated conclusively that certain strains of *Plasmodium falciparum*, in parts of South America and in parts of Southeast Asia, were resistant to chloroquine and to other widely used synthetic antimalarial agents. These observations, reinforced by problems with drug-resistant malaria parasites subsequently encountered by American military personnel in Southeast Asia, shattered complacency with antimalarial drugs that had developed during the 1950's and contributed to a marked resurgence of investigative interest in malaria. The 1960's witnessed a rejuvenation of basic research on malaria and of intensive efforts aimed at the development of new antimalarial agents.

A rekindling of older investigative approaches together with the successful application of a variety of new experimental techniques yielded a wealth of new information about the effects, limitations, and mechanisms of action of, and about resistance to, antimalarial drugs. This book provides a timely and comprehensive summary and discussion of earlier and more recent data pertinent primarily to drug resistance. It is a valuable compendium of otherwise widely scattered information relating to the biology of malaria parasites; host-drug-parasite interactions; older and newer methods for assessing effects of antimalarial drugs in vivo or in vitro; experimental techniques for inducing drug resistance; results and implications of studies of malaria parasites of lower animals; results of studies of parasites that cause human malaria; the use of drug combinations in an effort to thwart the emergence of drug-resistant parasites; mechanisms of action of and of resistance to antimalarial drugs; entomological, immunological, and genetic aspects of drug resistance; and the impact of drug resistance on malaria control and eradication programs.

Those well versed in malaria will not have great difficulty spotting occasional arguable statements; overall, however, such instances will prove remarkably few in view of the immense amount of information considered. Coverage of different aspects of the subject is thorough, use of tables is extensive, and illustrations are numerous and excellent. Although references are not numbered, my count indicates that 1709 are cited.

This book is in essence a very detailed progress report that provides considerable insight into methodology and the state of our knowledge relating to drug resistance in malaria as it existed at the end of the 1960's. It attests both to the notable advances that have been made on multiple investigative fronts and to the substantial extent to which our knowledge remains incomplete despite these advances. Although research carried out during the 1960's provided a great deal of useful new information about antimalarial drugs and drug resistance, many fundamental questions remain only partially answered and many pressing needs remain largely unmet. We need, for example, deeper understanding of the mechanisms involved in resistance to antimalarial drugs, more information about the factors that influence the geographic spread of drug-resistant parasites, better means with which to combat drug-resistant parasites, and more adequate insight into how currently available means can best be utilized.

The resurgence of malaria research during the 1960's offers hope that much-needed additional progress will take place during the 1970's. A major question, however, is whether it will be possible to sustain during the 1970's the investigative momentum developed during the 1960's. Peters begins by noting that problems with malaria during wartime have often provided the stimuli for accelerated research in malaria. He concludes by pointing out that malaria is likely to remain a formidable public health problem for some time. Perhaps one might add as a footnote the hope that the cyclic ups and downs of malaria research coincident with the beginnings and endings of wars will at long last be blunted so that exigencies of war will not constitute a prerequisite for waging a sustained investigative assault on malaria during the 1970's.

ROBIN D. POWELL
Department of Internal Medicine, College of Medicine, University of Iowa, and *Veterans Administration Hospital, Iowa City*

Biophysics

Membranes and Ion Transport. E. EDWARD BITTAR, Ed. Wiley-Interscience, New York, 1970–71. In 3 vols. Vol. 1, xvi, 484 pp., illus. $22. Vol. 2, xiv, 296 pp., illus. $15.25. Vol. 3, xiv, 382 pp., illus. $18.

Though this three-volume work, dedicated to the late Edward Conway, is written primarily for the novice, many a membranologist should find it highly informative and generally interesting. Considering the dynamic nature of the field and the voluminous literature on ions and membranes, the heroic task of selecting subject material and imposing a reasonably consistent viewpoint on 34 contributing authors has been well done. Many of the contributors approach their subjects by comparison of traditional findings and concepts with current information, rendering gently persuasive arguments for alterations of existing theory. Though this informational rather than overtly critical approach is inherently sound, the reluctance of a few authors to offer substantive critical comment appears excessive. The reader, particularly the novice, is not