from prehistoric fauna in the Solomons to dietary change in the Marshall Islands—that it is difficult to discern any common themes. This is partly a function of the underdeveloped state of cultural anthropology in the Pacific. But a more deliberately selective approach to the symposium could have advanced understanding of some of the major problems in Pacific ethnology and prehistory more effectively. The book does include individual papers of great interest, such as Shawcross's general discussion of the relevance of animal population dynamics to archeological reconstruction, but these would probably have achieved wider circulation if published in appropriate journals. The feeling of bittiness is enhanced by the inclusion of two papers (by Clark and Vasilievsky) identical to those by the same authors published in Fitzhugh's volume.

Despite the unequal quality of these two books they do mark a new awareness among anthropologists of the important role that seas and coasts have played in the cultural history of mankind. For that reason alone they deserve a warm welcome. They also have much to offer specialists studying human life, past and present, along Pacific, Arctic, and North Atlantic shores.

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Regulation of Viruses

Control Processes in Virus Multiplication. Papers from a symposium, London, Apr. 1975. D. C. BURKE and W. C. RUSSELL, Eds. Published for the Society for General Microbiology by Cambridge University Press, New York, 1975. x, 450 pp., illus. $27.50. Society for General Microbiology Symposia, 25.

The editors asked the contributors to this book not only to consider the biosynthetic events that occur during virus replication, but also to discuss the regulation of these processes. This attempt to come to grips with regulation of synthesis is what gives this book its greatest value. Bacterial viruses have provided the most precise knowledge of regulatory processes, and the findings concerning these viruses are described, though in a highly condensed form. The greater part of the book is concerned with animal virus systems, and there is an attempt to identify the unique regulatory mechanisms that function in eukaryotic systems. Almost all the contributions in this volume effectively present current knowledge of biosynthetic events within infected cells. The papers by Burke and Russell, "Control of nucleic acid replication in cells infected with animal viruses," and by A. E. Smith, "Control of translation of animal virus messenger RNA," are particularly effective summaries. The paper by N. J. Dimmock, "Transport of virus macromolecules in infected cells," is of considerable interest, not because of the remarkable advances that have been made in this area, but because the subject is usually ignored. Dimmock's paper effectively pulls together data on membrane structure and information on the transport of macromolecules and illustrates the advantages of recognizable viral proteins and nucleic acids in the study of transport. Also valuable is Showe and Kellenberger's discussion of control mechanisms in virus assembly. Although solid progress has been made in research on these mechanisms, particularly with T-4 bacteriophage, very few studies have been carried out with animal viruses.

Overall, the book makes good reading and does a creditable job of presenting the biosynthetic pathways that function in the synthesis of viral macromolecules. The book also includes a brief description of some of the well-defined regulatory processes that have been described in elegant studies in bacteria. Although one purpose of the book is to describe control mechanisms, it is clear that animal virologists have amassed very few data on regulatory mechanisms either in infected or in uninfected cells.

Animal virology has made remarkable advances during the past ten years through the use of techniques, such as nucleic acid hybridization, that enable the investigator to examine viral processes separately from cellular processes. If virologists hope to understand the regulation of viral processes, however, they will have to deal with cellular processes instead of treating them as background noise. In future symposiums on control mechanisms, it is likely that there will be a heavier emphasis on the cell and the interactions of viruses with cells.

A deficiency of the book is that only a few figures or tables are used to present data or illustrate models. This approach may be appropriate, however, for readers who are working in the broad field of virus multiplication. This is also a good book for someone who is thinking of working with animal viruses and wants to know where the field now stands.

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Drug Actions in Bacteria

Microbial Drug Resistance. Papers from a symposium, Tokyo, Oct. 1974. SUSUMU MITSUHASHI and HAJIME HASHIMOTO, Eds. University Park Press, Baltimore, 1975. xvi, 566 pp., illus. $42.50.

The majority of the 47 papers in this volume are by scientists from Japan, where the phenomenon of transferable antibiotic resistance was first discovered in 1959. In the 15 or so years since the initial discovery that plasmid-determined antibiotic resistances are transmissible in matings between bacteria, the field has expanded by leaps and bounds. The editors, who have been in the field from the start, have organized the book in a useful way.

The first of the three sections deals with the genetics and molecular biology of these transmissible antibiotic resistance factors (R plasmids). R. H. Rownd and his coauthors have contributed two papers that analyze the unusual behavior of R plasmids in *Proteus mirabilis* and show how the extraordinary capacity for alteration of the plasmids in this organism, specifically the capacity to increase the number of copies of the drug resistance genes, produces increased resistance levels in the host cells. In another paper in this section, T. Arai describes the characterization of multicopy mutants of an R plasmid found in *Escherichia coli* that may be useful as tools for the genetic analysis of R factor genomes. Such multicopy mutants were detected because their *E. coli* hosts exhibit higher resistance levels attributable to gene-dosage effects similar to those described by Rownd and co-workers in *P. mirabilis*. In other papers, N. Datta presents the criteria by which R plasmids are classified into compatibility groups and Hashimoto *et al.* report the isolation of a miniplasmid similar to that recently described by Stanley Cohen and colleagues and suitable for use as a vehicle in recombinant DNA experiments. The paper by R. Curtiss III on bacterial conjugation in minicells, which because they lack DNA can serve as useful receptacles for transferred plasmid DNA, presents useful tricks of the trade of molecular genetics, as do many of the papers.

The second section of the book deals with the epidemiology of plasmid-mediated drug resistance. The introductory paper by Tanaka *et al.* surveys the types of R plasmids isolated in Japan over the last nine years. A series of seven papers covers a variety of investigations involving *Pseudomonas aeruginosa*, an im-

portant organism in urinary tract infections and burn cases that has become the subject of intense study in recent years. B. W. Holloway, who has worked with this difficult and ubiquitous organism for many years, has contributed an excellent paper summarizing his studies on both the chromosomal genetics and the plasmid biology of *P. aeruginosa*. This group of papers provides a useful survey of research on this organism. Other matters treated are drug resistance in *Salmonella* species isolated from humans and animals and R plasmids in *Serratia marcescens* and *Vibrio cholerae*.

The final section of the book is devoted to biochemical studies on a number of antibiotics in current use. These papers contain information on how R plasmid–specified enzymes act upon the antibiotics to bring about drug resistance and descriptions of new antibiotics that can in some instances evade such plasmid-mediated resistance mechanisms.

All in all, this is one of the most valuable books of its kind this reviewer has encountered. The papers are generally brief and to the point, and they touch on most of the important areas in this fast-moving field. The book is highly recommended for a wide spectrum of investigators, from microbiologists and epidemiologists to geneticists and molecular biologists. The one disturbing note, however, is its price.

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Membrane Systems

Molecular Aspects of Membrane Phenomena. Papers from a symposium, Seattle, Nov. 1974. H. E. KABACK, H. NEURATH, G. K. RADDA, R. SCHWYZER, and W. R. WILEY, Eds. Springer-Verlag, New York, 1975. xiv, 338 pp., illus. $27.50.

This collection of papers documents both technical and conceptual advances in the study of three key membrane phenomena: dynamics, recognition, and energy coupling. The presentations are on the whole lucid and well referenced, and they include ample descriptions of techniques and experimental data that will be welcomed by the specialist. There is also sufficient background to provide perspective for the nonspecialist. A broad spectrum of membrane systems, including bacterial membranes, mitochondria, chloroplasts, and plasma membranes of lymphocytes, fibroblasts, and *Neurospora*, as well as artificial membranes, are dealt with. The contributions are logically assembled, and this gives the collection a unity that makes for satisfying reading and study.

The section on dynamic properties stresses new experimental approaches for examining molecular interactions in membranes. Philip Siekevitz in his introduction to the book provides a rationale for this concern by referring to an interplay of diversified forces acting on the membrane and raising a number of probing questions regarding the implications of this interplay for membrane structure and molecular organization. Techniques that have allowed measurements of phospholipid mobility and asymmetry in the plane of the membrane, order-disorder lipid transitions, and nearest-neighbor analysis of membrane components are described. The time dimension of membrane dynamics is portrayed in a paper by Fritz Melchers describing how synthesis, turnover, and surface representation of the immunoglobulin molecules on B lymphocyte subpopulations can be used to characterize different stages in their differentiation.

In the section dealing with recognition the controversial question of whether protease-mediated cell surface alterations, measured by lectin-induced agglutinability of the cells, initiates cell division and allows escape from density-dependent growth control is discussed. In addition, the role of membranes in transducing molecular information, such as that encoded in acetylcholine and polypeptide hormones, into physiological responses is elaborated. Of particular interest is the contribution by Robert Schwyzer, in which consideration is given to the mechanisms underlying recognition and triggering of membrane-bound receptors.

The final section, dealing with energy coupling, is remarkable in the extent to which it signifies a rallying of support for Peter Mitchell's chemosmotic theory. It was proposed as early as 1961 that there is adenosine triphosphate–dependent H^+ transport and H^+-dependent cotransport of substrates in mitochondria. Evidence presented in this volume supports this hypothesis for mitochondria and indicates that at least facsimiles of the same process also operate in chloroplasts, bacterial membranes, and the plasma membrane of *Neurospora crassa*. There is little doubt that Mitchell's theory has been both guide and goad over the years, but the presentations in this volume suggest that chemosmotic thinking has emerged as a rational framework for the interpretation of many of the current data on bioenergetics.

The conference was well attended, and the issues under consideration were timely, relevant, and in some cases controversial. It is therefore unfortunate that at least highlights of the informal discussions have not been included in the published proceedings.

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Books Received

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Cellular Mechanisms Modulating Gonadal Action. R. L. Singhal and J. A. Thomas, Eds. University Park Press, Baltimore, 1976. viii, 472 pp., illus. $34.50. Advances in Sex Hormone Research, vol. 2.

Chemical Transmission in the Mammalian Central Nervous System. Charles H. Hockman and Detlef Bieger, Eds. University Park Press, Baltimore, 1976. xii, 442 pp., illus. $34.50.

Cholinesterases and Cholinergic Receptors. Proceedings of a meeting, Split, Yugoslavia, Apr. 1975. Else Reiner, Mira Škrinjarić-Špoljar, and Vera Simeon, Eds. Croatica Chemica Acta, Zagreb, Yugoslavia, 1975. vi + pp. 163–506, illus. Paper, $12. Reprinted from *Croatia Chemica Acta*, vol. 47, no. 3.

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Combined Effects of Radioactive, Chemical and Thermal Releases to the Environment. Proceedings of a symposium, Stockholm, June 1975. International Atomic Energy Agency, Vienna, 1975 (U.S. distributor, Unipub, New York). x, 360 pp., illus. Paper, $21. Proceedings Series.

Communications Channels. Characterization and Behavior. Bernard Goldberg, Ed. IEEE Press, New York, 1976 (distributor, Wiley, New York). viii, 762 pp., illus. Cloth, $22.95; paper, $11.95. IEEE Selected Reprint Series.

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