

pertaining to Coccidia of invertebrates are given for comparison. Also, descriptions of the known species of Coccidia of domestic animals and a number of good diagrammatic illustrations are included. The pertinent literature up to 1965 is well covered.

In writing this book Kheysin attempted to summarize the knowledge concerning the life cycles of the Coccidia of domestic animals, with emphasis on the cytological and physiological aspects. He was successful in achieving this purpose, and the book should be useful to anyone wishing such a review.

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Thermal Physiology of Man

The Stress of Hot Environments. D. MCK. KERSLAKE. Cambridge University Press, New York, 1972. x, 316 pp., illus. \$19.50. Monographs of the Physiological Society, No. 29.

Considering the fact that a large fraction of the world's human population is frequently exposed to high environmental temperatures, the number of books dealing with the biological reactions to this particular form of stress is small. Its well-organized presentation of the older and newer concepts of thermoregulation in hot environments makes this one a welcome source of information for the qualified reader. The writer leads the reader from the physical characteristics of human thermoregulation through participating physiological functions to the practical application of evaluating thermal stress in quantitative terms. The frequently used mathematical concepts are all defined in terms based on the recently proposed standard system of symbols for thermal physiology (*J. Appl. Physiol.* **27**, 439 [1969]). Because of the present status of this system in the biological sciences, the author and the reader are faced with certain problems. Many biologists are not used to employing terms like kilopascal for vapor pressure or $W/m^2 \cdot kPa$ for the coefficient of heat exchange by evaporation.

Throughout the book there is an emphasis on peripheral rather than central mechanisms of heat regulation in man, especially in relation to cardiovascular adaptations. Since the text deals exclusively with responses of the human organism to heat, a large section of the book is devoted to the

specific cutaneous cooling system of man. The present information on the regulation of sweating is adequately reviewed; particularly, problems related to the depression of sweat gland activity are discussed in detail.

An evaluation of the various indices of heat stress currently employed is the culmination of the earlier chapters. Though the thoroughness of the analysis is commendable, the fact remains that no one index will satisfy every possible condition, especially if one takes into consideration individual differences in size, shape, and physiological responses. In this respect a discussion of the location, density, and function of cutaneous thermal receptors would have added to the value of the monograph. It is a well-known fact that human subjects with similar measurable physiological responses to heat do not necessarily perceive a standardized thermal stress with the same intensity.

The scientific terminology used, the practical appendices, and the large number of references (431) should make this a useful book for scientists and engineers who are concerned with problems of man and his thermal environment.

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Bacteria

Spore Research 1971. Proceedings of a meeting, Harrogate, Yorks., England, Dec. 1970. A. N. BARKER, G. W. GOULD, and J. WOLF, Eds. Academic Press, New York, 1972. xiv, 370 pp., illus. \$17.

Sporeforming bacteria and bacterial endospores have been the subject of several recent books and review articles. Research on bacterial sporeformers has been published in the proceedings of the bacterial spore conferences that have been held each four years since the first international spore conference was organized by H. Orin Halvorson in 1956. This book is the first publication of the proceedings of the British Spore Group and invited foreign guests.

In light of the many recent and detailed reviews of this specialized field of research, it might seem that another book on the subject is unnecessary. However, this book is quite different in scope from previous research reviews. Much of the recent research has been directed toward studies of

bacterial sporulation, germination, and outgrowth as model systems for cellular differentiation, and these processes have been subjected to extensive analysis by biochemists and geneticists. The biochemical and structural bases for the dormant and resistant states of the spore have been similarly studied. These studies have for the most part concentrated on those species of the aerobic sporeforming bacteria more amenable to genetic and biochemical analysis in the laboratory. Studies of anaerobic sporeformers and researches of a more practical nature have received less attention, although they are of great importance to the health-related sciences and to the preservation industries. It is these that are the principal subject of the present book.

The book opens with a thoughtful review of the effects of oxygen on anaerobic sporeformers and the nature of obligate anaerobiosis. There are five papers and one abstract dealing with germination of clostridial spores. Several other papers cover the effects of pH, drying, various chemicals, and recovery temperature on the heat resistance and outgrowth of spores. All are of importance to applied microbiologists. Although these papers set the general theme of the book, there are several on other topics, including a series of three excellent papers describing the sporulation, spore structure, germination, and natural occurrence of thermophilic actinomycetes.

Actinomycetes resemble fungi by producing a mycelium, but in cytological features of the spore and in the sporulation process, as observed by electron microscopy, they have much in common with bacteria of the genera *Bacillus* and *Clostridium*. The spores of at least some species are as resistant to heat as the hardier bacterial spores and contain dipicolinic acid. Several other papers present studies of the fine structure of the spores, the chemistry and structure of parasporal inclusions, and taxonomy of sporeformers. A paper by P. D. Walker and his associates deserves special mention. These scientists have described attempts to locate spore components in ultra-thin sections of spores. It is unfortunate that the labeled antibody techniques described did not provide a conclusion concerning the intracellular location of dipicolinic acid, but there is reason for optimism that that day is at hand.

The major criticism of this book is that the title misrepresents the contents. Spore research in 1971 has brought

about exciting discoveries relating to transcriptional changes and several other biochemical events that are beginning to define the nature of the events which occur during the onset of sporulation. These studies are almost totally neglected in this book. The book is obviously of great value to applied microbiologists and those specifically interested in bacterial spores, but is not the best source of information for the general microbiologist interested in acquiring a broad understanding of recent advances in research on bacterial spores.

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Plant Pathogens

Phytotoxins in Plant Diseases. Proceedings of the NATO Advanced Study Institute, Pugnoli, Italy, June 1970. R. K. S. WOOD, A. BALLIO, and A. GRANITI, Eds. Academic Press, New York, 1972. xx, 530 pp., illus. \$26.50.

While this conference was in progress in Italy, in the United States southern corn leaf blight was spreading north to cause the greatest economic loss to a single crop in a single year ever recorded. In many respects, the 1970 corn blight epiphytotic was a replay of an epiphytotic that occurred two decades earlier, Victoria blight of oats. Each was caused by a new race of a fungus belonging to the genus *Helminthosporium* and in each case a metabolic product of the fungus was found to be selectively toxic to plants susceptible to the disease. Results with victorin, the toxin involved in Victoria blight of oats, reawakened interest in the role of toxins in plant diseases and stimulated much of the work reported in this volume.

The book is made up of 20 major papers and more than 30 brief contributions from approximately 60 participants. Most of these deal with the production, bioassay, chemistry, and mode of action of toxic metabolites produced by fungal and bacterial plant pathogens. A few are concerned with effects of toxins on host metabolism or ultrastructure and the remainder are devoted to a variety of special topics. Although errors occur (two were found in a random check of 40 literature citations) most of the articles are well written and adequately documented.

This volume should be valuable not only to plant pathologists but also to

those interested in the chemistry of natural products and in plant growth regulation. A large number of phytotoxins have recently been chemically characterized and some, for example fusaric acid, a diterpenoid glucoside produced by the almond pathogen *Fusicoccum amygdali*, appear to be active growth regulators. A better known example of a phytotoxin with growth regulating properties is, of course, gibberellin.

Readers searching for new concepts or stimulating discussions will be disappointed with this book. Most of the authors merely restate previously published views and positions. In a number of areas of controversy, only a single school was represented at the conference. This may account for the lack of spirited debate during the recorded open discussions. In one instance the editors note that the subject under discussion had already been covered adequately, and the same comment would have been appropriate in many other places. A sharper editorial pencil would have deleted the noninformative material. On balance, the book can be recommended as a useful reference.

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Preservation

Public Archeology. CHARLES R. MCGIMSEY, III. Seminar Press, New York, 1972. xiv, 266 pp. \$9.50. Studies in Archeology.

All of us, the public, are the stewards of the past. If we are to learn about the past and save any evidences of it for the future we must act now, for, as McGimsey points out in this book, "Our generation cannot postpone the decision to work toward this preservation, for the forces of destruction are multiplying and gaining momentum. The next generation cannot study or preserve what already has been destroyed." The future of the past is "public archeology."

The book is aimed at archeologists, legislators, and citizens concerned with the archeological heritage of their locality or state. A basic principle is proposed that "no individual may act in a manner such that the public right to knowledge of the past is unduly endangered or destroyed" for "no one owns rights to an archeological object or to archeological data," not even the

archeologist. We must aim toward establishing that principle if the past is to become a body of usable information rather than a hodgepodge of antiquities.

The first part of the book is devoted to a short description of archeological practices and to the responsibilities of the archeologist, the amateur archeologist, and the public concerning archeological sites, and ends with a view of the plight of archeology today.

The heart of the text consists of three sections containing very practical advice on designing a state archeological program and a state antiquities act. Here the author uses his firsthand experience in establishing the Arkansas Archeological Survey and obtaining the antiquities legislation in that state, both of which are the best in the nation.

More than two-thirds of the text is a sourcebook of state-by-state information collected for many years on the various archeological programs and local and state legislation. The last section is on federal legislation affecting archeological preservation.

The book should be required reading for all students of archeology, professional and nonprofessional. It is an invaluable source of information for archeologists, legislators, and the public interested in learning what programs in archeology are provided in each state and what legislation is available for the preservation of archeological resources and support of archeological projects.

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Photochemical Change

Photochemistry and Spectroscopy. J. P. SIMONS. Wiley-Interscience, New York, 1971. xiv, 344 pp. + plates. \$16.50.

Simons has written an interesting elementary book which will be useful to students who want to enter the field of spectroscopy and photochemistry or want to understand the conversation of peers who have done so. The book will probably find extensive use in introductory courses in the subject area, although I expect that most teachers will add more comprehensive supplementary texts chosen to suit focused interests within the broad field.

The first chapter, which is 25 percent