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 *p*H, 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