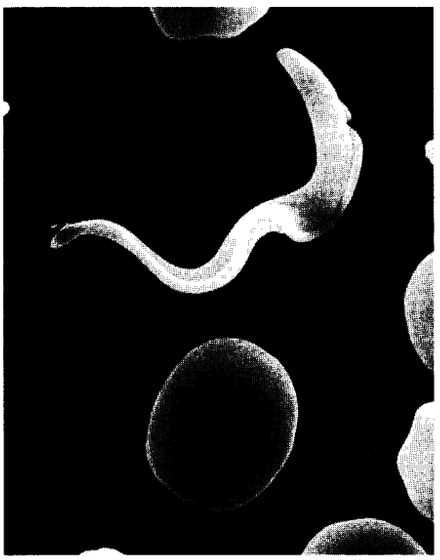

Scanning electron micrograph of *Trypanosoma brucei brucei* among red blood cells. [From *The Biology of Parasitism*; J. E. Donelson]

chapters include Warren's on the global impact of parasitic diseases, Nelson's on parasitic zoonoses, and Sher's on vaccination against parasites. Sher discusses the suggestion by Byron Waksman that parasite vaccine development may be best directed toward molecules against which little or no response is elicited rather than toward parasite antigens recognized by infected patients, and the discussion reveals considerable understanding of parasite immunology and the courage to argue against dogma. Similarly, the chapters by Butterworth on control of schistosomiasis and by Wang on parasite pharmacology present stimulating ideas as well as data.

Most of the remaining chapters in the volume concentrate on specific parasitic diseases such as amebiasis, trypanosomiasis, leishmaniasis, and toxoplasmosis and in many instances provide not only relevant information but also a rationale for the research cited. Surprisingly, there is no similar chapter on schistosomiasis, which generally receives scant attention in this volume, or on malaria, although the chapter on malaria genetics by Walliker raises important points about the spread of drug resistance. Many of the remaining chapters do not follow Waksman's example of giving a full discussion of vaccine strategy. Instead the chapters exhaustively discuss each author's favorite (usually surface) vaccine molecule. In some chapters, information is selectively presented, and some of it is already outdated.

A major strength of the Biology of Parasitism course is the exposure of its participants to the principles of molecular biology and immunology as well as to their application to specific parasites. This book attempts to cover both principles and specific applications, and it succeeds more in the former case than in the latter. This is a valuable book, however, deserving a wide readership, especially given the successes, and recent difficulties, in designing effective parasite vaccines.

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Bacterial Systems

Regulation of Procaryotic Development. Structural and Functional Analysis of Bacterial Sporulation and Germination. ISSAR SMITH, RALPH SLEPECKY, and PETER SETLOW, Eds. American Society for Microbiology, Washington, DC, 1989. xii, 304 pp., illus. $59; to ASM members, $45.

Because of their dormancy and ability to resist environmental extremes, bacterial endospores have been studied since the days of Cohn, Koch, and Pasteur, despite the fact that they are not routinely associated with outbreaks of infectious disease. The bizarre biological phenomenon of sporulation displayed by a few Gram-positive species has propelled *Bacillus subtilis* to a position of prominence because of its amenability to genetic analysis. With the development of sophisticated techniques of molecular biology, the realization that this cellular differentiation requires the precisely coordinated interplay of more than 100 genes and the utilization of this species as a host for cloning and expression of various foreign genes, molecular explanations of spore formation have ignited widespread interest.

After the tenth Spores Research Conference, the editors did not publish the papers presented at the meeting but put together this collection of overviews by 14 experts in exciting and rapidly developing specialties in the field. The editors have succeeded admirably in molding the chapters into a common format.

The collection gives lucid insights into the complicated process of sporulation and indicates important directions for further research. It also conveys how this prokaryotic phenomenon relates to a variety of developmental processes among other microbial species and higher organisms.

Some spore researchers justify their interest in the subject by the significance of sporulation to the preservation of foods. Gerhardt and Marquis give an up-to-date account of this aspect of the field.

Piggot provides the most current and extensive update of information on *B. subtilis* as a tool for genetic analysis by cataloging the more than 700 genetic markers now found on the chromosome (including at least 100 developmental loci). This chapter places special emphasis on the genes involved in germination and sporulation.

There is an attempt made throughout the book (and in considerable detail in a chapter by Youngman *et al.*) to illustrate innovative approaches to research to *B. subtilis*. This includes discussions of gene fusions, insertional mutagenesis, transposon tagging, special vectors for cloning, chimeric expression, and enhanced production of selected gene products. Foster and Johnstone discuss the fundamental concepts and the various research approaches used to analyze the mechanism triggering spore germination.

Early in the response to stress (before spore-specific antigens are synthesized), it is difficult to distinguish spore-specific events from those that would naturally be associated with the switch to stationary-phase metabolism. Three chapters focus on this part of the sequence: Sonenshein's on the metabolic regulation of sporulation and other stationary-phase phenomena; Valle and Ferrari's on the regulation and expression of subtilisin, one of the plethora of extracellular enzymes *Bacillus* populations elaborate, and of great industrial significance; and Dubnau's on genes accompanying the development of competence to actively take up high-molecular-weight DNA from the environment and to be transformed.

A particularly exciting development since the ninth Spores Conference has been the increasing number of discoveries regarding sigma factors, which coordinate the "cascade" of transcriptional events mediating each developmental change, as discussed in a chapter by Moran. This process is much more complex than originally envisaged, and these discoveries have triggered a search for similar regulatory molecules among other species.

It is now clearly established that the products of genes induced during heat shock, limitation of nitrogen or phosphate, chemotaxis, and osmoregulation in several Gram-negative species bear sensory and receptor components with striking similarities in structure and function to those playing pivotal roles in the sporulation process. These are all put into perspective in the chapter on the initiation of sporulation by Smith.

Sporulating bacteria undergo septation early in development to form the forespore (which eventually becomes dormant and acquires a multilayered protective coat) and the mother cell, which was once thought to direct spore synthesis. Three chapters related some of the excitement accompanying the realization that both genomes function in development and that different genes are

active concurrently in the two compartments. Setlow considers forespore-specific genes, Losick and Kroos dependence pathways for gene expression, and Stragier the temporal and spatial control of gene expression.

Some species of *Bacillus* have the unusual property of synthesizing a parasporal crystal within the mother cell concomitantly with spore maturation. Since these crystals are lethal to some insect species, their commercial significance has led to great interest in their structure as well as in the genetic mechanisms that govern their synthesis. Lereclus *et al.* provide an update on this topic.

Presenting a perspective on the discipline as a whole, the chapter by Chater draws parallels to the sporulating process in *Streptomyces*, a genus of vast economic importance since the earliest demonstration that the antibiotic these species elaborate has clinical use in treating all us higher eukaryotes.

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Books Received

Adoptive Cellular Immunotherapy of Cancer. Henry C. Stevenson, Ed. Dekker, New York, 1989. xiv, 242 pp., illus. $89.75. Immunology Series, vol. 48.

Adverse Reactions to Drug Formulation Agents. A Handbook of Excipients. Murray Weiner and I. Leonard Bernstein. Dekker, New York, 1989. x, 463 pp. $125. Clinical Pharmacology, vol. 14.

Aerosol Sampling. Science and Practice. James H. Vincent. Wiley, New York, 1989. xxii, 390 pp., illus. $180.

Album of Science. The Biological Sciences in the Twentieth Century. Merriley Borell. Scribner's, New York, 1989. xiv, 306 pp. $75.

Album of Science. The Physical Sciences in the Twentieth Century. Owen Gingerich. Scribner's, New York, 1989. xiv, 306 pp. $75.

Alcoholism. Biomedical and Genetic Aspects. H. Werner Goedde and Dharam P. Agarwal, Eds. Pergamon, Elmsford, NY, 1989. viii, 364 pp., illus. $60.01.

The Allometry of Growth and Reproduction. Michael J. Reiss. Cambridge University Press, New York, 1989. xvi, 182 pp., illus. $44.50.

Alternative Approaches to Lithic Analysis. Donald O. Henry and George H. Odell, Eds. American Anthropological Association, Washington, DC, 1989. xii, 256 pp., illus. Paper, $13.50; to AAA members, $10. Archeological Papers of the American Anthroplogical Association, no. 1. Based on a conference, Tulsa, OK, 1987.

Biotechnology in Europe and Latin America. Prospects for Co-operation. Bernardo Sorj, Mark Cantley, and Karl Simpson, Eds. Kluwer, Norwell, MA, 1989. xviii, 223 pp., illus. $69. Based on a seminar, Brussels, Belgium, April 1987.

Blacks, Science, and American Education. Willie Pearson, Jr., and H. Kenneth Bechtel, Eds. Rutgers University Press, New Brunswick, NJ, 1989. xxii, 174 pp., illus. $35.

Concepts and Conceptual Development. Ecological and Intellectual Factors in Categorization. Ulric Neisser, Ed. Cambridge University Press, New York, 1989. x, 317 pp. Paper, $18.95. Reprint, 1987 ed.

Coral Reefs of the World. Vol. 3, Central and Western Pacific. Susan M. Wells *et al.* International Union for Conservation of Nature and Natural Resources, Cambridge, U.K., 1988 (U.S. distributor, Columbia University Press, New York). 1, 329 pp., illus. $45.

Electronic Structure and Optical Properties of Semiconductors. Marvin L. Cohen and James R. Chelikowsky. 2nd ed. Springer-Verlag, New York, 1989. xii, 264 pp., illus. Paper, $39. Springer Series in Solid-State Sciences, vol. 75.

The Epidemiology of AIDS. Expression, Occurrence, and Control of Human Immunodeficiency Virus Type 1 Infection. Richard A. Kaslow and Donald P. Francis, Eds. Oxford University Press, New York, 1989. xiv, 359 pp., illus. $45.

Evolution and Animal Breeding. Reviews on Molecular and Quantitative Approaches in Honour of Alan Robertson. William G. Hill and Trudy F. C. Mackay, Eds. C.A.B. International, Wallingford, U.K., 1989. xii, 313 pp., illus. $84.

Evolution and Its Influence. Alan Grafen, Ed. Clarendon (Oxford University Press), New York, 1989. xiv, 130 pp., illus., + plates. $35. The Herbert Spencer Lectures 1986. Six papers on ideas of evolution in biology (A. J. Cain), sociology (W. G. Runciman), psychology (R. J. Herrnstein), social anthropology (M. Godelier), philosophy (B. Williams), and the arts (E. H. Gombrich).

Evolutionary Tinkering in Gene Expression. Marianne Grunberg-Manago, Brian F. C. Clark, and Hans G. Zachau, Eds. Plenum, New York, 1989. x, 275 pp., illus. $69.50. NATO Advanced Science Institutes Series A, vol. 169. From a workshop, Spetsai, Greece, Aug. 1988.

Les Explorateurs de la Santé. Voyage au Centre de la Recherche Médicale. Philippe Lazar. Editions Odile Jacob, Paris, 1989. 250 pp. Paper, 120 F.

Fibrewise Topology. I. M. James. Cambridge University Press, New York, 1989. x, 198 pp. $49.50. Cambridge Tracts in Mathematics, vol. 91.

Floods. Hydrological, Sedimentological and Geomorphological Implications. Keith Beven and Paul Carling, Eds. Wiley, New York, 1989. xii, 290 pp., illus. $85. British Geomorphological Research Group Symposia Series. From a workshop, Lancaster, U.K.

Olympus Utilisation Conference. (Vienna, Austria, April 1989). European Space Agency, Paris, 1989 (distributor, ESA Publications, Noordwijk, The Netherlands). xlii, 487 pp., illus. Paper, Dfl. 80.

On the Road to Worldwide Science. Contributions to Science Development. Michael J. Moravcsik. World Scientific, Teaneck, NJ, 1988. xxii, 551 pp., illus. $78; paper, $38.

Optical Processing and Computing. Henri H. Arsenault, Tomasz Szoplik, and Bohdan Macukow, Eds. Academic Press, San Diego, CA, 1989. xiv, 493 pp., illus. $59.50.

The Origin of the Solar System. The Capture Theory. John R. Dormand and Michael M. Woolfson. Horwood, Chichester, U.K., and Halsted (Wiley), New York, 1989. 230 pp., illus. $49.95. The Ellis Horwood Library of Space Science and Space Technology.

Our Mother-Tempers. Marion J. Levy, Jr. University of California Press, Berkeley, 1989. xx, 253 pp. $25.95.

Perspectives on Particle Physics. From Mesons and Resonances to Quarks and Strings. S. Matsuda, T. Muta, and R. Sasaki, Eds. World Scientific, Teaneck, NJ, 1989. xiv, 406 pp., illus. $78.

Phänomenologie der Mathematik. Elemente einer Phänomenologischen Aufklärung der Mathematischen Erkenntnis nach Husserl. Dieter Lohmar. Kluwer, Norwell, MA, 1989. viii, 244 pp. $84. Phaenomenologica, vol. 114.

Photography in Archaeology and Conservation. Peter G. Dorrell. Cambridge University Press, New York, 1989. x, 262 pp., illus. $39.50. Cambridge Manuals in Archaeology.

Photochemical Energy Conversion. James R. Norris, Jr., and Dan Meisel, Eds. Elsevier, New York, 1989. x, 366 pp., illus. $75. From a conference, Evanston, IL, July-Aug. 1988.

Photon Defined, Special Relativity Refuted, Electron Self-Field Stabilized. John Frank Johnson. Royal, Roanoke, VA, 1989. iv, 124 pp., illus. Paper, $50.

Physical Properties of High Temperature Superconductors. Vol. 1. Donald M. Ginsberg, Ed. World Scientific, Teaneck, NJ, 1989. x, 516 pp., illus. $84; paper, $48.

The Physics of Ionized Gases. L. Tanović, N. Konjević, and N. Tanović, Eds. Nova Science, Commack, NY, 1989. x, 728 pp., illus. $145. From a symposium, Sarajevo, Yugoslavia, Aug. 1988.

Pictorial Human Embryology. Stephen G. Gilbert. University of Washington Press, Seattle, 1989. xii, 172 pp. Paper, $20.

Plant Canopies. Their Growth, Form and Function. G. Russel, B. Marshall, and P. G. Jarvis, Eds. Cambridge University Press, New York, 1989. x, 178 pp., illus. $47.50. Society for Experimental Biology Seminar Se-