

freezing cold water by adding antifreeze to their systems.

As Peter Hochachka points out in his preface, three clear themes (or biases) are evident in this book. First, the biochemists and physiologists who wrote the chapters share an interest in principles of function that are universally applicable. Second, instructive variations on the universal functions appear in diverse species in similar environments and in similar species in diverse environments. Finally, most of the authors share the conviction, made familiar by Krogh, that the organism itself may be a valuable experimental parameter for illuminating particular biological problems.

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## Cell Biology

**Cell Motility.** Mechanism and Regulation. HARUNORI ISHIKAWA, SADASHI HATANO, and HIDEKI SATO, Eds. Liss, New York, 1986. xiv, 627 pp., illus. \$96. From a conference, Nagoya, Japan, Sept. 1984.

This book is the proceedings of a satellite conference of the third International Congress on Cell Biology. Its main merit for a North American and European audience is its strong Japanese flavor. The study of cell motility has many roots in Japan, and 29 of the 48 papers are from Japanese laboratories. The broad title of the book notwithstanding, the focus of the contributions is on the actin-based cytoskeleton and on mitosis. More precisely, the book focuses on primitive motile systems, with more than half the contributions dealing with organisms other than animals, in keeping with the significant interest Japanese workers have taken in such systems as models for higher organisms.

The volume is divided into six sections: Molecular Interaction of Actin and Myosin, Actin Regulatory Proteins, Cell Models for Movement, Cytoskeletal Involvement in Cell Division, and Structural Integrity of Microfilament System I and II, the last of these being a catchall. As an introduction, Ebashi writes an interesting and revealing personal account of the history of the study of muscle regulation. On the other hand, Bennett's summation is inappropriate to the book because of its esoteric treatment of the field and because his perspective is out of keeping with the rest of the volume. However, the editors have made the text very readable, with few typographical errors, and a good subject index has been provided.

The book makes an elegant case for the continued usefulness of primitive motile systems as models for study. Representatives of two major American laboratories, those of Korn and Pollard, present complementary general discussions of the mechanism of actin polymerization and *Acanthamoeba* actin-binding proteins, showing how much detailed biochemical information, similar to that found for higher systems, can come about from study of such a lowly organism. These papers are complemented by those of Sutoh *et al.*, Hatano *et al.*, and Isenberg *et al.*, who report on specific actin-binding proteins from other lower organisms. There are also many papers on vertebrate muscle and non-muscle myosin, actin, and the associated proteins, ranging from a nice report on conformational effects of light-chain phosphorylation on myosin by Onishi to reports on caldesmon, cofilin, gelsolin, and actinogelin. For me, one of the more exciting and novel reports (even though it is over two years old) is Higashi-Fujime's demonstration that movements of myosin filaments along unidirectional actin bundles can be visualized in vitro by dark-field microscopy. This line of investigation is now being actively pursued by several groups.

One strength of the volume is the large number of reports on the motile behavior of intact cells or cell fractions. These papers point out how far we still have to go to bridge the gap between the biochemistry of specific proteins and the events it underlies. Kamiya's report on the symmetrical oscillatory contractions of isolated plasmodial strands of *Physarum* is fascinating and raises many questions about the regulation of contraction and relaxation. Equally good reports on streaming in *Characeae* (Shimmen and Tazawa) and *Acetabularia* (Nagai and Fukui), movement of *Physarum* (Hatano), models of *Physarum* (Wohlfarth-Bottermann), axonal transport in squid axons (Allen and Weiss), and pigment movement in fish melanophores (McNiven *et al.*) make this section on cell behavior worthwhile reading. Again, the questions raised by such reports underscore the fact that our knowledge of the individual players is not matched by our knowledge of the rules of the game being played.

The section on cell division is highlighted by fantastic microscopic images, as is appropriate to the study of mitosis. This enigmatic problem has traditionally been approached by such methods, and good examples are present. The description of new mitosis-arresting drugs by Sato *et al.* may open up new avenues of research, whereas the direct experiments of Izutsu and Yoshida on the effects of microinjected dynein antibodies on mitosis may close a few doors.

The last sections of the book are dedicated primarily to actin bundles within cells. Particularly useful reports are those on stress fibers in situ by Ishikawa's and Fujiwara's groups and on the dynamics of stress fiber organization by Sanger *et al.* An exciting report by Owaribe and Masuda on the isolation of a contractile circumferential ring of actin found in retinal pigmented epithelial cells underscores their functional importance.

The papers in this book illustrate the wide range of problems approached and systems used in the study of cell motility. As in any proceedings volume there is unevenness in detail, but as a whole the volume is excellent. This is a volume that would be useful to both the biochemist and the morphologist because it emphasizes the strength and complexity of both approaches.

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## Books Received

**Automatic Control in Space 1985.** J. P. Chretien, Ed. Published for the International Federation of Automatic Control by Pergamon, New York, 1986. x, 314 pp., illus. \$68.75. IFAC Proceedings Series, 1986, no. 2. From a symposium, Toulouse, France, June 1985.

**Averting Catastrophe.** Strategies for Regulating Risky Technologies. Joseph G. Morone and Edward J. Woodhouse. University of California Press, Berkeley, 1986. x, 215 pp., illus. \$17.95.

**Behavior, Health, and Environmental Stress.** Sheldon Cohen *et al.*, Plenum, New York, 1986. x, 284 pp., illus. \$27.50.

**The Collins Encyclopedia of Animal Behaviour.** Peter J. B. Slater, Ed. Collins, London, 1986. xvi, 144 pp., illus. £9.95.

**The Collins Encyclopedia of Animal Biology.** R. McNeill Alexander, Ed. Collins, London, 1986. xvi, 144 pp., illus. £9.95.

**The Collins Encyclopedia of Animal Ecology.** Peter D. Moore, Ed. Collins, London, 1986. xvi, 144 pp., illus. £9.95.

**A Colour Atlas of Insect Tissues.** Via the Flea. Miriam Rothschild, Yosef Schleim, and Susumo Ito. Wolfe, London, 1986. 184 pp. £40.

**Compendium of Post Accident Heat Removal Models for Liquid Metal Cooled Fast Breeder Reactors.** B. D. Turland and J. Morgan, Eds. Published for the Commission of the European Communities by Harwood Academic Publishers, London, 1985 (distributor, STBS, London). pp. 1003-1418, illus. Paper, \$12. European Applied Research Reports, Nuclear Science and Technology Section, vol. 6, no. 5 (1985).

**Components of Scientific Instruments and Applications of Computers to Chemical Research.** Bryant W. Rossiter and John F. Hamilton, Eds. Wiley-Interscience, New York, 1986. xiv, 834 pp., illus. \$150. Physical Methods of Chemistry, 2nd ed., vol. 1.

**Computer Applications in the Polymer Laboratory.** Theodore Provder, Ed. American Chemical Society, Washington, DC, 1986. x, 323 pp., illus. \$69.95. ACS Symposium Series, 313. Based on a symposium, Miami Beach, FL, April 1985.

**Computers in the Classroom.** Henry S. Kepner, Jr., Ed. 2nd ed. National Education Association Professional Library, Washington, DC, 1986. 175 pp., illus. Paper, \$10.95.

**The Consequences of Chromosome Imbalance.** Principles, Mechanisms, and Models. Charles J. Epstein. Cambridge University Press, New York, 1986. xxii, 486 pp., illus. \$59. Developmental and Cell Biology Series, 18.