the excitement of a scientific paradigm shift in progress. As Lane illustrates, mitochondria are involved in a startling range of biological processes and, by our current understanding, these processes appear to be disconnected. Mitochondrial biology is still in a Ptolemaic state of epicycles within epicycles, and a Kepler is needed to reveal the underlying simplicity. I doubt that the particular ideas in this volume will stand the test of time, but the true explanation will be just as audacious as Lane's is.

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Annual Review of Cell and Developmental Biology. *Volume 22: 2006.*

Edited by Randy Schekman, Larry Goldstein, and Janet Rossant. Palo Alto (California): Annual Reviews. $85.00. xvi + 795 p; ill.; subject index and cumulative indexes (contributing authors and chapter titles, Volumes 18–22). ISBN: 0-8243-3122-2. 2006.

System Modeling in Cellular Biology: From Concepts to Nuts and Bolts.

Edited by Zoltan Szallasi, Jörg Stelling, and Vipul Periwal. A Bradford Book. Cambridge (Massachusetts): MIT Press. $50.00. xiv + 448 p; ill.; index. ISBN: 0-262-19548-8. 2006.

Systems biology is a field that has a coherent mission, but no dominant approach. The mission is to develop a deep understanding of the systems that comprise living organisms (e.g., metabolism, cell division, and gene regulation) to such an extent that they become quantitatively predictable, thus bringing biology into the realm of the physical sciences. Along with satisfying our intellectual curiosity, this predictability will aid us in designing drugs, combating disease, and engineering biology. As cellular biology has become better understood, and computers have become more powerful, computational modeling has become an important tool for investigating systems biology hypotheses.

This book describes various approaches toward a systems-level understanding of cellular biology, along with some of the accomplishments. Many chapters of this multiauthor volume are written by the innovators of the field. Each chapter can stand alone, but they are also coordinated nicely to yield a coherent overview of systems biology modeling.

The book is separated into four sections. The first, General Concepts, presents some of the big-picture ideas that are being considered by researchers. For example, it appears that biological systems evolve robustness to frequent disturbances, but that this necessarily implies fragility to rare disturbances. Also, most biological systems are found to be at least somewhat modular, much like engineered ones, although the implications of modularity remain as open questions. The next section, Modeling Approaches, presents modeling methods that work at different levels of detail. These range from stoichiometric modeling, which is a powerful approach for studying metabolic networks, to methods that directly address both the spatial organization of cells and the randomness that naturally arises from the small numbers of individual transcripts and proteins. A chapter on the qualitative analysis of genetic regulatory networks provides a very clear presentation of how to simplify a differential equation network representation to a Boolean network, and then to graphs. The next section, Models and Reality, focuses on the unavoidable mismatch between the biological data (with which theorists would like to work) and the experimental data that are actually measured. Finally, Computational Modeling presents some details about computational tools, including algorithms and the computer-readable Systems Biology Markup Language.

As is typical of many multiauthor books, this one varies significantly from chapter to chapter. Some will inspire readers to wonder about the great questions of biology, others will teach how to conduct research in the field, and yet others will describe the types of research that are currently being investigated to anyone who is assumed to be an outsider. My only disappointments were that a few of the chapters covered too much material with insufficient explanation. This volume should appeal to biologists who are reasonably comfortable with mathematics, or to physical scientists who have a basic knowledge of biology. Whether for graduate students or researchers, this book provides an excellent introduction to systems biology modeling.

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GENETICS & EVOLUTION

Parsimony, Phylogeny, and Genomics.

Edited by Victor A Albert. Oxford and New York: Oxford University Press. $124.50 (hardcover); $60.00 (paper). ix + 229 p; ill.; index. ISBN: 0-19-856493-7 (hc); 0-19-929730-4 (pb). 2005.

The editor has compiled a volume in honor of Steven Farris, the eminent systematist at Uppsala University and formerly of Stony Brook Univer-