

of these methods (such as protein immunology, DNA-DNA hybridization, and restriction analyses) have all had their day to be sure, but they have since long gone the way of the dodo. When I lecture about them it is for historical interest and to enable students to understand the older literature, but I cannot help the impression that they always look at me as if I were a much older man, older than I am and feel. Newer genomic techniques—such as microarrays and quantitative trait loci (QTL)—that are being increasingly used also in an evolutionary context to discover new gene interactions and in attempts to find the genes that underlie phenotypic (possibly selection relevant) traits would have been useful additions instead.

In the phylogenetics section, expanded coverage of maximum likelihood and Bayesian methods would have added to the strength and recency of this desktop reference. But graduate students are likely to know Joseph Felsenstein's volume, *Inferring Phylogenies* (2004. Sunderland (MA): Sinauer Associates), or recent reviews of these methods anyhow, so not much is lost here.

Anyone working in natural history, evolution, organismal biology, and behavioral ecology will want to read this "what-has-been-and-what-can-be-done" book.

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Edited by John M Hancock and Marketa J Zvelebil. Hoboken (New Jersey): Wiley-Liss. \$99.95. xxiii + 636 p; ill.; author index and index of entries. ISBN: 0-471-43622-4. 2004.

BIONANOTECHNOLOGY: LESSONS FROM NATURE.

By David S Goodsell. Hoboken (New Jersey): Wiley-Liss. \$79.95. xii + 337 p; ill.; index. ISBN: 0-471-41719-X. 2004.

This insightful and well-written volume covers the emerging field of bionanotechnology from the point of view that biology already does quite a good job of constructing nanometer scale machines, and that the study of natural biomolecular systems can reveal much that is useful to the nanotechnologists of today and tomorrow. The author alternates between the engineering view—how can we manipulate these systems and what can be achieved by controlling them—and the scientists' explanations of the current state of our understanding of the

natural systems. The book addresses questions such as: What would we like to achieve in nanoeengineering? How does biology perform similar tasks? How can we alter biosystems or learn from them to reach our goals?

Nearly three-fourths of the book is dedicated to descriptions of natural bionanomachines, which include proteins, nucleic acids, and lipid assemblies, plus separate chapters on the structural and functional principles of biomacromolecules. The remainder of the book focuses on recent advances in protein engineering, medical applications of synthetic nanoassemblies, self-assembling peptide and nucleic acid nanostructures, and a host of future applications of artificial nanomachines. At the end of many sections, the author provides bulleted lists that quickly summarize fundamental points, especially bridges between existing natural and potential artificial systems. Essential characteristics and control points of natural systems that could be exploited to achieve desired goals are emphasized.

Like Goodsell's landmark work *The Machinery of Life* (1993. New York: Springer-Verlag), which graphically illustrates not only the scale and shape of biomolecules, but also the crowded state of the cell interior, the illustrations in *Bionanotechnology* will make readers feel present within the molecular realm like a tourist riding along in the viscous, churning mixture that is the cytoplasm of living cells. The well-drawn, space filling depictions simplify complex macromolecular structures to their important essence and provide sufficient information to glean critical points without overwhelming readers with unnecessary detail. Should one shrink suddenly down to the macromolecular level, this volume would serve as a useful field guide to the molecular beasts one would encounter on such a sub-Lilliputian holiday, as well as a survival guide of how to make proper use of them.

The book is appropriate for engineers and materials scientists without a great deal of previous study in the biological sciences. It will quickly bring intelligent readers up to speed on the most important aspects of bionanomaterials. It also serves as a useful review for anyone familiar with molecular biological systems. The volume frames important aspects of biomolecular machinery in terms of the significant engineering challenges that lie ahead on the road to realization of the promises of nanomedicine and other future applications of bionanotechnology. I enthusiastically recommend this timely and well-written book on this important, emerging field.

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