Vignettes: Functional Revisions

I was recently in the Périgord and purchased a flint blade made using upper Paleolithic techniques from a craftsman in Les Eyzies, near the Font-de-Gaume cave. In his mid-forties, with a horned callus half an inch thick on his right hand from hefting his hammer, an elk leg bone, he may be the singular member of our species who has made the largest number of flint artifacts in the past 60,000 years. But even he is making his living in a new niche—hammering flint for sale to the tourists awestruck by the Cro-Magnon habitat of our ancestors.

—*Stuart Kauffman*, in *At Home in the Universe: The Search for the Laws of Self-Organization and Complexity* (Oxford University Press)

Whenever a designed object is superseded by other methods and removed from daily use, it enters a new category. Engineers' slide rules began to be replaced by calculators in the early 1970s. One of my favourite photographs . . . showed more than six hundred engineers' slide rules stuck into the ground around a neighbour's lawn, forming a tiny, sardonic, white picket fence. When I asked about it, my neighbour's wife said, "We bought these slide-rules for one dollar for a barrel of them and used all six hundred."

—*Victor Papanek*, in *The Green Imperative: Natural Design for the Real World* (Thames and Hudson)

telomeres and aging and tumor telomeres go on to explain why clinicians are now so interested in telomeres and telomerase. De Lange provides an excellent perspective on the contribution of telomeres to tumorigenesis. She does not merely discuss the relationship between telomerase activity and cancer but includes sections on the structure and dynamics of tumor telomeres and the contribution of telomere loss to genetic instability and hence to malignant transformation.

Just in case the reader begins to get the impression that telomere biochemistry is nearly all worked out, the book ends with a provocative chapter on *Drosophila* telomeres by Mary Lou Pardue. Pardue points out that not all telomeres are the same: in fact *Drosophila* telomeres are made of retroposons instead of the short tandem repeats synthesized by telomerase. The unusual organization of *Drosophila* telomeres illustrates how telomeres can be maintained by a variety of mechanisms. This important concept must be borne in mind by people who want to kill cancer cells by simply inhibiting telomerase. This chapter is a very suitable end to the book, as it serves to remind us that, as usual, nature is more complex than we could ever have imagined. Despite the huge advances that have been made, we still have a long way to go before we fully understand telomeres.

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Simulation Methods

Computer Modelling in Molecular Biology. JULIA M. GOODFELLOW, Ed. VCH, New York, 1995. xvi, 243 pp., illus. $115.

In her preface Julia Goodfellow characterizes this book as providing "a series of snap-shots of the use of molecular simulation techniques to study a wide range of biological problems." In fact the book might more appropriately have been entitled "Computer Simulations of Molecular Systems." It is written for computational chemists and molecular modelers who are familiar with computer simulation of macromolecules and is not a book for the representative molecular biologist who is engaged in analysis of sequence data and worries more about restriction sites and cell lines than algorithms and CPUs.

The first chapter presents a brief description of computer simulations, referencing many original publications. The book focuses on the potential-energy–based techniques for molecular modeling.

Chapter 2 contains a concise introduction to the modeling of protein structures. This chapter was written to highlight the difficulty of protein structure prediction, making the case that there are several levels of structure prediction and that in some cases it may not be possible to predict more than secondary structure reliably. In the following chapter there is a succinct description of molecular dynamics simulations of peptides focused on conformational studies. The numerous references provided make this chapter especially useful for those interested in methods for studying peptide conformations. Protein molecular dynamics is explored in the next chapter by Shoshana Wodak and co-workers. This chapter provides a comprehensive description of how molecular dynamics techniques are used to study protein structure and the events associated with unfolding, including an example of the free-energy perturbation method.

In the next two chapters molecular dynamics is used to study the functional mechanisms of biological molecules, with the focus in one case on nucleic acid oligomers and in the other on ion transport for the gramicidin A channel. Theory and methodology are expounded in sufficient detail to expose the reader to the challenges of these approaches.

The last two chapters differ in character from the other six. One reports on protein modeling to study peptide binding to the major histocompatibility complex (MHC) and seems more concerned with the biochemistry of MHC than with the methods used. The other is focused on a potential-energy–based method, called PEM (path energy minimization), for studying conformational transitions in macromolecules that appears to be a recent development and would not be a technique routinely available to most computational chemists.

The computational chemist will find this book an attractive acquisition, while the molecular biologist may wonder at the choice of title.

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Books Received

The Anatomy and Physiology of the Mammalian Larynx. D. F. N. Harrison. Cambridge University Press, New York, 1995. xii, 288 pp., illus. $74.95.

Brainscapes. An Introduction to What Neuroscience Has Learned about the Structure, Function, and Abilities of the Brain. Richard M. Restak. Hyperion, New York, 1995. vii, 149 pp., illus. $19.95.

Climate Change 1994. Radiative Forcing of Climate Change and an Evaluation of the IPCC IS92 Emission Scenarios. J. T. Houghton *et al.*, Eds. Published for the Intergovernmental Panel on Climate Change by Cambridge University Press, New York, 1995. viii, 339 pp., illus. $59.95; paper, $24.95.

Dream Reaper. The Story of an Old-Fashioned Inventor in the High-Tech, High-Stakes World of Modern Agriculture. Craig Canine. Knopf, New York, 1995. xiii, 305 pp., illus. $25 or $C35.

Effects of Atomic Radiation. A Half-Century of Studies from Hiroshima and Nagasaki. William J. Schull. Wiley-Liss, New York, 1995. xvi, 397 pp., illus. $45.

Symmetry through the Eyes of a Chemist. István Haragittai and Magdolna Hargittai. 2nd ed. Plenum, New York, 1995. xiv, 469 pp., illus. $85.

T-Cell Signaling of Macrophage Activation. Cell Contact-Dependent and Cytokine Signals. Richard D. Stout and Jill Suttles. Springer, New York, and Landes, Austin, TX, 1995 (distributor, CRC Press, Boca Raton, FL). viii, 189 pp., illus. $79. Molecular Biology Intelligence Unit.