Part I is devoted to the conformation of biopolymers, with general considerations on intermolecular forces illustrated by an extended review on the conformation of nucleic acids. The chapter on nucleic acids, which covers Michel Daune's principal interest, is an excellent theoretical introduction to that important topic which makes the link between molecular biophysics and molecular biology. The next chapter is a less developed discussion on protein conformation. Perhaps because of lack of space, Michel Daune has left out the structure of membrane proteins. It is true that much less is known presently on the structure of hydrophobic proteins than on soluble proteins. However, it is the object of many modern studies in biophysics and illustrate quite well general principles on hydrophobicity. Part II of the book is devoted to the dynamics of biopolymers with a theoretical section and a review of a few experimental approaches, from which NMR has been excluded because it would be too complicated to summarize. As suggested in the title of this manual, dynamics of biological macromolecules is as important as their structures. Life requires movement. Michel Daune has rightly emphasized this aspect. The third part gives an overview about polymer hydration, also a very general and fundamental problem in biophysics. This allows Michel Daune to tackle the problem of amphipaticity and to give some insights onto lipid organization in an aqueous medium. The membrane community, to which I belong, will complain, of course, about the quasi-absence of a real membrane section in this book. To illustrate this weakness, it is interesting to note that the index contains neither the word "membrane" nor the word "phospholipid." Of course, it is reasonable that the author of a book develops the topics he is more familiar with; but the title of the book has to be adjusted in consequence.

Part IV is a more extensive study of polymer-ion interactions. Michel Daune presents in an understandable way the various theories underlining polyelectolytes interactions with macromolecules as well as ion conductivity through membranes. This is an important general topic of molecular biophysics. Finally, the last part of the book deals with the general theme of association between molecules; it includes classical theories of enzymology, but leaves out the difficulties associated with reactions taking place in the inhomogenous environment that prevails in cells.

The book contains some developments written in the form of exercises, and each section is completed by a small bibliography, which is quite useful, although of course the reader will not find the most recent references. A mathematical appendix is added at the end. Indeed, this book, although designated first for biochemists and biologists, deals with some concepts of physics requiring a minimum of mathematical formalism. Throughout the book, figures, including structure representations, are in black and white, which is not the most attractive type of presentation but is certainly the cheapest. A book written in French suffers from a lower impact than an English written manual and, therefore, economy is necessary.

In summary, Michel Daune's book is a useful reference book for students and researchers, who will find the physical basis of most problems of molecular biology. Perhaps Michel Daune should have associated his effort with that of one or several other contributors to present a complete view of the field. Nevertheless, provided one reads French, I recommend having this book on the shelf.

Muscle Contraction by Clive R. Bagshaw

Chapman & Hall, New York, 1993. 155 pages. $27.50

Reviewed by Vincent A. Barnett, Department of Physiology, University of Minnesota Medical School

The first edition of "Muscle Contraction" by Clive Bagshaw was written as part of an outline series in biology and limited to 80 pages. Despite these limitations, Dr. Bagshaw created a book that was a marvel in its concise yet remarkably up-to-date distillation of the state of the field at that time. The book gave a clear exposition of the basic structural, biochemical, and mechanical features of muscle cells. It also outlined the major theories concerning the coupling of muscle biochemistry to function, and the experiments that led to and/or supported these models. That slim volume was a great aid to instructors and students, because it provided an easily digested basis set of information for those interested in the study of the molecular mechanism of muscle action. With the second edition, Chapman & Hall have given Dr. Bagshaw a little more room to work with his material, yet he has resisted the temptation to generate an unwieldy tome. Instead, the new volume clings to the spirit of the first edition by presenting the updated material in a clear and minimalistic fashion. Although the page count has nearly doubled, the current edition of "Muscle Contraction" can hardly be described as massive, especially considering the breadth of material covered. In blending the new material into the framework of the previous edition, Bagshaw has continued to follow the shortest path to the exposition of the fundamental concepts and critical experiments.

In the decade between the first and second editions, new sarcomeric proteins have been identified, and significant new advances have been made concerning the structures of actin and myosin as well as the techniques used to examine their interactions. All of this has been placed its proper context in the second edition. The relatively new data from the crystal structure of G-actin and the implications of this data in the structure of F-actin are clearly described. Given Bagshaw's gift for clarity, it is almost a disappointment that the distribution of this book began just before the publication of the structure of the myosin head (Rayment et al. *Science.*

1993. 261:50–58). It would have been beneficial to examine the features of both the actin and myosin structures and the model for their interaction (Rayment et al. *Science*. 1993. 261:58–65) in the same textbook.

Given that an economical style has been employed, there are sections where the reader might want more information than is provided. In discussing the ability of vanadate to stabilize a myosin nucleotide complex, the only reference I found was to vanadate photo-cleavage paper, with no references to papers that establish the biochemical effects of vanadate on myosin (e.g., Goodno and Taylor. 1981. *Proc. Natl. Acad. Sci. USA*). 79:21–25) or the mechanical effects of vanadate in muscle fibers (e.g., Dantzig and Goldman. 1985. *Biophys. J.* 86:305–327).

Of considerable utility is the manner in which the rudimentary principles of many of the physical techniques used to study muscle are explained. X-ray diffraction, electron spin resonance, the use of caged nucleotides, and in vitro motility are clearly outlined so that the nonspecialist can get more out of papers from the literature.

For a small book covering a large field, the use of jargon seems to have been kept to a minimum. In most cases, each new term is accompanied by a clear definition. As in the first edition, there is specific reference material at the end of each chapter, annotated to include a thumbnail sketch of what the reader will find in each paper. A general reference section is found at the end of the book along with a very useful appendices containing general physiological data on muscle fibers and the sizes and proposed functions of the major muscle proteins.

The second edition includes two new chapters. "Mechanochemical coupling" (Chapter 7) was a subsection of the chapter on the "Molecular Basis of Contraction" (Chapter 6, volume 1) in the first edition. The expansion of this section of the book provides a more fitting discussion of a principle focus of modern muscle research. A completely new and completely warranted chapter in the second edition is the chapter on in vitro motility assays (Chapter 9). This technique has emerged as a major tool for the study of actin-myosin interactions during the past decade. Variations of the technique have provided important evidence for the minimum size of the myosin motor domain and the influence of actin polarity on the direction of myosin movement. In vitro motility is also providing crucial information relating to the quantitation of the magnitude of the force and the step-size of a myosin molecule per ATP hydrolyzed.

The final chapter of both the first and second volumes is on "Problems and prospects." It was gratifying to note that there has been progress made on a couple of the major problems listed in the first edition. Crystal structures of G-actin and the myosin head are leading to more precise molecular models for the interaction of these proteins in muscular contraction. Molecular biological techniques are beginning to unravel some of the mysteries of muscle development and muscle abnormalities. However, as Bagshaw has clearly surmised, the advances of the past decade have more sharply defined the questions that take us into the next. Is the coupling between the ATPase of myosin and force production tight or weak? What are the conformational changes that allow for the conversion of chemical energy into mechanical work?

This book is perhaps the first reference source that should be handed to a beginning student in a muscle laboratory. By using examples from the original literature, Bagshaw leads the student away from classical textbook descriptions of rigid oar-like crossbridge interactions towards more up-to-date models that are in tune with the dynamic properties of the myosin crossbridge. The current edition of "Muscle Contraction" has brought the field up-to-date again, and when the answers to Dr. Bagshaw's current questions are available, the next edition will provide a clear distillation of the advances in the study of muscle contraction.

Malignant Hyperthermia: A Genetic Membrane Disease by S. T. Ohnishi and T. Ohnishi

CRC Press, Boca Raton, FL, 1994. 331 pages. $129.95 cloth

Reviewed by Charles F. Louis and James R. Mickelson, Department of Veterinary Biology, University of Minnesota

Malignant Hyperthermia: A Genetic Membrane Disease, a volume in the CRC series "Membrane-Linked Diseases," provides an account of this interesting inherited skeletal muscle syndrome of humans and pigs. Malignant hyperthermia is characterized by a rapid elevation in body temperature and muscle rigidity after exposure to halogenated volatile anesthetics. Unless promptly treated with the skeletal muscle relaxant dantrolene, death quickly follows. In one respect, this volume is a timely review of this subject because the molecular basis for this disease in the pig has been defined and research into the more heterogeneous syndrome in humans is generating great interest. Studies by a number of groups, including one of the editors (S. T. Ohnishi), initially identified an abnormality in some aspect of the process of sarcoplasmic reticulum Ca^{2+} release in the muscle of malignant hyperthermia susceptible pigs. This has ultimately led to the definition of a mutation in the sarcoplasmic reticulum Ca^{2+} release channel as being highly linked to malignant hyperthermia in pigs as well as a number of human families.

This book is divided into five major sections and starts with a poignant set of vignettes from malignant hyperthermia-susceptible families. The hard work and enthusiasm of such people led in 1981 to the establishment of