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Book Review: *Fractal Physiology*

Fractal Physiology. James B. Bassingthwaighte, Larry S. Liebovitch, and Bruce J. West, American Physiological Society Methods in Physiology Series, Oxford University Press, New York, 1994. ISBN 0-19-508013-0.

This is an important and timely book that is conceptually sound, logically organized, and well written. The authors of this book have probably done as much as anyone in pioneering fractals in biology. This volume should have significant appeal and interest to two groups. The first, for which it is (presumably mainly) aimed, is the biological (including biomedical and biophysical) science community which wants and needs a solid introduction to the general ideas and methods of fractals as applied to familiar themes, and that is not (for them) mathematically oppressive. The second group, which may include readers of this journal as well as others who would like a broad presentation of those areas of biology where the concepts of fractals have been usefully applied. In this context, this book has the potential for building needed bridges between these groups and should be generally welcomed.

There is one area in which this volume is to be especially credited, and that is in an emphasis in research areas where the data are not obviously amenable to fractal analysis, but, where done, provides useful insights. An example is in the analysis of single-channel conductance experiments. Historically, data from such experiments were treated in terms of Markov process models; however, by the 1980s, it was becoming clear that such models were in danger of crashing under the weight of their superabundant states and rate constants. Fractal analysis, particularly by the second author of this volume, provided alternate and interesting points of view. The central issues are not yet resolved, but a singular service has been performed in this important area.

One could quibble that the title of this book is too restrictive, since it in fact casts a broader net than is implied by the term "physiology" and includes emphases on basic concepts, structure, kinetics, models, etc. A possible criticism of the book is in the handling of the bibliography,

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which apparently has been somewhat less than meticulous. For example, a number of references cannot be found as cited. Also, it is unfortunate that the book is a casualty of its own timing. Some of the most interesting and important uses of fractals, namely the relevance of long-range correlations in biological data (in, for example, cardiac physiology and DNA coding) were only emerging as this book was written and get little mention. In fairness, however, one cannot hope any text dealing with such a rapidly expanding field as fractals in biology to be completely up to date. But, these can be corrected in what hopes will be future revisions.

Finally, the American Physiological Society is to be congratulated for its continuing support of books such as this that provide its membership (and others) with valuable and useful information.

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