that contain some altogether sensible advice, most of which amounts to a rejection of serious departures from past approaches. What is new and concrete in the book thus amounts to careful statements of the case for pessimism. As compared with this pessimism, the introductory and concluding chapters by the editors contain not so much a mid-course correction as a dismissal of most proposals for changes of course.

Richard K. Betts and Paul Bracken offer succinct versions of the cases they have developed elsewhere. Can we be sure of avoiding an enemy's surprise attack without running the risk of responding too violently to false alarms? Fen Osler Hampson and Francis Fukuyama offer detailed summaries of the threats posed by the European Central Front and the countries of the Middle East. One hopes that the abundance of oil has decreased the tensions and risks in the Middle East, but worries about the area remain plausible enough. The risk of nuclear escalation in South Korea gets somewhat less coverage in the book. Stephen Meyer offers a well-researched overview of Soviet views on nuclear escalation, although it is hardly clear that the debates about what the Soviets expect and believe can ever be finally resolved by what they say, or by what else we can monitor.

The Blechman collection differs in that, with the exception of a chapter by Joseph Nye that reads almost like a shorter version of the chapters by the editors in the Allison, Carnesale, and Nye book, its chapters are not addressed to general points of view but to specifics and in that these chapters are optimistic rather than pessimistic.

Taking the view that the current nuclear confrontation is not going to be eliminated, the authors outline the track record to date and offer some never overstated, interestingly and imaginatively described mid-term steps that might well reduce the risks of nuclear warfare. William Lynn's historical survey of United States-Soviet confidence-building measures, such as the ABM Treaty and SALT I and II, is complemented well by Richard Betts's proposal for a Joint Nuclear Risk Control Center. Sidney Drell and Theodore Ralston make a convincing case that much might yet be gained from various kinds of bans on weapons testing (if only we could have arranged a ban on MIRV testing!). Blechman presents some interesting new ideas on containing the threat of nuclear terrorism, and Victor Utgoff does the same with respect to automated monitoring as a

means of keeping the United States and the Soviet Union informed of each other's deployments and moves.

The two books go together nicely as a package for anyone who wants to set out on the subject of nuclear deterrence and for anyone who has gotten caught up too much in a predominately dovish or hawkish enthusiasm for new ways out of our dilemma. Someone who had already read a fair amount of the mainstream literature on nuclear issues might find the devil's advocate cases in *Hawks, Doves, and Owls* new and interesting, but would mainly find himself or herself reassured by the book that the world has indeed not changed beyond recognition since 1950. The same reader would find the drift of the Blechman book quite congenial and would uncover a number of new nuggets in the book's practical proposals.

What are hardest to find in most of the many books that are now appearing on the subject of nuclear war are some really Pareto-optimal improvements, moves to reduce the likelihood of nuclear war without increasing too much the chances of war in general and moves to reduce the tensions on one front without increasing them on another. A reader should be warned that most of the "improvements" and "ways out" offered in the literature on nuclear war may be illusory. That having been said, the Blechman collection offers a plausible list of new ideas that might actually be good ideas.

GEORGE H. QUESTER
Department of Government and Politics, University of Maryland, College Park 20742

Plant Cytology

Plant Membranes. Endo- and Plasma Membranes of Plant Cells. DAVID G. ROBINSON. Wiley-Interscience, New York, 1985. xx, 331 pp., illus. $69.50. Cell Biology.

Twenty years ago we lacked mechanistic and functional information about plant membranes, and it was generally thought that such membranes were synthesized and functioned in ways similar to those known for their animal counterparts. Since 1965, our understanding of the biogenesis and activities of plant membranes has advanced tremendously, and Robinson has succeeded in bringing these advances together in a lucid and timely volume. In order to maintain focus and to provide a book of reasonable

length, he does not include treatments of plastid or mitochondrial membranes, which have received a great deal of attention elsewhere. He provides just the right amount of historical perspective and builds upon considerations of ultrastructure to develop a most readable, knowledgeable, and impressive account of the biochemical, cellular, and molecular characteristics and functions of plant membrane systems.

Robinson begins the volume with detailed descriptions of the individual membrane systems. These descriptions are current and well documented, though they often become a bit encyclopedic. Greater use of summary tables would have been an aid to those outside the field. For such readers, the author relies too heavily upon the use of abbreviations, which can readily lead to confusion even for knowledgeable readers. An outstanding feature of the section is an evaluative presentation of methods of isolation and characterization of the respective membrane fractions. Too frequently in discussions of the subject this kind of treatment is not included or is so highly abbreviated that it is of little value to researchers outside the field.

The second section of the volume is devoted to functional aspects of plant membranes. The treatment of such topics as the synthesis and secretion of extracellular macromolecules, the mobilization and synthesis of storage products, and recognition phenomena (for example, graviperception, light quality perception, and auxin transport and reception) is excellent. The subjects, which are broad and complex, are elegantly dealt with in a way that provides the essentials without obscuring the main points of the discussion with too many details or specific examples. Robinson integrates the varied literature on these topics into timely and thought-provoking mechanistic presentations.

The final section of the book examines the biogenesis and turnover of membranes. In this section Robinson wisely uses a case study format, which allows him to draw from specific well-studied animal systems to develop a context for the discussion of the comparatively poorly studied analogous plant systems. He states, "One must realize that biochemically we are still in the Dark Ages when it comes to understanding the biogenesis of plant endo and plasma membranes." His basic premise in this section is that it is likely that plant and animal cells have common mechanisms for membrane synthesis and degradation but vary in the proportions in which they

use the mechanisms. Robinson states, however, that though the role of the Golgi apparatus is well established in the synthesis of the plasmalemma in animal cells there is no direct evidence that it plays a similar role in plant systems.

This excellent book not only will be extremely valuable to the student but will be an essential source book for the cell and molecular biologist, the plant physiologist, and the plant biologist. The book is well written and concise, and it raises many exciting questions that will be important to future research in the field.

RANDALL S. ALBERTE
*Department of Molecular Genetics
and Cell Biology,
University of Chicago,
Chicago, Illinois 60637*

Fractals

The Geometry of Fractal Sets. K. J. FALCON-ER. Cambridge University Press, New York, 1985. xiv, 162 pp., illus. $32.50. Cambridge Tracts in Mathematics, 85.

The word "fractal" was coined by B. B. Mandelbrot in 1975 to describe a class of sets that arise in mathematical models appropriate for describing phenomena observed in a wide range of scientific disciplines, from astronomy to fluid mechanics to biology to economics. Scientists have now learned to recognize a fractal, though there is still no consensus about a precise definition of one. There are several distinct procedures leading to a fractal index or dimension for a set without interior. The reviewer thinks that the term "fractal" should be reserved for sets whose index is the same when calculated by any of these methods. We can then use the most convenient method for analysis. The book under review uses Hausdorff measures, which result from the most highly developed of the mathematical theories relevant to a rigorous study of fractals.

The main achievement of the book is that it gives a structured, readable account of the development of the interaction between geometry and measure theory, which was discovered initially by A. S. Besicovitch (many papers from 1924 to 1948) and generalized by H. Federer (*Geometric Measure Theory*, Springer-Verlag, 1969) and his school. Falconer's book develops the theory rigorously but avoids complicated notation and jargon and emphasizes the geometrical content of the results.

When the dimension of a set E in n-space is an integer $k < n$, the local geometry of the set can be used to classify sets into those that are "regular" and those that are "irregular." Only the irregular sets of integer dimension satisfy the intuitive properties of a fractal. For example, a regular 1-set is curvelike in the sense that it has a tangent at most points and its projection onto every line (with one possible exception) has positive length. On the other hand, an irregular 1-set intersects every rectifiable arc in a set of zero length, has a tangent almost nowhere, and projects onto almost all lines in a set of zero length.

The study of sets of dimension s when s is not an integer shows that such sets are always geometrically irregular. The author gives precision to the idea of geometric irregularity by obtaining both positive and negative results about s-sets. Cartesian products are considered: in general the dimension of $A \times B$ is at least the sum of the dimensions of A and B, and a strong regularity condition on at least one set is needed for equality. The author also discusses capacity dimension, which is defined by the use of potential theory, and shows this to be the same as Hausdorff dimension. The Besicovitch solution to the Kakeya problem, which gives a set in the plane of zero area that contains a unit line segment in every direction, is also explained.

For the nonspecialist, the last chapter of the book may be the most interesting. Here a range of examples of fractals is described and precise arguments are given concerning the determination of the Hausdorff dimension. A set E is called self-similar if a suitable scalar magnification of a neighborhood of each point yields the whole of E. Such sets have an easily computed dimension and include the "snowflake curve" of von Koch and the classical Cantor set on the line. Beautiful pictures of a mildly random version of self-similar sets can be found in Mandelbrot's book *The Fractal Geometry of Nature* (Freeman, 1982). There is a proof that the trajectory of mathematical Brownian motion in space is a fractal of dimension 2. The author also studies attractor sets arising from a dynamical system and the residual set remaining after efficient packing of space by geometrically similar sets.

The book is written primarily for mathematicians, and all the main results have complete proofs. However, scientists who become interested in fractals would also benefit from a precise definition of a fractal, and the book develops both theory and geometrical intuition to

this end. It is by far the most accessible mathematical account available and therefore is an invaluable addition to the literature.

S. JAMES TAYLOR
*Department of Mathematics,
University of Virginia,
Charlottesville 22903*

Books Received

Abortion Policy. An Evaluation of the Consequences for Maternal and Infant Health. Jerome S. Legge, Jr. State University of New York Press, Albany, 1985. xviii, 182 pp. $34.50; paper, $12.95.

Acoustic and Vibrational Communication in Insects. Klaus Kalmring and Norbert Eisner, Eds. Verlag Paul Parey, Berlin, 1985. viii, 232 pp., illus. Paper, DM 98. From a congress, Hamburg, Aug. 1984.

Acoustics of Worship Spaces. David Lubman and Ewart A. Wetherill, Eds. Published for the Acoustical Society of America by the American Institute of Physics, New York, 1985. xvi, 91 pp., illus. Paper, $15. From a meeting, San Diego, Nov. 1983.

The Biology of Crustacea. Vol. 9, Integument, Pigments, and Hormonal Processes. Dorothy E. Bliss and Linda H. Mantel, Eds. Academic Press, Orlando, Fla., 1985. xxx, 550 pp., illus. $79.

Building the Universe. Christine Sutton, Ed. Basil Blackwell, New York, and New Scientist, London, 1985. xiv, 361 pp., illus. $24.95; paper, $8.95. New Scientist Guides.

Calcium Regulation in Biological Systems. Setsuro Ebashi et al., Eds. Academic Press, Orlando, Fla., 1984. xvi, 260 pp., illus. $29.50. From a symposium, Kyoto, Japan, Nov. 1983.

The Cancer Patient and Supportive Care. Medical, Surgical, and Human Issues. Donald J. Higby, Ed. Nijhoff, Dordrecht, 1985 (U.S. distributor, Kluwer, Hingham, Mass.). xiv, 250 pp. $52.50. Cancer Treatment and Research.

The Carnegie-Mellon Curriculum for Undergraduate Computer Science. Mary Shaw, Ed. Springer-Verlag, New York, 1985. xiv, 198 pp. Paper, $18.50.

Cerebrovascular Diseases. Fred Plum and William A. Pulsinelli, Eds. Raven, New York, 1985, xiv, 259 pp., illus. $69.50. From a conference, Williamsburg, Va., March 1984.

Chemical Induction of Cancer. Structural Bases and Biological Mechanisms. Vol. 3B, Aliphatic and Polyhalogenated Carcinogens. Yin-tak Woo et al. Academic Press, Orlando, Fla., 1985. xx, 598 pp., illus. $98.50.

Chemical Methods in Bacterial Systematics. Michael Goodfellow and David E. Minnikin, Eds. Academic Press, Orlando, Fla., 1985. xvi, 412 pp., illus. $69.50. The Society for Applied Bacteriology Technical Series, no. 20. From a conference, July 1983.

The Chemistry and Biology of Isoquinoline Alkaloids. J. D. Phillipson, M. F. Roberts, and M. H. Zenk, Eds. Springer-Verlag, New York, 1985. viii, 304 pp., illus. $39. Proceedings in Life Sciences. From a symposium, April 1984.

Chemistry and Technology of Basic Organic and Petrochemical Synthesis. N. N. Lebedev. Mir, Moscow, 1985 (U.S. distributor, Imported Publications, Chicago). Two volumes. 640 pp., illus. $16. Translated from the Russian edition (Moscow, 1981) by A. Beknazarov.

Forms of Psychological Inquiry. Joseph H. Notterman. Columbia University Press, New York, 1985. xiv, 195 pp., illus. $20. Critical Assessments of Contemporary Psychology.

Fourier Transform Infrared Spectroscopy. Industrial Chemical and Biochemical Applications. T. Theophanides, Ed. Reidel, Boston, 1984 (distributor, Kluwer, Hingham, Mass.). viii, 192 pp., illus. $29.50.

Fragile Sites on Human Chromosomes. Grant R. Sutherland and Frederick Hecht, with contributions by John C. Mulley, Thomas W. Glover, and Barbara K. Hecht. Oxford University Press, New York, 1985. xiv, 280 pp., illus. $45. Oxford Monographs on Medical Genetics, no. 13.

Frontiers in Fluid Mechanics. A Collection of Research Papers Written in Commemoration of the 65th Birthday of Stanley Corrsin. S. H. Davis and J. L. Lumley, Eds. Springer-Verlag, New York, 1985. xiv, 289 pp., illus. $34.

Frontiers in Longevity Research. Applications of Nutritional and Other Discoveries in the Prevention