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.

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Fractals

The Geometry of Fractal Sets. K. J. FALCONER. 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.

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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.

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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.

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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