This marvelous textbook differs from its successful predecessor [the author, *The geometry of fractal sets*, Cambridge Univ. Press, Cambridge, 1986; MR0867284] both in content and in style. The first book was essentially an accessible introduction to geometric measure theory, with the last chapter devoted to fractal examples. The new text is definitely directed to a wide audience of mathematicians interested in fractals and their applications. The first part, “foundations”, defines Hausdorff measure, Hausdorff dimension and related concepts (box-counting, packing measures) and reviews mathematical techniques for calculating dimension as well as theorems on densities, dimension of projections and intersections.

The second and larger part, “applications and examples”, forms a survey of almost all kinds of fractals which have appeared in the mathematical literature, from number-theoretical examples, graphs of functions, self-similar sets, Julia sets, strange attractors, up to Brownian motion and physical examples such as diffusion-limited aggregation. Random fractals and multifractal formalism are treated for the first time in textbook form.

The presentation is lucid. The author knows the subject. Avoiding any speculation, he concentrates on facts which can be stated and shown rigorously. Long technical proofs are sketched or omitted, but two proofs for one statement are given when intuitive and beautiful arguments are available. Compared with other texts on fractals, the treatment is very careful. In discussions with many colleagues, only one error was reported (T. Traynor: the $E_k$ before Proposition 1.7 must be closed). Each of the 18 chapters starts with an overview or motivation and ends with some exercises and well-chosen general references. For checking details of some statements, however, more specific references would have been helpful.

It is impossible to deal with all aspects of “fractals” in 300 pages. The author’s emphasis is on Hausdorff measure, while numerical questions in calculating dimensions, computer algorithms, topological features and recursive structure are not treated systematically. On the whole, the book offers a lot of information and insight without requiring too much effort.  

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