To appear in: The Mathematical Gazette

Mandelbrot, Benoît B.: Fractals and Chaos. The Mandelbrot Set and Beyond. Selecta Volume C. Springer-Verlag, New York 2004, xii, 308 pp., £38.50, ISBN 0-387-20158-0.

Fractals, fractal geometry or chaos theory have been a hot topic in scientific research. It may come as a surprise that much of the theory as we know it was initiated during the last 30 years and by the vision of one man: Benoît Mandelbrot. The story starts in 1975 with Mandelbrot's small booklet *Les objets fractals. Forme, hasard et dimension* (published by Flammarion, Paris). Already in 1977 it was translated and expanded into *Fractals: Form, Chance and Dimension* (W.H. Freeman, San Francisco), but the breakthrough came in 1980 with the first picture of the *Mandelbrot set* in 'Fractal aspects of the iteration of $z \mapsto \lambda z(1-z)$ for complex λ and z', *Ann. New York Acad. Sci.* and reprinted on pp. 37–51 in the present volume. It was, however, Mandelbrot's 1982 masterpiece *The Fractal Geometry of Nature* (W.H. Freeman, New York) that popularized the subject. Mandelbrot's book is a scientific, philosophic and pictorial treatise at the same time and it is one of the rare specimen of serious mathematics books that can be read and re-read at many different levels.

The volume under review is 'Selecta C' of Mandelbrot's œuvre. It is a selection of papers which appeared between 1980 and 2003, dealing with (non-)quadratic rational dynamics, iterated (nonlinear) function systems and multifractal measures. Alongside some important and very technical original papers, there is a highly readable (also for the non-specialist) introduction and survey-type original contributions, extracts from his 1982 monograph as well as unpublished material. The last chapter is devoted to a brief historical account of the subject's early heroes: Pierre Fatou and Gaston Julia. Rather than being a juxtaposition of papers, Mandelbrot succeeded in creating a readable selection of material which contains new original contributions. The papers featured in the book are sometimes corrected and annotated; that in this process the original pagination was lost is somewhat unfortunate. The style is what one could call 'truly Mandelbrotian', a mixture of hard science, often with a personal touch, some (sometimes quite lop-sided) personal notes and recollections and always the urge to convey a message.

A brief word on the numbering. Selecta C is a companion volume of Selecta E (Fractals and Scaling in Finance), N (Multifractals and $1/f$ noise)

and H (Gaussian Self-Affinity and Fractals) which have been appearing with Springer since 1997. In the bibliography the above mentioned books from 1975, 1977 and 1982 are referred to as O, F and FGN and the 1997 written *Fractales, hasard et finance*, Flammarion, Paris is lettered FE. Whether these are to be seen as (early) volumes of Mandelbrot's 'Selecta', I don't know, but it would make perfect sense.

Mandelbrot has done it again: here is a book that will be as important for the scientific community, many of Mandelbrot's early papers appeared in hard-to-get journal and proceedings volumes, as it will be appealing to a general informed audience.

University of Sussex @ Brighton René L. Schilling