



Symmetry in Chaos: A Search for Pattern in Mathematics, Art, and Nature

Michael Field, Martin Golubitsky

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Chaotic dynamics (known popularly as chaos theory or, more simply, chaos) is among the most fascinating new fields in modern science, revolutionizing our understanding of order and pattern in nature. Symmetry, a traditional and highly developed area of mathematics, would seem to lie at the opposite end of the spectrum. From the branching of trees to the rose windows of great cathedrals, symmetric patterns seem the antithesis of such chaotic systems as weather patterns. And yet, scientists are now finding connections between these two areas, connections which could have profound consequences for our understanding of the physical world. In *Symmetry in Chaos*, mathematicians Michael Field and Martin Golubitsky offer an engaging look at where these two fields meet. In the process, they have generated mathematically a series of stunning computer images linking symmetry and chaos.

Field and Golubitsky describe how a chaotic process eventually can lead to symmetric patterns (in a river, for instance, photographs of the turbulent movement of eddies, taken over time, often reveal patterns on average) and they provide clear explanations of the science that lies behind the generation of these pictures. And the images they generate are spectacular. Because of the symmetry, these full-color and black-and-white images--some chaotic and some fractal--have a surprisingly classical appearance. Indeed, through comparisons with pictures from nature, such as sea shells and flowers, and decorative designs ranging from Islamic motifs to contemporary graphic logos to ceramic tiles, the authors highlight the familiar yet unusual nature of these mysterious pictures. Finally, the book features an appendix containing several BASIC programs, which will enable home computer owners to experiment with similar images.

This lavishly illustrated, oversized volume offers both a fascinating glimpse of the frontier of modern science and a stunning collection of remarkable images. *Symmetry in Chaos* will intrigue science buffs as well as anyone interested in decorative art and pattern design.

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