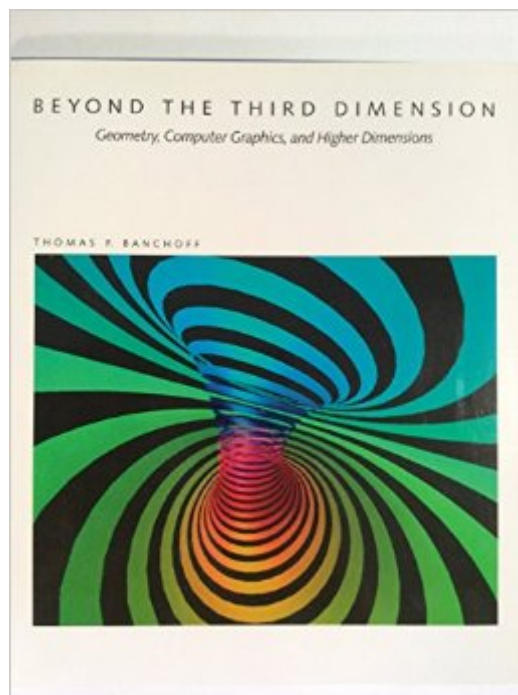


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Beyond The Third Dimension: Geometry, Computer Graphics, And Higher Dimensions (Scientific American Library)



Synopsis

This work investigates ways of picturing and understanding dimensions below and above our own. What would a two-dimensional universe be like? How can we even attempt to picture objects of four, five or six dimensions? Such are the questions examined in this text. --This text refers to an out of print or unavailable edition of this title.

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Mathematical ideas, when first learned, tend to undergo a curious inner transformation. At the outset, some tangible representation is necessary to effectively latch onto the concept. Thereafter, the symbolic elaboration using the language of mathematics is sufficient to encompass not only that particular figure, but limitless others like it as well. The underlying geometry is still there, but there are simply too many possibilities to illustrate in any amount of time. The first step of illustrating must be manifest, using ink or chalk or sand or digital pixels. In this way, even the finest geometric illustrations can be considered extremely crude and inaccurate in comparison to rigorous mathematical precision. Consider, however, how extraordinarily difficult it would be to grasp trigonometric functions, vector spaces, or even the basic Cartesian coordinate system, without first observing supporting representative illustrations. Even if later forgotten, those initial images are crucial for understanding. This work provides a wide range of richly color-illustrated examples of the abstract geometric structures dealt with regularly in mathematics and the sciences. It is unique in its

quality and affordability, and is supported with excellent prose, briefly describing the developmental history, and frequently how to reconstruct the figures from a sparse handful of assumptions. From an introductory description of dimension, this book then branches into numerous and diverse major topics: scaling, slices, regular polytopes, perspective, coordinate geometry, and non-euclidean geometry. While sparing in its level of mathematical description and precision, it never diverges into a fully artistic exposition on the subjects either.

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