

## BOOK REVIEWS

**Yes, We Have No Neutrons: An Eye-Opening Tour through the Twists and Turns of Bad Science.** A. K. Dewdney. 1997. John Wiley & Sons, Inc., New York, NY. 180 p. \$22.95.

Science, according to A. K. Dewdney, is a castle which houses both “sorcerers” (scientists) and “apprentices” (non-scientists/scientists-gone-astray/bumblers). To understand science—to enter the castle—we must pass through three creaking doors. The first door opens into a hall filled with “things” representing technology, things which have specific functions. Is this a part of science? No, asserts the author, for technology and science are two different things, and to recognize that difference is to move away from apprenticeship. The second door is labeled “The Two Sciences.” Here, we must differentiate between deductive and inductive science. Since this book deals with inductive science “gone wrong,” we shall take that turning and move toward the third door through which we find ideas and how to test them.

Such is the opening to an enthralling and entertaining work by the author of the “Mathematical Recreation” column in *Scientific American* and an associate professor of mathematics at the University of Western Ontario. While the basic steps of scientific methodology may be old hat to many readers, the author uses these reminders to introduce the “apprentices” of his castle: individuals who frame hypotheses without bothering to check them (Freud), others who ask the wrong questions (directors of Biosphere 2) or no questions at all (Binet and IQ which begat Arthur Jensen which begat J. P. Rushton), and apprentices who fail to imagine experiments that will disconfirm false hypotheses (Frank Drake and radio astronomy). In addition, we meet science-gone-bad when the experiments fail to be repeatable (Blondlot and N-rays, Fleishmann and Pons, and cold fusion) and when an entire technology is based on mistaken interpretations (F. Rosenblatt and neural nets).

What makes these examples of bad science? The author first distinguishes between bad science and fraudulent science. Bad science “happens when someone

strays in a fatal way from the scientific method.” The apprentices who perform this bad science may either be amateurs trying to look like scientists, people with some scientific training working outside their normal discipline, or accomplished scientists who neglect a key part of the scientific method.

Following the introduction (which should be read by all science undergraduates, graduate students, and practicing sorcerers), the author chronologically details the apprentice-like work of his select examples of bad science. We first meet René Blondlot, a well-respected French physicist who had been working with the X rays recently announced by Rontgen in Germany. As the author points out “...if good luck favors the sorcerer, bad luck bends over backwards for the apprentice.” The announcement by Blondlot of his N ray discovery, followed by its subsequent refutation, presents a fascinating view of bad science.

Throughout each of the subsequent chapters, the author mixes personalities, scientific insights and a delightful dry humor in just the proper proportions to brew a highly readable potion worthy of any sorcerer. The chapter titles themselves indicate the approach that Dewdney takes to his subject: “Dreaming Up Theories: The Unconscious Con of Sigmund Freud” (Chapter 3); “The Apprentice Builds a Brain: Mised by Metaphors” (Chapter 5 – neural nets); or “Biosphere 2 Springs a Leak” (Chapter 7). The even-numbered chapters are just as good!

Even though Dewdney covers a real cross-section of the sciences (and social sciences), the reader is never lost in the jargon of a particular discipline. He writes for the educated layperson without sacrificing important scientific considerations.

Following the last chapter, we are presented with a chapter-by-chapter list of “Further Readings,” to which is appended brief comments by the author on each work’s appropriateness to the study. This book exceeded my expectations; it was scientifically informative, historically fascinating, pithy in its use of humor, and an overall delight to read.

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