What Science Is and How It Really Works

Scientific advances have transformed the world. However, science can sometimes get things wrong, and at times, disastrously so. Understanding the basis for scientific claims and judging how much confidence we should place in them is essential for individual choice, societal debates, and development of public policy and laws. We must ask: What is the basis of scientific claims? How much confidence should we put in them? What is defined as science and what is not? This book synthesizes a working definition of science and its properties, as explained through the eyes of a practicing scientist, by integrating advances from philosophy, psychology, history, sociology, and anthropology into a holistic view. Crucial in our political climate, the book fights the myths of science often portrayed to the public. Written for a general audience, it also enables students to better grasp methodologies and helps professional scientists to articulate what they do and why.

JAMES C. ZIMRING is a professor of pathology at the University of Virginia. The recipient of many awards for his research and teaching, he is recognized as an international expert in the field of transfusion biology and routinely delivers academic lectures both nationally and internationally.

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To my wife Kim and daughter Alex

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James C. Zimring

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While this book was already in press, and the final typesetting had been done, a new book was published by Dr. Lee McIntyre entitled "The Scientific Attitude: Defending Science from Denial, Fraud, and Pseudoscience." In this work, Dr. McIntyre advances novel concepts and defines the attitude by which scientists approach evidence as a necessary component of science, which can help to defend it against deniers and pseudoscientists. Had "The Scientific Attitude" been available to me while this book was still being written, I would have certainly referenced it highly, especially in sections discussing how scientists handle data and the general property of attempting to mitigate error as a characteristic of science. These ideas are fully developed in Dr. McIntyre's book that was published six months prior to the current work.