

Foreword

Every year, in English-speaking countries alone, more than a hundred books that promote the wildest forms of bogus science and the paranormal are published. The percentage of Americans today who take astrology seriously is larger than the percentage of people who did so in the early Middle Ages, when leading church theologians—Saint Augustine, for example—gave excellent reasons for considering astrology nonsense. We pride ourselves on our advanced scientific technology, yet public education in science has sunk so low that one-fourth of Americans and 55 percent of teenagers, not to mention a recent president of the nation and his first lady, believe in astrology!

Now and then a courageous publisher, more concerned with enlightening the public than with profits, will issue a book that honestly assesses pseudoscience and the paranormal. Works of this sort now in print can be counted on your fingers. It is always an occasion for rejoicing when such a book appears, and there are several ways in which *How to Think about Weird Things* is superior to most books designed to teach readers how to tell good science from bad.

First of all, this book covers an enormous range of bogus sciences and extraordinary claims that currently enjoy large followings in America. Second, unlike most similar books, the authors heavily stress principles that help you critically evaluate outlandish claims—and tell you *why* these principles are so important. Third, the book's discussions are readable, precise, and straightforward.

I am particularly pleased by the book's clearheaded assessment of scientific realism at a time when it has become fashionable in New Age circles to think of the laws of science as not "out there," but somehow a projection of our minds and cultures. Yes, quantum mechanics has its subjective tinge. There is a sense in which an electron's properties are not definite until it is measured, but this technical aspect of quantum theory has no relevance on the macroscopic level of everyday life. In no way does the mathematical formalism of quantum mechanics imply, as some physicists smitten by Eastern religions claim, that the moon is not there unless someone looks at it. As Einstein liked to ask, Will a mouse's observation make the moon real?

The authors give clear, accurate explanations of puzzling physical theories. Quantum theory indeed swarms with mind-boggling experiments that are only dimly understood. None of them justify thinking that $E = mc^2$ is a cultural artifact, or that E might equal mc^3

in Afghanistan or on a distant planet. Extraterrestrials would of course express Einstein's formula with different symbols, but the law itself is as mind-independent as Mars.

As the authors say simply: "There is a way that the world is." It is the task of science to learn as much as it can about how this universe, not made by us, behaves. The awesome achievements of technology are irrefutable evidence that science keeps getting closer and closer to objective truth.

As the authors tell us, there are two distinct kinds of knowledge: logical and mathematical truth (statements that are certain within a given formal system), and scientific truth, never absolutely certain, but which can be accepted with a degree of probability that in many instances is practically indistinguishable from certainty. It takes a bizarre kind of mind to imagine that two plus two could be anything but four, or that, as the authors put it, cows can jump over the moon or rabbits lay multicolored eggs.

The authors are to be especially cheered for their coverage of unsubstantiated alternative treatments, some of them weird beyond imagining. Preposterous medical claims can cause untold harm to gullible persons who rely on them to the exclusion of treatment by mainstream physicians.

The authors are also to be commended for finding colorful and apt quotations from other writers. Bertrand Russell, for instance, gave three simple rules for curbing one's tendency to accept what he called "intellectual rubbish":

1. When the experts are agreed, the opposite opinion cannot be held to be certain.
2. When they are not agreed, no opinion can be regarded as certain by a nonexpert.
3. When they all hold that no sufficient grounds for a positive opinion exist, the ordinary person would do well to suspend judgment.

"These propositions seem mild," Russell added, "yet, if accepted, they would absolutely revolutionize human life."

I am under no illusions about how effective this book will be in persuading readers to adopt Russell's three maxims. I *can* say that to the extent it does, it will have performed a service that our technologically advanced but scientifically retarded nation desperately needs.

—Martin Gardner