

# THE MIND OF GOD

**THE  
SCIENTIFIC  
BASIS FOR  
A RATIONAL  
WORLD**



PAUL DAVIES

*Author of God and the New Physics  
and The Cosmic Blueprint*

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The Scientific Basis  
for a Rational World

Paul Davies

Simon & Schuster

New York London Toronto ~~Sydney Tokyo Singapore~~



**Simon & Schuster**  
Simon & Schuster Building  
Rockefeller Center  
1230 Avenue of the Americas  
New York, New York 10020

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Designed by Deirdre C. Amthor

Manufactured in the United States of America

1 3 5 7 9 10 8 6 4 2

Library of Congress Cataloging-in-Publication Data  
Davies, P. C. W.

The mind of God : the scientific basis for a rational  
world / Paul Davies

p. cm.

Includes bibliographical references and index.

1. Religion and science—1946- I. Title.

BL240.2.D29 1992

215—dc20 91-28606 CIP

ISBN: 0-671-68787-5

*For Caroline, in recognition of  
your own search for truth*



If we do discover a complete theory, it should in time be understandable in broad principle by everyone, not just a few scientists. Then we shall all, philosophers, scientists, and just ordinary people, be able to take part in the discussion of why it is that we and the universe exist. If we find the answer to that, it would be the ultimate triumph of human reason—for then we would truly know the mind of God.

Stephen Hawking

Concluding sentence of *A Brief History of Time*





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# Preface

WHEN I WAS A CHILD I used to infuriate my parents by continually asking “why?” Why can’t I go out to play? Because it might rain. Why might it rain? Because the weatherman has said so. Why has he said so? Because there are storms coming up from France. Why are there . . . ? And so on. These relentless interrogations normally ended with a desperate “Because God made it that way, and *that’s that!*” My childhood discovery (deployed more out of boredom than philosophical acuteness) that the explanation of a fact or circumstance *itself* demanded an explanation, and that this chain might continue indefinitely, has troubled me ever since. Can the chain of explanation really stop somewhere, with God perhaps, or with some superlaw of nature? If so, how does this supreme explanation itself escape the need to be explained? In short, can “that” ever be “that”?

When I became a university student I reveled in the ability of science to provide such breathtaking answers to our questions about the world. The power of science to explain things is so dazzling I found it easy to believe that, given the resources, all the secrets of the universe might be revealed. Yet the “why, why, why . . . ?” worry returned. What lies at the bottom of this magnificent explanatory scheme? What holds it all up? Is there an ultimate level, and if so where did *that* come from? Could one be satisfied with a “that’s-that” explanation?

In later years I began doing research on topics like the origin of the universe, the nature of time, and the unification of the laws of physics, and I found myself trespassing on territory that for centuries had been

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the near-exclusive province of religion. Yet here was science either providing answers to what had been left as dark mysteries, or else discovering that the very concepts from which those mysteries drew their power were actually meaningless or even wrong. My book *God and the New Physics* was a first effort to grapple with this clash of ideologies. *The Mind of God* is a more considered attempt.

Since publication of the first book, a lot of new ideas have emerged at the forefront of fundamental physics: the superstring theory and other approaches to so-called Theories of Everything, quantum cosmology as a means of explaining how the universe might appear from nothing, Stephen Hawking's work on "imaginary time" and the cosmological initial conditions, chaos theory and the concept of self-organizing systems, and advances in the theory of computation and complexity. In addition, there has been an enormous resurgence of interest in what might be crudely described as the science-religion interface. This has taken two distinct forms. First, a greatly increased dialogue between scientists, philosophers, and theologians about the concept of creation and related issues. Second, a growing fashion for mystical thinking and Eastern philosophy, which some commentators have claimed makes deep and meaningful contact with fundamental physics.

I should like to make my own position clear at the outset. As a professional scientist I am fully committed to the scientific method of investigating the world. I believe that science is an immensely powerful procedure for helping us to understand the complex universe in which we live. History has shown that its successes are legion, and scarcely a week passes without some new progress being made. The attraction of the scientific method goes beyond its enormous power and scope, however. There is also its uncompromising honesty. Every new discovery, every theory is required to pass rigorous tests of approval by the scientific community before it is accepted. Of course, in practice, scientists do not always follow the textbook strategies. Sometimes the data are muddled and ambiguous. Sometimes influential scientists sustain dubious theories long after they have been discredited. Occasionally scientists cheat. But these are aberrations. Generally, science leads us in the direction of reliable knowledge.

I have always wanted to believe that science can explain everything, at least in principle. Many nonscientists would deny such a claim resolutely. Most religions demand belief in at least some supernatural

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events, which are by definition impossible to reconcile with science. I would rather not believe in supernatural events personally. Although I obviously can't prove that they never happen, I see no reason to suppose that they do. My inclination is to assume that the laws of nature are obeyed at all times. But even if one rules out supernatural events, it is still not clear that science could in principle explain everything in the physical universe. There remains that old problem about the end of the explanatory chain. However successful our scientific explanations may be, they always have certain starting assumptions built in. For example, an explanation of some phenomenon in terms of physics presupposes the validity of the laws of physics, which are taken as given. But one can ask where these laws come from in the first place. One could even question the origin of the logic upon which all scientific reasoning is founded. Sooner or later we all have to accept something as given, whether it is God, or logic, or a set of laws, or some other foundation for existence. Thus "ultimate" questions will always lie beyond the scope of empirical science as it is usually defined. So does this mean that the really deep questions of existence are unanswerable? I notice, on perusing the list of my chapter and section titles, that an awful lot of them are questions. At first I thought this was stylistic ineptitude, but I now realize that it reflects my instinctive belief that it is probably impossible for poor old *Homo sapiens* to "get to the bottom of it all." Probably there must always be some "mystery at the end of the universe." But it seems worth pursuing the path of rational inquiry to its limit. Even a proof that the chain of inference is uncompletable would be worth knowing. As we shall see, something of that sort has already been demonstrated in mathematics.

Many practicing scientists are also religious. Following the publication of *God and the New Physics*, I was astonished to discover how many of my close scientific colleagues practice a conventional religion. In some cases they manage to keep these two aspects of their lives separate, as if science rules six days a week, and religion on Sunday. A few scientists, however, make strenuous and sincere efforts to bring their science and their religion into harmony. Usually this entails taking a very liberal view of religious doctrine on the one hand, and on the other hand imbuing the world of physical phenomena with a significance that many of their fellow scientists find unappealing.

Among those scientists who are not religious in a conventional sense, many confess to a vague feeling that there is "something" beyond



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the surface reality of daily experience, some meaning behind existence. Even hard-nosed atheists frequently have what has been called a sense of reverence for nature, a fascination and respect for its depth and beauty and subtlety, that is akin to religious awe. Indeed, scientists are very emotional people in these matters. There is no greater misconception about scientists than the widespread belief that they are cold, hard, soulless individuals.

I belong to the group of scientists who do not subscribe to a conventional religion but nevertheless deny that the universe is a purposeless accident. Through my scientific work I have come to believe more and more strongly that the physical universe is put together with an ingenuity so astonishing that I cannot accept it merely as a brute fact. There must, it seems to me, be a deeper level of explanation. Whether one wishes to call that deeper level “God” is a matter of taste and definition. Furthermore, I have come to the point of view that mind—i.e., conscious awareness of the world—is not a meaningless and incidental quirk of nature, but an absolutely fundamental facet of reality. That is not to say that *we* are the purpose for which the universe exists. Far from it. I do, however, believe that *we* human beings are built into the scheme of things in a very basic way.

In what follows I shall attempt to convey the reasons for these beliefs. I shall also examine some of the theories and beliefs of other scientists and theologians, not all of which concur with my own. Much of the discussion involves new advances at the frontiers of science, some of which have led to interesting and exciting ideas about God, creation, and the nature of reality. This book is not, however, intended to be an exhaustive survey of the science-religion interface, but more of a personal quest for understanding. The book is aimed at the general reader, so I have tried to keep the technical aspects to a minimum. No previous knowledge of mathematics or physics is necessary. Some sections, especially chapter 7, involve rather convoluted philosophical arguments, but the reader can pass quickly over these sections without serious problem.

So many people have helped me in this quest, it is impossible to acknowledge them all personally. I have gained much of value from coffee-time conversations with my immediate colleagues at the Universities of Newcastle upon Tyne and Adelaide. I have also received fascinating insights from conversations with John Barrett, John Barrow, Bernard Carr, Philip Davies, George Ellis, David Hooton, Chris