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## Preface

**T**he first version of this book was a pre-publication edition. With previous books, I made reading copies of the final manuscript for friends, publishers, publicists, and others. With today's technologies, a small print run had become an attractive alternative. I could seed the ideas more widely and get feedback from more people.

As a result of feedback from many readers, I have made some changes in this trade edition. I have reworked the material concerning the relationship between light and God, and the mystical identity of self and God, to make my meaning clearer. In addition, I have rewritten a large part of the final chapter to reflect my own changing views.

A regularly updated list of recommended reading is available on my website at [www.peterussell.com](http://www.peterussell.com).

*Peter Russell*  
*Sausalito, California*  
*2003*

*More than anything else, the future of civilization depends on the way the two most powerful forces of history, science and religion, settle into relationship with each other.*

Alfred North Whitehead

## Introduction

**I**t was the spring of 1996; I had been invited to a small seminar, deep in the California redwoods, to discuss the evolution of consciousness. As I sat there listening to various debates about the nature of mind, recent discoveries in neurochemistry, and theories on the origins of consciousness, I felt increasingly frustrated. I wanted to say, “We’ve got it all backwards,” or words to that effect. But I couldn’t express my misgivings in a coherent, well-reasoned manner—which one needs to do in those settings to be taken seriously. So I bit my lip and sat with my frustration.

A few weeks later, on a plane from Los Angeles to San Francisco, I opened an old book I had recently come across. The author, a Dutchman writing in the 1920s, was not saying anything that was new to me, but he reminded me of the processes of perception and the way we construct our experience of reality. My readings in philosophy, particularly the writings of Immanuel Kant, came flooding back; so did my studies in physics on the nature of light, and my explorations into Eastern philosophy and meditation.

Suddenly the root of my frustration became clear. We need more than a new theory of consciousness. We must reconsider some of our fundamental assumptions about

the nature of reality. That was the insight that was trying to break through at the seminar. I started scribbling, and by the time the plane landed, the picture was clear. Our whole worldview needed to be turned inside out.

Over the following months, I worked on an essay pulling together the various pieces of a model of reality in which consciousness played a primary role. In the process, I discovered that the implications were even deeper than I had supposed. The new worldview not only changed the way science looked at consciousness, it also led to a new view of spirituality—and, most surprisingly, to a new concept of God.

The seeds sown on that plane flight have now grown into this book. As with any exploration of such profound issues, the ideas are not complete, and may never be complete. They represent my current thinking on the key ingredients of a new worldview, and how consciousness could be the long-awaited bridge between science and spirit.

As much as the book is a journey of ideas that starts with science and arrives at God, it is also my own personal journey from being a physicist with little interest in spiritual matters to an explorer of consciousness who now begins to appreciate what the great spiritual teachings have been saying for thousands of years.



# 1

## From Science to Consciousness



People travel to wonder at the height of mountains, at the huge waves of the sea, at the long courses of rivers, at the vast compass of the ocean, at the circular motion of the stars; and they pass by themselves without wondering.

ST. AUGUSTINE

I have always been a scientist at heart. As a teenager, I delighted in learning how the world works—how sound travels through the air, why metals expand when heated, why bleaches bleach, why acids burn, how plants know when to bloom, how we see color, why a lens bends light, how spinning tops keep their balance, why snowflakes are six-pointed stars, and why the sky is blue.

The more I discovered, the more fascinated I became. At sixteen I was devouring Einstein and marveling at the paradoxical world of quantum physics. I delved into different

theories of how the universe began, and pondered the mysteries of space and time. I had a passion for knowing, an insatiable curiosity about the laws and principles that governed the world.

I was equally intrigued by mathematics, sometimes called “the queen and servant” of science. Whether it was the swing of a pendulum, the vibrations of an atom, or the path of an arrow shot into the wind, every physical process had an underlying mathematical expression. The premises of mathematics were so basic, so obvious, so simple, yet from them unfolded rules governing the most complex of phenomena. I remember the exhilaration I felt upon discovering how the same basic equation—one of the simplest and most elegant of all mathematical equations—governs the propagation of light, the vibrations of a violin string, the coiling of a spiral, and the orbits of the planets.

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*Matter has reached the point of beginning  
to know itself. . . . [Man is] a star's way of  
knowing about stars.*

*George Wald*

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Numbers, so boring to many, were to me magical. Irrational and imaginary numbers, infinite series, indefinite integrals—I could not get enough of them. I loved the way they all fitted together, like pieces of a cosmic jigsaw puzzle.

Most intriguing of all was how the whole world of mathematics unfolded by the simple application of reason. It

seemed to describe a preordained universal truth that transcended matter, time, and space. Mathematics depended on nothing, and yet everything depended on it. If you had asked me then whether there was a God, I would have pointed to mathematics.

## The Young Atheist

Conventional religion I had rejected at an early age. I was brought up as a member of the Church of England, but in a somewhat lax fashion. Like many families in our village, we attended Sunday service every few weeks—enough to keep our sins in check and our guilt at bay. That was as far as religion affected me. It was an accepted part of life, but not an important part.

So it was until I entered my teens, when I went through the customary ceremony of confirmation. If the process had lived up to its name, I should then have been confirmed as a member of the church. Nothing could have been further from the truth. If anything was confirmed, it was my skepticism toward religion.

I could accept ideas of not sinning, loving thy neighbor, caring for the sick, and other models of Christian behavior, but my mind balked at some of the articles of faith I was expected to accept. On Sundays, the congregation dutifully recited the Nicene Creed, professing their belief in “God, the Father, creator of Heaven and Earth . . . [whose] only begotten son . . . born of the virgin Mary . . . arose from the dead . . . and ascended into Heaven to sit at the right hand

of the Father.” Such a creed might have been credible at its inception seventeen hundred years ago, but to a budding scientist growing up in the second half of the twentieth century, it was far from believable.

Copernicus had shown that we were not the center of the universe. Astronomers had found no evidence of a heaven up in the sky. Darwin had dispelled the idea that God created the earth and all its living creatures in six days. And biologists had proven virgin birth impossible. Which story should I believe? A text whose only authority was itself, and whose proclamations had little bearing on my everyday reality? Or contemporary science with its empirical approach to truth? At age thirteen, the choice was obvious. I dropped out of conventional religion, and for the rest of my teens my spiritual concerns were reduced to an ongoing debate as to whether I was an atheist or an agnostic.

## Psychological Inclinations

I was not, however, a diehard materialist; I did not believe everything could be explained by the physical sciences. By my mid-teens I had developed an interest in the untapped powers of the human mind. Stories of yogis buried alive for days, or lying on beds of nails, intrigued me. I dabbled in so-called out-of-body experiences and experimented with the altered states of consciousness produced by hyperventilating or staring at pulsating lights. I developed my own techniques of meditation, though I did not recognize them as such at the time. I was fascinated by the possible

existence of extraterrestrial intelligence; given the trillions of stars in the cosmos, I thought it extremely unlikely that ours was the only planet in the entire universe that had developed conscious life.

I was also making my first ventures into philosophy. My friends and I spent countless hours debating whether or not the mind had an independent existence from the brain. If so, how did mind and brain interact? Or was the mind somehow generated by the brain? When we tired of that, there was always the related question of free will versus determinism. If everything, including the state of our own brains, was predetermined by the laws of physics, was our experience of free will genuine, or just an illusion?

Nevertheless, drawn as I was to questions about the human mind, my overriding interest was still in the physical sciences, and above all, mathematics. Thus, when the time came to pick which subject I was to study at university, the choice was obvious. And when I had to decide which university I should apply to, the choice was again clear. Cambridge was, and probably remains, the best British university at which to study mathematics.

## Premonitions of Paradise

My first visit to Cambridge was on the day of my interview—the first part of the admissions procedure.

From afar, the city emerged from flat, wet, green fields like a cultural oasis. As I approached the city center, streets of neatly terraced houses and Edwardian homes gave way

to grander university buildings. Architecture from across the centuries—old Norman churches, towering Gothic chapels, ornate Elizabethan halls, Victorian science laboratories, and contemporary edifices of glass and steel—mingled in the sunshine. Within the college walls, carefully manicured lawns covered the courtyards and quadrangles. Heavy oak doors concealed worn stone staircases, leading to the rooms of who-knew-what world-famous professor.

At the heart of the university lay the market square. Unlike many English towns, whose traditional markets have disappeared to be replaced by tastefully cobblestoned reminders of the town's heritage, the Cambridge market square was crowded with stalls full of fruit, vegetables, flowers, clothes, books, records, hardware, toys, furniture, and bric-a-brac. Here was a city whose heart remained alive, whose soul had not been trampled by the twentieth century's rush to efficiency and functionality.

As I made my way through the gently winding streets to the college where I was to have my interview, I had that feeling you sometimes get when you meet someone and just know that you are going to be seeing a lot more of each other. I felt sure that I would be coming to live in this exotic seat of learning.

About six weeks later, as I left my house one morning on my way to school, I passed the postman on his rounds. Out of the blue, the thought came that he had a letter for me, and not just any letter; he had a letter offering me a place at Cambridge. There was no reason to expect such a letter. Although my interview had gone reasonably well, I had not

yet taken the entrance exam. So I dismissed the thought and continued on my way.

Arriving at school a half hour later, I was told my mother had just phoned with the news that the postman did have a letter from Cambridge, and that I had indeed been offered a place.

## Going Up

Nine months later, I was “going up,” as they say at Cambridge, to begin my studies. The day after my arrival I had my first meeting with my tutor, a renowned professor of English literature. At Cambridge a tutor has very little to do with a student’s academic instruction; that is the concern of one’s supervisor. Tutors are *in locus parentis*, a Latin term meaning “in place of parents.” Their role is to take care of a student’s personal well-being.

“Don’t be too serious a student,” my tutor advised. “Go to the lectures, yes; do your assignments. But most of all value the people who are here. Your fellow students are the cream of the cream, and the graduates and dons you will be living with are some of the best minds in the country.

“The conversations you have over dinner, or walking by the river in the afternoon, are as important as the lectures you go to in the morning. You are here not just to get a degree; you are also here to mature as a person, to find yourself.”

Never could there have been a more favorable time to find oneself. This was Cambridge in the sixties. Centuries-old traditions were crumbling fast. The university had just

abolished the rule that undergraduates should wear their academic gowns when about the town at night. No longer was a male student likely to be expelled for being caught with a woman in his room. Students staged the first sit-ins, challenging the establishment to give them a democratic voice in their own education. A banner demanding “Peace in Vietnam” was strung between the spires of King’s College chapel—an audacious, if sacrilegious, feat of climbing. There was a sense of hope, the potential for change, for something new.

Peace was in the air, and so was love. Hippies in Afghan coats happily rubbed shoulders with students in tuxedos. White bicycles appeared, belonging to no one but available for anyone to use. Karl Marx, Alan Watts, and Marshall McLuhan were prescribed extracurricular reading. Sergeant Pepper called out across the courtyards, inviting anyone and everyone to sit back and enjoy the show.

## The Turning Point

I was exactly where I thought I wanted to be, studying with the best of minds in the best of places. By my third year, Stephen Hawking was my supervisor. Although he had already fallen prey to the motor-neuron disorder known as Lou Gehrig’s disease, the illness had not yet taken its full toll. He could still walk with the aid of a cane and speak well enough to be understood.

Sitting with him in his study, half my attention would be on whatever he was explaining—the solution of a particularly



difficult set of differential equations, perhaps—but my eye would be caught by hundreds of sheets of paper strewn across his desk. Scrawled on them, in very large handwriting, were equations that I could hardly begin to fathom. Only later did I realize they were probably part of his seminal work on black holes.

On more than one occasion, a spasmodic movement of his arm would send a pile of papers sliding to the floor. I wanted to get down and scoop them up for him, but he always insisted I leave them there. To be doing such groundbreaking work in cosmology was achievement enough. To be doing it with such handicaps was astounding. I felt extremely privileged and very daunted.

Yet, deep inside, something else was stirring.

In mathematics I had reached the point where I could solve Schrödinger's equation for the hydrogen atom. Schrödinger's equation is one of the fundamental equations of quantum physics. Solving it for a single particle such as an electron is fairly straightforward; solving it for two particles—the electron and proton that constitute a hydrogen atom—is more difficult. But once you have the solution, you can begin to make predictions about the behavior of the atom. To me, this was fascinating. Out of pure mathematics emerged functions that described the physics of hydrogen, and to some degree its chemistry.

But now another more intriguing question had aroused my interest. How had hydrogen, the simplest of elements, evolved into creatures such as ourselves, able to reflect upon the immensity of the cosmos, understand its functioning,

and even study the mathematics of hydrogen? How had a transparent, odorless gas become a system that could be aware of itself? In short, how had the universe become conscious?

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*The most incomprehensible thing about the universe is that it is comprehensible.*

*Albert Einstein*

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However hard I studied the physical sciences, they were never going to answer these deeper, more fundamental, questions. I felt increasingly drawn to explore mind and consciousness, and focused less on my mathematical assignments.

My tutor, sensing my distraction, approached me one day to ask how I was doing. I shared with him as best I could my misgivings about my chosen path. His response surprised me: “Either complete your degree in mathematics [I was in my final year] or take the rest of the year off and use it to decide what you really want to study.” Then, knowing how hard it would be for me to make such a choice, he added, “I want your decision by noon on Saturday.”

Saturday, five minutes before noon, I was still torn between my two options, struggling with feelings of failure and a sense of wasted time, yet knowing I would not be fulfilled continuing with mathematics. In the end I surrendered to my intuition and decided to take the rest of the year off. By late afternoon, I had packed, said a temporary

farewell to my friends, and was on my way, with only uncertainty ahead.

## The Best of Both Worlds

During the next six months I produced light shows, worked in a jam factory at night, and from time to time pondered my future career.

At first I thought I might study philosophy.

The term *philosophy* originated 2,500 years ago with Pythagoras, best known to most of us for his mathematical explorations. Pythagoras led a remarkable life, even by today's standards. As a teenager he made his way from Greece to Egypt, where he spent ten years training as a temple initiate. His career was interrupted by the Persians, who raided Egypt and took Pythagoras back to Babylon as a slave. Ten years later, his learning and wisdom earned him his freedom; but then, rather than returning to his native Greece, he remained in Babylon for another ten years, studying mathematics in the mystery schools. When he did eventually return home, he established a community in southern Italy, where he shared with his students much of what he had learned over the years.

Pythagoras was a puzzle to his contemporaries; his life did not fit any conventional style. When asked by a visitor to his community what it was he did, he is said to have replied, "I am simply a lover [*philo*] of wisdom [*sophia*]."

Philosophy at Cambridge had changed considerably from the love of wisdom. Mostly it was the study of past

philosophers. Where living philosophers were concerned, logical positivism was the vogue, and I'd had enough of logic by then. None of it had much to do with the questions concerning the nature of consciousness.

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*The aim isn't to degrade mind to matter,  
but to upgrade the properties of matter to  
account for mind, and to tell how from the  
dust and water of the earth, natural forces  
conjured a mental system capable of asking  
why it exists.*

*Nigel Calder*

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The only other academic discipline that broached the subject of consciousness was experimental psychology. Whereas clinical psychology involved treating those who are mentally ill, experimental psychology was concerned with the normal functioning of the human brain. It also included learning, memory, the processes behind perception, and how the brain builds up its picture of the world. I decided it was a step in the right direction, and returned to university to study experimental psychology.

The structure of degrees at Cambridge was a little different from that of most universities. Degrees were awarded within a particular school, and you could only combine subjects from within that school. Mathematics, for example, came under the School of Mathematics, and could not be combined with philosophy, which came under the School

of Moral Sciences. Experimental psychology came under the School of the Natural Sciences. So did theoretical physics. Since they were in the same school, I could combine them into a single degree. Moreover, the curriculum for theoretical physics was essentially the same as that of applied mathematics—in many cases the lectures were identical, and often given by the same professors; only the buildings and course titles were different.

So I found myself able to continue pursuing my interests in mathematics and physics, while at the same time embarking on my exploration of the inner world of consciousness.