

THE SPIRITUAL BRAIN

A Neuroscientist's Case for the Existence of the Soul

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and

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Introduction

When my doctoral student Vincent Paquette and I first began studying the spiritual experiences of Carmelite nuns at the Université de Montréal, we knew that our motives were quite likely to be misunderstood.

First, we had to convince the nuns that we were *not* trying to prove that their religious experiences did not actually occur, that they were delusions, or that a brain glitch explained them. Then we had to quiet both the hopes of professional atheists and the fears of clergy about the possibility that we were trying to reduce these experiences to some kind of “God switch” in the brain.

Many neuroscientists want to do just that. But Vincent and I belong to a minority—nonmaterialist neuroscientists. Most scientists today are materialists who believe that the physical world is the only reality. Absolutely everything else—including thought, feeling, mind, and will—can be explained in terms of matter and physical phenomena, leaving no room for the possibility that religious and spiritual experiences are anything but illusions. Materialists are like Charles Dickens’s character Ebenezer Scrooge who dismisses his experience of Marley’s ghost as merely “an undigested bit of beef, a blot of mustard, a crumb of cheese, a fragment of an underdone potato.”

Vincent and I, on the other hand, did not approach our research with any such materialist presumption. As we are not materialists, we did not doubt in principle that a contemplative might contact a reality outside herself during a mystical experience. In fact, I went into neuroscience in part because I knew experientially that such things can indeed happen.

Vincent and I simply wanted to know what the neural correlates—the activity of the neurons—during such an experience might be. Given the overwhelming dominance of materialism in neuroscience today, we count ourselves lucky that the nuns believed in our sincerity and agreed to help us and that the Templeton Foundation saw the value of funding our studies.

Of course, you may well ask, can neuroscience studies of contemplative nuns demonstrate that God exists? No, but they can—and did—demonstrate that the mystical state of consciousness really exists. In this state, the contemplative likely experiences aspects of reality that are not available in other states. These findings rule out various materialist theses that the contemplative is faking or confabulating the experience. Vincent and I also showed that mystical experiences are complex—a finding that challenges a vast variety of simplistic materialist explanations such as a “God gene,” “God spot,” or “God switch” in our brains.

Toronto-based journalist Denyse O’Leary and I have written this book to discuss the significance of these studies, and more generally, to provide a neuroscientific approach to understanding religious, spiritual, and mystical experiences. The discipline of neuroscience today is materialist. That is, it assumes that the mind is quite simply the physical workings of the brain. To see what this means, consider a simple sentence: “I made up my mind to buy a bike.” One would not say, “I made up my *brain* to buy a bike.” By contrast, one might say, “Bike helmets prevent brain damage,” but not “Bike helmets prevent *mind* damage.” But materialists think that the distinction you make between your mind as an immaterial entity and your brain as a bodily organ has no real basis. The mind is assumed to be a mere illusion generated by the workings of the brain. Some materialists even think you should not in fact *use* terminology that implies that your mind exists.

In this book, we intend to show you that your mind does exist, that it is not merely your brain. Your thoughts and feelings cannot be dismissed or explained away by firing synapses and physical phenomena alone. In a solely material world, “will power” or “mind over matter” are illusions, there is no such thing as purpose or meaning, there is no room for God. Yet many people have experience of these things, and we present evidence that these experiences are real.

In contrast, many materialists now argue that notions like meaning or purpose do not correspond to reality; they are merely adaptations for human survival. In other words, they have no existence beyond the evolu-

tion of circuits in our brains. As co-discoverer of the genetic code Francis Crick writes in *The Astonishing Hypothesis*, “Our highly developed brains, after all, were not evolved under the pressure of discovering scientific truths but only to enable us to be clever enough to survive and leave descendants.” But are questions about our meaning or purpose merely survival mechanisms? If such an airy dismissal of the intellectual life of thousands of years sounds vaguely unconvincing, well, perhaps it should.

Suppose, for example, a healthy man donates a kidney for free to a dying stranger. The materialist may look for an analogy among moles, rats, or chimpanzees, as the best way to understand the donor’s motives. He believes that the donor’s mind can be *completely* explained by the hypothesis that his brain evolved slowly and painstakingly from the brains of creatures like these. Therefore, his mind is merely an illusion created by the workings of an overdeveloped brain, and his consciousness of his situation is actually *irrelevant* as an explanation of his actions.

This book argues that the fact that the human brain evolves does not show that the human mind can be dismissed in this way. Rather, the human brain can enable a human mind, whereas the mole brain cannot (with my apologies to the mole species). The brain, however, is not the mind; it is an organ suitable for connecting a mind to the rest of the universe. By analogy, Olympic swimming events require an Olympic class swimming pool. But the pool does not create the Olympic events; it makes them feasible at a given location.

From the materialist perspective, our human mind’s consciousness and free will are problems to be explained away. To see what this means, consider Harvard cognitive scientist Steven Pinker’s comments on consciousness in a recent piece in *Time* magazine entitled “The Mystery of Consciousness” (January 19, 2007). Addressing two key problems that scientists face, he writes,

Although neither problem has been solved, neuroscientists agree on many features of both of them, and the feature they find least controversial is the one that many people outside the field find the most shocking. Francis Crick called it “the astonishing hypothesis”—the idea that our thoughts, sensations, joys and aches consist entirely of physiological activity in the tissues of the brain. Consciousness does not reside in an ethereal soul that uses the brain like a PDA [personal digital assistant]; consciousness is the activity of the brain.

Given that Pinker admits that neither problem concerning consciousness is either solved or anywhere close to being solved, how can he be so sure that consciousness is merely “the activity of the brain,” implying that there is no soul?

One convenient aspect of Pinker’s materialism is that any doubt can be labeled “unscientific” in principle. That preempts a discussion of materialism’s plausibility. Certainly, materialism is a faith that many intellectuals would never think of questioning. But the strength of their conviction neither shows that it is a correct account of reality nor provides evidence in its favor. A good case can be made for the opposite view, as this book will demonstrate.

Yes, this book—departing from a general trend in books on neuroscience aimed at the general public—does question materialism. Much more than that, it presents evidence that materialism is not true. You will see for yourself that the evidence for materialism is not nearly so good as Steven Pinker would like you to believe. You can only retain your faith in materialism by assuming—on faith—that any contrary evidence you read about must be wrong.

For example, as we will show, a materialist readily believes—without any reliable evidence whatsoever—that great spiritual leaders suffer from temporal-lobe epilepsy rather than that they have spiritual experiences that inspire others as well as themselves. Where spirituality is concerned, this experiential data is an embarrassment to narrow materialism. That is because a system like materialism is severely damaged by any evidence against it. Consequently, data that defy materialism are simply ignored by many scientists. For instance, materialists have conducted a running war against psi research (research on knowledge or action at a distance, such as extrasensory perception, telepathy, precognition, or telekinesis) for decades, because *any* evidence of psi’s validity, no matter how minor, is fatal to their ideological system. Recently, for example, self-professed skeptics have attacked atheist neuroscience grad student Sam Harris for having proposed, in his book entitled *The End of Faith* (2004), that psi research has validity. Harris is only following the evidence, as we shall see. But in doing so, he is clearly violating an important tenet of materialism: materialist ideology trumps evidence.

But other challenges to materialism exist. Materialists must believe that their minds are simply an illusion created by the workings of the brain

and therefore that free will does not really exist and could have no influence in controlling any disorder. But nonmaterialist approaches have clearly demonstrated mental health benefits. The following are a few examples discussed in this book.

Jeffrey Schwartz, a nonmaterialist UCLA neuropsychiatrist, treats obsessive-compulsive disorder—a neuropsychiatric disease marked by distressing, intrusive, and unwanted thoughts—by getting patients to reprogram their brains. Their minds change their brains.

Similarly, some of my neuroscientist colleagues at the Université de Montréal and I have demonstrated, via brain imaging techniques, the following:

- Women and young girls can voluntarily control their level of response to sad thoughts, though young girls found it more difficult to do so.
- Men who view erotic films are quite able to control their responses to them, when asked to do so.
- People who suffer from phobias such as spider phobia can reorganize their brains so that they lose the fear.

Evidence of the mind's control over the brain is actually captured in these studies. There *is* such a thing as “mind over matter.” We do have will power, consciousness, and emotions, and combined with a sense of purpose and meaning, we can effect change.

At one time, materialist explanations of religion and spirituality were at least worth considering. For example, Sigmund Freud argued that childhood memories of a father figure led religious people to believe in God. Freud's explanation failed because Christianity is the only major religion that emphasizes the fatherhood of God. But his idea, while wrong, was not ridiculous. Relationships with fathers, happy or otherwise, are complex human experiences, with some analogies to religion. Similarly, anthropologist J. G. Frazer thought that modern religions grew out of primal fertility cults and were only later spiritualized. Actually, the evidence points more clearly to spiritual experiences as the source of later religious beliefs and rituals. Still, Frazer's idea was far from trivial. It derived from a long and deep acquaintance with ancient belief systems.

But recently, materialistic explanations of religion and spirituality have gotten out of hand. Influenced by this materialistic prejudice, popular media jump at stories about the violence gene, the fat gene, the monogamy gene, the infidelity gene, and now, even a God gene! The argument goes like this: evolutionary psychologists attempt to explain human spirituality and belief in God by insisting that cave dwellers in the remote past who believed in a supernatural reality were more likely to pass on their genes than cave dwellers who didn't. Progress in genetics and neuroscience has encouraged some to look, quite seriously, for such a God gene, or else a God spot, module, factor, or switch in the human brain. By the time the amazing "God helmet" (a snowmobile helmet modified with solenoids that purportedly could stimulate subjects to experience God) in Sudbury, Canada, became a magnet for science journalists in the 1990s (the Decade of the Brain), materialism was just about passing beyond parody. Nonetheless, materialists continue to search for a God switch. Such comic diversions aside, there is no escaping the nonmaterialism of the human mind.

Essentially, there is no God switch. As the studies with the Carmelite nuns have demonstrated and this book will detail, spiritual experiences are complex experiences, like our experiences of human relationships. They leave signatures in many parts of the brain. That fact is consistent with (though it does not by itself demonstrate) the notion that the experiencer contacts a reality outside herself.

The fact is materialism is stalled. It neither has any useful hypotheses for the human mind or spiritual experiences nor comes close to developing any. Just beyond lies a great realm that cannot even be entered via materialism, let alone explored. But the good news is that, in the absence of materialism, there are hopeful signs that spirituality can indeed be entered and explored with modern neuroscience.

Nonmaterialist neuroscience is not compelled to reject, deny, explain away, or treat as problems all evidence that defies materialism. That is promising because current research is turning up a growing body of such evidence. Three examples addressed in this book are the psi effect, near death experiences (NDEs), and the placebo effect.

The psi effect, as seen in such phenomena as extrasensory perception and psychokinesis, is a low-level effect, to be sure, but efforts to disconfirm it have failed. NDEs have also become a more frequent subject of research in recent years, probably because the spread of advanced

resuscitation techniques has created a much larger population that survives to recount them. As a result of the work of researchers such as Pim van Lommel, Sam Parnia, Peter Fenwick, and Bruce Greyson, we now have a growing base of information. The results do not support a materialist view of mind and consciousness, as advanced by Pinker, who writes in *Time* “when the physiological activity of the brain ceases, as far as anyone can tell the person’s consciousness goes out of existence.”

Most of us have not experienced unusual effects like psi or NDE, but we have all probably experienced the placebo effect: have you ever gone to your doctor to get a letter saying you can’t go to work because you have a bad cold—and suddenly begun to feel better while sitting in the clinic, leafing through magazines? It’s embarrassing, but easy to explain: your mind generates messages to begin the analgesic or healing processes when you accept that you have in fact started on a path to recovery. Materialist neuroscience has long regarded the placebo effect as a problem, but it is one of the best attested phenomena in medicine. But for nonmaterialist neuroscience, it is a normal effect that can be of great therapeutic value when properly used.

Materialism is apparently unable to answer key questions about the nature of being human and has little prospect of ever answering them intelligibly. It has also convinced millions of people that they should not seek to develop their spiritual nature because they have none.

Some think that the solution is to continue to uphold materialism a bit more raucously than before. Currently, key materialist spokespersons have launched a heavily publicized and somewhat puzzling “anti-God” crusade. Antitheistic works such as *Breaking the Spell: Religion as a Natural Phenomenon* (Daniel Dennett), *The God Delusion* (Richard Dawkins), *God: The Failed Hypothesis—How Science Shows that God Does Not Exist* (Victor J. Stenger), *God Is Not Great* (Christopher Hitchens), and *Letters to a Christian Nation* (Sam Harris) are accompanied by conferences such as the Science Network’s “Beyond Belief” and campaigns such as the YouTube Blasphemy Challenge.

The remarkable thing is that there isn’t a single new idea in anything they have to say. Eighteenth-century *philosophes* said it all long ago, to as much or little purpose. Granted, recent works have been spiced with the questionable assumptions of evolutionary psychology—the attempt to derive religion and spirituality from the practices that may have enabled a

few of our Pleistocene ancestors to pass on their genes. But the Pleistocene ancestors are long gone, and not much can really be learned from a discipline that lacks a subject. There are also plenty of assurances about the illusory nature of mind, consciousness, and free will, and the uselessness or danger of spirituality.

A variety of experts of the mid-twentieth century had predicted that spirituality would slowly but surely disappear. Once supplied with abundant material goods, people would just stop thinking about God. But the experts were wrong. Spirituality today is more varied, but it is growing all over the world. Thus, its continuing vitality prompts speculations, fears, and some pretty wild guesses—but most of all, a compelling curiosity, a desire to investigate.

But how can we investigate spirituality scientifically? To start with, we can rediscover our nonmaterialist inheritance. It has always been there, just widely ignored. Famous neuroscientists such as Charles Sherrington, Wilder Penfield, and John Eccles, were not in fact reductive materialists, and they had good reasons for their position. Today, nonmaterialist neuroscience is thriving, despite the limitations imposed by widespread misunderstanding and, in a few cases, hostility. Readers are urged to approach all the questions and evidence presented in this book with an open mind. This is a time for exploration, not dogma.

Our book will establish three key ideas. The nonmaterialist approach to the human mind is a rich and vital tradition that accounts for the evidence much better than the currently stalled materialist one. Second, nonmaterialist approaches to the mind result in practical benefits and treatments, as well as promising approaches to phenomena that materialist accounts cannot even address. Lastly—and this may be the most important value for many readers—our book shows that when spiritual experiences transform lives, the most reasonable explanation and the one that best accounts for all the evidence, is that the people who have such experiences have actually contacted a reality outside themselves, a reality that has brought them closer to the real nature of the universe.

Mario Beauregard
Montreal, Canada
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Toward a Spiritual Neuroscience

In June 2005, the historic World Summit on Evolution was held on the remote island of San Cristobal in the Galápagos Islands, off the coast of Ecuador. The unassuming location, Frigatebird Hill, was chosen because it was the very spot where Charles Darwin first docked in 1835 to probe the “mystery of mysteries”—the origin and nature of species, including (and perhaps especially) the human species.

These isolated Pacific islands lying on the equator later became a stop-over for pirates, whalers, and sealers who drove the unique life forms that Darwin studied to the brink of extinction. But still later, under government protection in the twentieth century, the islands evolved into a sort of shrine to materialism—the belief that all life, including human life, is merely a product of the blind forces of nature.¹ In the materialist’s view, our “minds”—soul, spirit, free will—are simply an illusion created by the electrical charges in the neurons of our brains. Nature is, as Oxford zoologist Richard Dawkins famously put it, a “blind watchmaker.”²

The Galápagos meeting was quickly hailed as the Woodstock of Evolution. The scientists present, a “Who’s Who of evolutionary theory,”³ were well aware of their own importance and the significance of the proceedings. “We are simply stunned to be here,” wrote one science journalist, recalling that the elite audience listened to the familiar tale of evolution “rapt, like children hearing the retelling of a favorite story.”⁴

According to the favorite tale, human beings are merely “a bizarre tiny clade,” in the words of one attendee.⁵ And the mission of the next summit promises to tell that tale to the whole world.⁶ However, to judge from the

growing dissension around the teaching of evolution, the world has heard it already.

A Series of Mindless Events?

A key figure at the conference was American philosopher Daniel Dennett. Dennett, who bears a striking physical resemblance to Charles Darwin, is a world-famous philosopher of mind. He is the favorite philosopher of those who think that computers can simulate human mental processes. Curiously, for a philosopher of mind, he hopes to convince the world that there isn't really any such thing as a mind in the traditional sense. He is best known, perhaps, for saying that "Darwin's dangerous idea" is the best idea anyone ever had, because it firmly grounds life in materialism. As he understands it, human beings are "big, fancy robots" and, better still:

If you have the right sort of process and you have enough time, you can create big fancy things, even things with minds, out of processes which are individually stupid, mindless, simple. Just a whole lot of little mindless events occurring over billions of years can create not just order, but design, not just design, but minds, eyes and brains.⁷

Dennett insists that there is no soul or spirit associated with the human brain, or any supernatural element, or life after death. Thus, his career focus has been to explain how "meaning, function and purpose can come to exist in a world that is intrinsically meaningless and functionless."⁸ He came to the Galápagos to testify to that view.

Of course, many people are dismayed by ideas such as Dennett's and hope that they are false. Others welcome them as a means of freeing the human race from restraints imposed by traditional religions and philosophies. Let us progress, they say, toward a more humane system that both expects less of humans and blames them less for their failures—failures they can't help anyway, really.⁹

The question addressed in this book is not whether materialism is good news or bad news. Rather, the question is, does the evidence from neuroscience support it? As constitutional law professor Phillip Johnson, long a foe of materialism, which he terms "naturalism," writes: "If the blind watchmaker thesis is true, then naturalism deserves to rule, but I am ad-

...dressing those who think the thesis is false, or at least are willing to consider the possibility that it may be false.”¹⁰

True or false, materialism was the dominant intellectual current of the twentieth century and provided the impetus for most major philosophical and political movements of the day. Indeed, many thinkers today see the primary purpose of science as providing evidence for materialist beliefs. They reject with hostility any scientific evidence that challenges such beliefs, as we will see in our discussion of the psi effect in Chapter Six. Every year, thousands of books are published, in dozens of disciplines, advancing materialist views.

Not this one. This book will show that Professor Dennett and the many neuroscientists who agree with him are mistaken. It will take you on a journey different from the one he has made. Not to the Galápagos Islands, but inside the brain. It will show you why he is mistaken. In the first place, the materialists’ account of human beings does not bear up well under close examination. In the second place, there is good reason for believing that human beings have a spiritual nature, one that even survives death.

But first things first. Why should you embark on this journey unless you see the need for a nonmaterialist account of human nature? A new account is needed because the materialists’ account is inadequate. It is failing in a number of areas. So let us begin by outlining some of the failures. Let’s start with this question: What would you be left with if you accepted the materialists’ explanation of *you*? Would you recognize yourself? If not, why not? What is missing?

Mind, Will, Self, and Soul

The brain and its satellite glands have now been probed to the point where no particular site remains that can reasonably be supposed to harbor a nonphysical mind.¹¹

—*Sociobiologist Edward O. Wilson*

Why do people believe that there are dangerous implications of the idea that the mind is a product of the brain, that the brain is organized in part by the genome, and that the genome was shaped by natural selection?¹²

—*Cognitive scientist Steven Pinker*

What of the mind, the will, the self, the soul? Do they have a future in the new world of science?

Dennett is far from being the only materialist thinker who argues that there really is no *you* in you at all, that consciousness, soul, spirit, and free will are merely illusions bolstered by folklore. On the contrary, his view is in fact the standard assumption in current neuroscience. Dennett speaks for a number of neuroscientists when he says, “a brain was always going to do what it was caused to do by current, local, mechanical circumstances.”¹³ Your consciousness, your sense of yourself, is “like a benign ‘user-illusion.’”¹⁴ Anything resembling free will is unlikely or, at best, minimal and problematic.¹⁵

American culture critic Tom Wolfe put the matter succinctly in an elegant little essay he published in 1996, “Sorry, but Your Soul Just Died,” which expounds the “neuroscientific view of life.”¹⁶ He wrote about the new imaging techniques that enable neuroscientists to see what is happening in your brain when you experience a thought or an emotion. The outcome, according to Wolfe, is:

Since consciousness and thought are entirely physical products of your brain and nervous system—and since your brain arrived fully imprinted at birth—what makes you think you have free will? Where is it going to come from? What “ghost,” what “mind,” what “self,” what “soul,” what anything that will not be immediately grabbed by those scornful quotation marks, is going to bubble up your brain stem to give it to you? I have heard neuroscientists theorize that, given computers of sufficient power and sophistication, it would be possible to predict the course of any human being’s life moment by moment, including the fact that the poor devil was about to shake his head over the very idea.¹⁷

Wolfe doubts that any sixteenth-century Calvinist believed so completely in predestination as these hot young scientists. The whole materialist creed that Wolfe outlines hangs off one little word, “Since”—“*Since* consciousness and thought are entirely physical products of your brain and nervous system . . .” In other words, neuroscientists have *not* discovered that there is no you in you; they start their work with that assumption. Anything they find is interpreted on the basis of that view. The science does not require that. Rather, it is an obligation that materialists impose on themselves.

But what if scientific evidence points in a different direction? As we will see, it does. But before we get to the neuroscience, it may be worthwhile to look at some other reasons for thinking that the twentieth-century materialist consensus isn't true. Neuroscience is, after all, a rather new discipline, and it would be best to first establish that there are also good reasons for doubting materialism that arise from older disciplines.

What People Believe

If materialism is true, why don't most people believe it?

In April 1966, *Time* magazine announced that Americans were turning their backs on God. Selecting Good Friday (April 8) to spread the news, the cover story asked "Is God Dead?" implying that the answer is yes. Science was killing religion. Anything that could not be known by the methods of science, as interpreted at that time, was uninteresting or unreal.¹⁸ From then on, the only valid philosophy or spirituality would be existential anguish. The *Time* editors were quite sure of this. And they could not have been more wrong.

A Beliefnet poll taken thirty-nine years later in 2005 asked 1,004 Americans about their religious beliefs—and found that 79 percent described themselves as "spiritual" and 64 percent as "religious." As *Newsweek* pointed out in its September 2005 cover story, "Spirituality in America": "Nobody would write such an article now, in an era of round-the-clock televangelism and official presidential displays of Christian piety."¹⁹ *Newsweek's* Jerry Adler comments:

History records that the vanguard of angst-ridden intellectuals in *Time*, struggling to imagine God as a cloud of gas in the far reaches of the galaxy, never did sweep the nation. What was dying in 1966 was a well-meaning but arid theology born of rationalism: a wavering trumpet call for ethical behavior, a search for meaning in a letter to the editor in favor of civil rights. What would be born in its stead, in a cycle of renewal that has played itself out many times since the Temple of Solomon, was a passion for an immediate, transcendent experience of God.²⁰

How did *Time* get it so wrong? Adler suggests that *Time's* editors may have mistaken the values and lifestyles of midtown Manhattan for America in general. Also, *Time* focused on the problems of prestigious Protes-

tant denominations and ignored the widespread Pentecostal revivals. Those revivals and similar phenomena such as the Jesus movement probably lured away more of those denominations' members than secularism did. Because *Time's* editors in 1966 had the preconceived notion that religion was dying out, they apparently did not either notice these trends or grasp their significance.

There have been important changes in religion in America, to be sure. Possibly as a consequence of multiculturalism, the paths chosen today are much more diverse. Among mainstream Americans, hostility toward other faiths is much lower than a generation ago. But Americans, however they conceive God, are still "one nation, under God."

Atheism

Not many people have enough faith to be atheists. Worldwide, the proportion of atheists has declined in recent years. Although Europe is often thought of as highly secular compared to the United States, similar trends seem to be at work there. The numbers of true atheists in Europe, for example, has declined to the point where they are not numerous enough to be used in statistical research.²¹ It is interesting to reflect that in 1960 half of the world's population was nominally atheist.²² Nothing like that number could be so described today. In 2004, one of the world's best-known apologists for atheism, philosopher Antony Flew, announced that the apparent intelligent design of the universe and of life forms had convinced him that there really was some sort of deity.²³ Flew, it should be noted, did not join a religion, in the usual sense, but rather became a deist—that is, he came to believe in God based on external evidence, not personal experience.

The best-known portion of American society today in which atheism is widespread is elite scientists. For example, whereas 41 percent of American Ph.D. scientists believe in a God to whom one can pray, the picture changes drastically in elite academies such as the National Academy of Sciences (NAS). When polled by historians Edward Larson and Larry Witham in 1996, only 7 percent of members expressed personal belief in God and over 72 percent expressed personal disbelief. The remainder expressed doubt or agnosticism.²⁴

This fact is not apparently very well known, even within that academy itself. In 1998, Bruce Alberts, then president of NAS, urged the teaching of Darwinian evolution in public schools, claiming that “there are many very outstanding members of this academy who are very religious people, people who believe in evolution, many of them biologists.” Larson and Witham commented crisply: “Our survey suggests otherwise.”

By contrast, most humans have never believed in atheism or materialism. Indeed, religion may well have been around as long as humans. Seventy thousand years ago, the Neanderthals, an extinct species of human, buried their dead with tools, apparently to be used in another world. Significantly, many Neanderthal dead were placed in a fetal position, suggesting that Neanderthals expected to be “born again” when they died.²⁵ British archaeologist Paul Pettitt reports:

At the Sima de los Huesos (“Pit of the Bones”) at Atapuerca in Spain, over 32 individuals of *Homo heidelbergensis* dating to over 200,000 years ago were found at the bottom of a deep shaft. It is possible that these bones . . . all got there accidentally—but I doubt it. Caves and sinkholes are dark, mysterious places; they echo with the strange sounds of wind and water. In later periods they were regarded as gateways to the “otherworld.” It seems far more likely that early Neanderthals perceived them in a similar way.²⁶

Why don’t most people believe in materialism? Early twentieth-century psychiatrists theorized that spirituality is driven by a desire for a father figure or an unconscious desire to avoid death. Those explanations were plausible attempts to explain spirituality, though, by their very nature, they were untestable. They also tended to be Eurocentric, assuming that developments in European Christianity or Judaism were representative of religion worldwide.²⁷ Unfortunately, the progress of science, far from shedding light, has led to a host of less plausible explanations today. Today’s explanations have degenerated into notions that sometimes border on the frivolous, such as the supposed evolutionary fitness of religious people, theotoxins (poisonous chemicals in the brain), brain damage, memes, a God gene, or a God spot in the brain. We will look at many current proposed explanations and show why they are inadequate to the explanatory task. For now, note that all these contending explanations have one feature in common. Like the early twentieth-century psychia-

trists' theories, they are attempts to explain *away* spirituality as something that does not in fact point to a spiritual reality.

Of course, if the materialists are right, spirituality must necessarily be an illusion. But as noted earlier, the materialists have simply assumed that they are right; they have not demonstrated it. They would have been wise to proceed with caution before writing off as an illusion the deepest beliefs that the majority of humankind have always had about *themselves*. We would not write off the horse's view of being a horse or the dog's view of being a dog. But materialist preconceptions require that we write off humans' view of being human. That in itself ought to make us suspicious.

One popular way of writing off spirituality is evolutionary psychology, an attempt to understand human behavior based on theories about the behavior that helped early hominids survive.

Evolutionary Psychology

Has our remote human past deluded us into doubting materialism?

In the later decades of the twentieth century, evolutionary psychology exploded as scientists from many disciplines attempted to tackle the fundamental questions about human nature and the human mind by beginning with a startlingly simple proposition: the higher-primate brain (that is, the human and ape brain)

comprises many functional mechanisms, called psychological adaptations or evolved psychological mechanisms, that evolved by natural selection to benefit the survival and reproduction of the organism. These mechanisms are universal in the species, excepting those specific to sex or age.²⁸

Papers proliferate, claiming that all human behavior, including altruism, economics, politics, sex, love, war, obesity, rape, and religion, is best understood in the light of the qualities that enabled our remote ancestors to survive. But who knows exactly why a given remote human ancestor survived? The farther back we go, the more significant these individual fates become. A widely accepted theory in genetics holds that a single woman, "mitochondrial Eve," who lived between 190,000 and 130,000 years ago, is the ancestor of every living human being. Was she especially fit? Especially lucky? Specially chosen? We just don't know.

Still less do we know how she thought, because she left nothing behind except mitochondria.

Some theorists argue that our inability to understand and accept this line of reasoning is itself a demonstration of its correctness. Richard Dawkins writes, “It is almost as if the human brain were specifically designed to misunderstand Darwinism, and to find it hard to believe.”²⁹ But is evolutionary psychology a fruitful line of inquiry? We consider that in more detail in Chapter Seven, but for now let us address one key question: Can we find the answers to human nature in genetic programs from the deep reaches of our human or prehuman past?

Friendship is unnecessary, like philosophy, like art. . . . It has no survival value; rather it is one of those things that give value to survival.

—C. S. Lewis, *The Four Loves*

Some features of human behavior undoubtedly arose in the remote past. Consider, for example, jealousy. It is hardly unique to humans, or even to primates. Dogs and cats unambiguously demonstrate jealousy. But, for that very reason, discovering an origin for jealousy would be trivial. To truly explain human nature, evolutionary psychology aims to explain uniquely human behavior like altruism, the willingness of human beings to sacrifice themselves for others, sometimes even for strangers.

Altruism: Wrong Brain Wiring?

Altruism, or self-sacrifice for people other than one’s own kin, is usually, though not always, related to spiritual beliefs; for example, Mother Teresa’s image routinely appears in articles devoted to studying altruism. Altruism is easier to study directly than spirituality, precisely because it is a behavior that can be studied apart from a belief system. So how does evolutionary psychology account for altruism? As science writer Mark Buchanan explains in *New Scientist*, “In evolutionary terms it is a puzzle because any organism that helps others at its own expense stands at an evolutionary disadvantage. So if many people really are true altruists, as it seems, why haven’t greedier, self-seeking competitors wiped them out?”³⁰

Evolutionary psychology has not shrunk from the challenge of explaining altruism. Evolutionary biologist Robert Trivers, of Rutgers University, thinks

he has an answer: evolution *is* wiping altruists out, but hasn't yet finished the job. "Our brains misfire when presented with a situation to which we have not evolved a response," he explains.³¹ In other words, we should be selfish because evolution has wired us that way. And if we are not, our brains are wired wrong. Fair enough. If that is true, we should expect to see that altruists mainly cause trouble for themselves and others by their actions.

On Tuesday, August 2, 2005, during a torrential downpour, an Air France airbus carrying 309 people overshot a runway at Pearson International Airport in Toronto and subsequently burst into flames. The Canadian minister of transportation was informed that 200 people had died. The governor-general of Canada issued her heartfelt condolences to their grieving survivors. In fact, as the rain and smoke subsided, it emerged that no one had died (though 43 people had suffered minor injuries). Why was that? As it happens, the plane came to a halt near Highway 401, Ontario's main artery. Columnist Mark Steyn recounts:

Eyewitness accounts vary: some people are said to have panicked, others to have stayed calm.... Passing motorists pulled off the road and hurried toward the burning jet to help any survivors. Of the eight emergency exits, two were deemed unsafe to use, and on a third and a fourth the slides didn't work. Nonetheless, in a chaotic situation, hundreds of strangers coordinated sufficiently to evacuate a small space through four exits in less than a couple of minutes before the Airbus was consumed by flames.³²

Many evacuated passengers were later picked up on the shoulder of the 401 and driven by strangers to Air France's terminal.

So ... hundreds of unrelated people who would never see each other again cooperated to ensure that all got out in time? People offered rides to strangers from other parts of the world, even though some of them might well have been terrorists who were responsible for the grounding of the plane?

Altruism is a necessary part of surviving in a group although there is the problem of the "free-loader." If "free-loader" genes were undetected then everyone would become a "free-loader" and social groups would disintegrate. Here the need for recognition and memory are important so that one can recognise and reward altruistic deeds (and punish "free-loaders"). Cost/benefit modules weigh up whether my altruistic deed will

be rewarded with altruistic deeds in return and whether by doing a good deed I will suffer in the short or long term.³³

—*From an online introduction to
evolutionary psychology*

Your heart's desire is to give, so give in whatever way you are at peace about.³⁴

—*Trent Fenwick, who donated a kidney
to a dying stranger*

Of course, one can always construct a plausible story set in prehistoric times to account for altruism as a self-seeking behavior, and many theorists have done so.³⁵ But surely it makes more sense to conclude that the Toronto strangers who took the risk of helping were not seeking any benefit, either for themselves or their descendants. Nor is evolution somehow bogged down in the process of wiping them out. Nor are their brains wired wrong. Nor are they secretly benefiting in some way relative to passing motorists who do not help. Evolutionary psychologists are simply looking in the wrong places to try to understand their behavior.

Indeed, if evolution were wiping altruists out, we should logically expect to see fewer altruists in the present day than in the past. But there is no evidence for that. Rather, religions such as Christianity, which directly promotes altruism, and Buddhism, which discourages selfishness and worldliness, have largely replaced the “cargo cults” of earlier historical times. This indirectly suggests that altruism has become more popular, not less.

Evolutionary Psychology as Science

Evolutionary psychology has come under fire from a number of quarters³⁶ on account of the lack of testability or falsifiability of any given hypothesis. Evolutionary biologist Jerry Coyne complains:

Evolutionary psychology suffers from the scientific equivalent of megalomania. Most of its adherents are convinced that virtually every human action or feeling, including depression, homosexuality, religion, and consciousness, was put directly into our brains by natural selection. In this view, evolution becomes the key—the only key—that can unlock our humanity.³⁷

Evolutionary psychology, which we consider in more detail in Chapter Seven, fares poorly when it tries to explain religion or spirituality, a fact that was recognized nearly a century ago by Evelyn Underhill, a researcher of mysticism:

Récéjac has well said that “From the moment in which man is no longer content to devise things useful for his existence under the exclusive action of the will-to-live, the principle of (physical) evolution has been violated.” Nothing can be more certain than that man is not so content. He has been called by utilitarian philosophers a tool-making animal—the highest praise they knew how to bestow. More surely he is a vision-making animal; a creature of perverse and unpractical ideals, dominated by dreams no less than by appetites—dreams which can only be justified upon the theory that he moves towards some other goal than that of physical perfection or intellectual supremacy, is controlled by some higher and more vital reality than that of the determinists. We are driven to the conclusion that if the theory of evolution is to include or explain the facts of artistic and spiritual experience—and it cannot be accepted by any serious thinker if these great tracts of consciousness remain outside its range—it must be rebuilt on a mental rather than a physical basis.³⁸

Ernst Fehr and Suzanne-Viola Renninger reach a less loftily expressed, but related, conclusion:

In an age of enlightenment and secularization, scientists such as Charles Darwin shocked contemporaries when they questioned the special status of human beings and attempted to classify them on a continuum with all other species. Humans were stripped of all that was godlike. Today biology is restoring to them something of that former exalted position. Our species is apparently the only one with genetic makeup that promotes selflessness and true altruistic behavior.³⁹

Lest there be any misunderstanding, it is *not* the purpose of this book to argue that evolution did not occur. There is a fossil record, after all. In spite of its many defects, the record shows that evolution occurred. Rather, the issue is whether human evolution is a fully naturalistic process that occurs without meaning, purpose, direction, or design in a fully materialist universe. This book offers evidence from neuroscience and other scientific disciplines that challenges that view.

Some well-traveled roads in the pursuit of understanding human nature in a purely materialist way are simply dead ends. The attempt to demonstrate that altruism or spirituality is really some sort of covert Darwinian survival mechanism is one of those dead ends. We can indeed draw some fact-based conclusions about the psychology of our remote ancestors—for example, we can conclude from early burial practices that they had some religious beliefs. But we have no real way of knowing whether those beliefs improved their chances of survival. Generally, spirituality is positively associated with health and happiness in society today, but we cannot assume, without evidence, that it has always been so. Was it really “fit” for the Neanderthals to bury useful objects with their dead? Or were they motivated by something that reached beyond Darwinian fitness?

But what about our nearest animal relatives, the chimpanzees and other large primates? Some scientists have spent their lives living with them and studying them in detail, hoping to shed light on the nature of the human.

Our Animal Nature

Does the answer to human nature lie in our animal nature? In our kinship with chimpanzees? With mammals in general? Should we go back beyond the specifically human past to experiences?

Or, where old-eyed oxen chew
Speculation with the cud,
Read their pool of vision through,
Back to hours when mind was mud⁴⁰

So thought Victorian George Meredith, an enthusiast for materialism. Of course, it is easy for a gifted poet like Meredith, gazing into the huge, blank eyes of a contented ox, to imagine himself “back to hours when mind was mud.” But it is easy for a gifted poet to imagine anything. How do we know which imaginations are true insights into the nature of reality?

Practically speaking, were there ever, could there ever have been, hours when all mind—whether inside our universe or beyond it—was mud? In

other words, can mind merely evolve from nonmind without any help at all, as materialists insist? That question is at the heart of the conflict between materialism and all philosophies that ascribe meaning and purpose to the universe.

Focusing more narrowly on the human mind for the moment, two important research trends in recent decades have been to study ape behavior in the wild and to try to teach apes American sign language. Researchers in both areas hope to unlock the secrets of the human mind. The assumption, of course, is that the human being is simply “the third chim-

Can Humans and Chimpanzees Be Crossed?

Humans and chimpanzees are thought to have split off from a common ancestor about 5 to 7 million years ago, according to current evolutionary theory. Because chimps are the animal species closest to humans, many have speculated on the possibility of producing a hybrid, a “humanzee.” According to documents unearthed from the former Soviet Union, Soviet dictator Joseph Stalin hoped to produce such half-man, half-ape super-warriors, announcing, “I want a new invincible human being, insensitive to pain, resistant and indifferent about the quality of food they eat.”⁴¹ The plan came to nothing, and the scientist in charge of it died in the vast Soviet prison system.

But more often the motive for producing a hybrid has been philosophical. British zoologist Richard Dawkins has enthused that if such a hybrid were born, “Politics would never be the same again, nor would theology, sociology, psychology or most branches of philosophy. The world that would be so shaken, by such an incidental event as a hybridisation, is a speciesist world indeed, dominated by the discontinuous mind.”⁴² By “discontinuous mind,” Dawkins means the view that there are fundamental differences in quality between the human mind and the chimpanzee mind, a view with which he vehemently disagrees.

In any event, hybridization may be very difficult. Chimpanzees have forty-eight chromosomes and humans have only forty-six. The late paleontologist Stephen Jay Gould also explains:

The genetic differences between humans and chimps are minor, but they include at least ten large inversions and translocations. An inversion is, literally, the turning around of a chromosomal segment.

panzee,” and that the human mind is merely a souped-up version of the chimpanzee mind. Two species of chimpanzee are currently recognized, the common chimpanzee (*Pan troglodytes*) and the smaller bonobo (*Pan paniscus*); if humans were classified with chimpanzees, we would be the third. According to one reckoning, we share about 98 percent of our DNA with chimpanzees, so surely, the reasoning goes, the 100 percent chimpanzees hold the secret.

There has even been a project to reclassify the chimpanzee in the genus *Homo*, along with modern humans and (extinct) Neanderthals.⁴³ More

Each hybrid cell would have a set of chimp and a corresponding set of human chromosomes. Egg and sperm cells are made by a process called meiosis, or reduction division. In meiosis, each chromosome must pair (lie side by side) with its counterpart before cell division, so that corresponding genes can match up one to one: that is, each chimp chromosome must pair with its human counterpart. But if a piece of human chromosome is inverted relative to its counterpart in chimps, then gene-by-gene pairing cannot occur without elaborate looping and twisting that usually precludes successful cell division.⁴⁴

But, despite the technical difficulties, the idea refuses to die. Referencing a current theory that humans and chimps took some time to go their separate ways, University of Washington psychology professor David P. Barash recently hailed the day when “thanks to advances in reproductive technology, there will be hybrids, or some other mixed human-animal genetic composite, in our future.” Echoing Dawkins, he reasons that a hybrid would erase the line between humans and other life forms, announcing, “It is a line that exists only in the minds of those who proclaim that the human species, unlike all others, possesses a spark of the divine and that we therefore stand outside nature.”⁴⁵

Canadian science fiction writer Rob Sawyer, who focuses on key ethical issues in his work, has pointed out that—were it possible—it would hardly be ethical to reproduce even an extinct hominid in a lab, arguing, “If you brought back *Homo erectus*, he would be considered, by all the standards of our day, severely mentally retarded.”⁴⁶ So, probably, would the humanzee, if its proponents were ever to succeed in producing it.

ambitious still, many authors have speculated on hybridizing a human and a chimpanzee, hoping that the resulting live birth would create social, moral, and legal confusion and thus help humans see that we are animals, after all, without a higher destiny.

The Great Apes

Although a few years ago it would have seemed the most implausible science fiction, it does not appear to me out of the question that, after a few years in such a verbal chimpanzee community, there might emerge the memoirs of the natural history and mental life of a chimpanzee, published in English or Japanese (with perhaps an “as told to” after the byline).⁴⁷

—*Carl Sagan, The Dragons of Eden*

What can the great apes tell us about ourselves?

If we are really the 98 percent chimpanzee, then surely self, mind, will, soul, spirit, and spirituality are just human forms of a normal animal brain function. Maybe the 100 percent chimpanzee can indeed help us understand ourselves. But this approach to understanding the human mind has run aground. Here are some of the reasons:

The DNA evidence of similarity between humans and chimpanzees does not tell us what we need to know. Recall that only four nucleotides (A, C, G, T) write the entire genetic code, so a purely random assortment would report us as sharing 25 percent of our DNA with any known life form, whether or not it has a brain. Also, as evolutionary anthropologist Jonathan Marks reminds us, we share 40 percent of our DNA with fish, but no one suggests that fish are 40 percent of a human⁴⁸—or for that matter that humans are 250 percent of a fish. Crude concepts like DNA sharing do not really provide much help in understanding the human mind because it is the differences we need to know about, not the similarities. In any event, current estimates of how much DNA humans and chimpanzees share range from 95 to over 99 percent, depending on the rules chosen by the researcher making the estimate.⁴⁹ So it is not even clear yet how much DNA we do share.

Apes are not really a mirror for human behavior or thinking. Primatologists study apes to provide an evolutionary explanation for human behavior, particularly violent behavior. As a result, they tend to focus on

behavior that is common (or at least interesting) among humans even if it is rare among other primates. Robert Sussman, of Washington University, and Paul Garber, of the University of Illinois, pointed out recently, after a massive literature survey, that most apes are not even very *social*, let alone prone to violence. Gorillas spend only 3 percent of their time in social activities and chimpanzees only 25 percent. Comparisons between human and ape behavior are easily distorted by observer bias and cannot tell us much about ourselves.⁵⁰

Chimpanzees and humans do not, in general, share close emotional bonds. If you want to live with a nonhuman who is emotionally close to humans, share your life with a dog, not a chimpanzee. Dogs have demonstrated in research studies a greater ability to understand human emotions than chimpanzees have—even though the human face is more similar to the chimpanzee face than it is to the canine face. As Colin Woodward notes in *The Chronicle of Higher Education*:

Chimpanzees, our closest relatives, have been shown to follow a human's gaze, but they do very poorly in a classic experiment that requires them to extract clues by watching a person. In that test, a researcher hides food in one of several containers out of sight of the animal. Then the chimp is allowed to choose one container after the experimenter indicates the correct choice by various methods, such as staring, nodding, pointing, tapping, or placing a marker. Only with considerable training do chimps and other primates manage to score above chance.⁵¹

By 2001, experiments had shown that dogs were far better than chimpanzees at finding food using social cues provided by humans. So, greater genetic similarity does not mean greater community of mind between humans and chimpanzees.

The claims that apes have mental abilities similar to those of humans are questionable. Some researchers have devoted their careers to teaching simple deaf-language signs to apes, but, as Jonathan Marks notes:

For all the interest generated by the sign-language experiments with apes, three things are clear. First they do have the capacity to manipulate a symbol system given to them by humans, and to communicate with it. Second, unfortunately, they have nothing to say. And third, they do not use any such system in the wild.⁵²

Marks concludes: “Language is just not a chimpanzee thing. There is in fact very little overlap between chimpanzee and human communication.”⁵³ Indeed, nonhuman primates probably lack the neural complexity to handle the abstract thought needed for a mind. Radiologist Andrew Newberg and his colleagues note:

A rudimentary version of the parietal lobe is present in our close evolutionary relative, the chimpanzee. While chimps are smart enough to master simple mathematical concepts and develop non-verbal language skills, their brains appear to lack the neural complexity needed to formulate any significant kind of abstract thought, which is the type of thought that leads to the formation of cultures, art, mathematics, technology, and myths.⁵⁴

One of the reasons that primatologists such as Jane Goodall have stressed the similarity between apes and humans is entirely praiseworthy: they want to provide protection for the natural habitats of endangered wild apes and to end inhumane treatment of captive apes in laboratories. But, as Marks has pointed out, apes need protection as apes, not as equivalent to humans. He notes, “Apes should be conserved and treated with compassion, but to blur the line between them and us is an unscientific rhetorical device.”⁵⁵

It’s refreshing to work with chimpanzees: They are the honest politicians we all long for. When the political philosopher Thomas Hobbes postulated an insuppressible power drive, he was right on target for both humans and apes. Observing how blatantly chimpanzees jockey for position, one will look in vain for ulterior motives and expedient promises.⁵⁶

—*Primatologist Frans B. M. De Waal*

Genuine politics—even politics worthy of the name—the only politics I am willing to devote myself to—is simply a matter of serving those around us: serving the community and serving those who will come after us. Its deepest roots are moral because it is a responsibility expressed through action, to and for the whole.⁵⁷

— *Political prisoner and human-rights activist
Vaclav Havel, later president of the Czech
Republic*

So the chimpanzees cannot help us understand ourselves because the very thing that separates us from them *is* the human mind. How that mind arose and how it works is still a genuine puzzle. As science writer Elaine Morgan says:

Considering the very close genetic relationship that has been established by comparison of biochemical properties of blood proteins, protein structure and DNA and immunological responses, the differences between a man and a chimpanzee are more astonishing than the resemblances. . . . Something must have happened to the ancestors of *Homo sapiens* which did not happen to the ancestors of gorillas and chimpanzees.⁵⁸

So what can the chimpanzees and other great apes tell us? Not what we need to know, unfortunately. They can't answer for us the very questions they don't ask for themselves.

But perhaps the answer does not lie with life forms at all. If it is human *intelligence* we need to understand in order to comprehend the spiritual nature of humans, perhaps biology is merely a soupy mess that gets in the way of clean, mathematical binary code. Thus, many theorists have insisted that the answer really lies in artificial intelligence (AI), the intelligence of computers.

Artificial Intelligence

Supercomputers will achieve one human brain capacity by 2010, and personal computers will do so by about 2020. . . . By the 2030s, the nonbiological portion of our intelligence will predominate.⁵⁹

—*Ray Kurzweil, The Age of Spiritual Machines*

Do computers know? Can artificial intelligence reproduce mind or spirit?

In Douglas Adams's zany novel *Hitchhiker's Guide to the Galaxy*, Deep Thought, the second greatest computer of all time and space has been assigned the job of calculating the answer to the Ultimate Question of Life, the Universe, and Everything. The computer ponders for 7.5 million years and then announces the answer: "forty-two."

In response to general disappointment, Deep Thought replies, "The problem, to be quite honest with you, is that you've never actually known what the question is." Deep Thought then offers to design an even greater

computer, called “Earth,” which incorporates living beings. Earth will determine the question to which “forty-two” is the answer.

The question, when finally proposed, is:

WHAT DO YOU GET IF YOU MULTIPLY SIX BY NINE.

“Six by nine. Forty-two.”

“That’s it. That’s all there is.”⁶⁰

Will advanced computers eventually do better than arithmetic-challenged “Earth,” as Daniel Dennett hopes? Can they become “spiritual machines” that approximate the human mind, as artificial intelligence guru Ray Kurzweil has predicted? Will they be able to understand—or more probably eliminate—spirituality⁶¹ as a concept?

“Did you know,” he said at last, “that it’s possible to scan every neural net in a human brain and produce an exact duplicate of the subject’s mind inside a computer? . . . What would you say if I told you that my brain had been scanned and duplicated?”⁶²

—*Robert J. Sawyer, The Terminal Experiment*

Philosopher of mind John Searle recounts that, in the closing decades of the twentieth century, many thinkers were utterly convinced that a computer that thinks like a human being was quite possible. After all, the human brain was thought to *be* a computer. He recalls:

I cannot exaggerate the excitement that this idea generated, because it gave us at long last not just a solution to the philosophical problems that beset us, but it gave us a research program. We can study the mind, we can find out how the mind really works, by discovering which programs are implemented in the brain. An immensely appealing feature of this research program is that we do not actually have to know how the brain works as a physical system in order to do a complete and strict science of the mind. . . . We just happen, by a kind of evolutionary accident, to be implemented in neurons, but any sufficiently complex hardware would do as well as what we have in our skulls.⁶³

So did Ray Kurzweil’s “spiritual machine”⁶⁴ fulfill these hopes, as predicted?

Deeper and Deeper into the Blue ...

One long-standing artificial intelligence goal has been a computer big enough and cleverly programmed enough to beat any human at chess. Chess is a good game for a powerful computer because, like tic-tac-toe, it has strictly defined problems. Of course, chess is vastly more complicated. The thirty-two pieces and sixty-four squares provide a range of options that exceeds the estimated number of atoms in the universe.⁶⁵

At first, progress was slow. In 1952 AI pioneer Alan Turing wrote the first computer chess program. Only in 1980 was the Fredkin Prize established: \$100,000 would be awarded to the programmers of the first computer to beat a reigning world chess champion. For over a decade and a half, the programmers toiled at their craft without collecting the prize. In 1996 Russian grand master Garry Kasparov announced “Machines are stupid by nature,” and proceeded to beat IBM’s Deep Blue.

But, in 1997, Kasparov made headlines by losing to Deep Blue, and its three programmers shared the Fredkin Prize. According to many media sources, the age of the human was over and the age of the spiritual machine was about to begin.

Machines are just passing over an important threshold: the threshold at which, to some extent at least, they give an unbiased human being the impression of intelligence. Because of a kind of human chauvinism or anthropocentrism, many humans are reluctant to admit this possibility. But I think it is inevitable.⁶⁶

—*Carl Sagan*, *The Dragons of Eden*

The commentators entirely missed the point that Deep Blue’s programmers are just as human as Kasparov. So the question is not whether a machine can beat a human but whether a human who plays chess by writing a program fares better than a human who plays chess without writing a program. If the machine gives the impression of intelligence, as Carl Sagan has noted, that should be no surprise, for an intelligence created it. The lines that Shakespeare wrote for Hamlet give the impression of intelligence too, and for the same reason.

In any event, the age of the spiritual machine went by so fast that practically everyone missed it. In 2003, Kasparov tied the much more power-

ful Deep Junior and another program, X3dFritz.⁶⁷ This surprised many people because a powerful computer program is capable of considering many more strategies at once than a human being can. Generally, a chess-playing computer relies on its enormous parallel processing power to sort through a vast memory to evaluate millions of moves and choose the best one. Deep Junior powered through up to 3 million possible moves per second. Kasparov probably evaluated only two to three moves per second.

Well, that raises an obvious question: Why does Kasparov *ever* win? Shouldn't he always lose? The answer seems to be that what Kasparov is doing when he is thinking about his next play is different in kind from what Deep Junior is doing. Kasparov himself said, "Whatever [programmers] Shay and Amir say about Junior's ability to run through millions of possible strategies, I, by contrast, might consider only a few strategies in any one game. But you can bet your life they will be the very best ones."⁶⁸ As philosopher and chess enthusiast Tim McGrew, of Western Michigan University, puts it: "Something is going on in the grand master's mind that is not only radically different . . . but also inconceivably more efficient. It is a kind of computational miracle that humans can play chess at all."⁶⁹

It also emerged, in the aftermath, that the grand masters are getting better at playing computers, even as the computers are becoming more powerful.⁷⁰ AI enthusiast Kenneth Silber complains:

This is a disappointing state of affairs for enthusiasts of artificial intelligence. Chess, with its demands for calculation and memory, is an activity seemingly well-suited for computers. If computers are making only moderate progress in chess, what prospect is there for them to develop such capabilities as creativity, common sense and consciousness—let alone the superhuman intelligence that some experts predict?⁷¹

The answer may well be, no prospect at all. We will not find the answer in the soul of the new machine because the AI specialists misconceived the problem from the beginning. Computer chess doesn't help us understand human thinking because computers don't form or follow plans, nor do they have goals. They do not have overarching ideas, nor do they use analogy or metaphor—and there is no way currently proposed to make them do so. What they do is perform calculations. The difficulty is that, as computer pioneer John Holland points out, "There are many artificial intelligence problems that cannot be solved by simply performing more

calculations.” As a result, he doesn’t expect “conscious” computers any time soon.⁷²

I don’t think there’s anything unique about human intelligence. All the neurons in the brain that make up perceptions and emotions operate in a binary fashion.

—*Software pioneer Bill Gates*

The human mind is a computer made out of meat.

—*Artificial intelligence guru Marvin Minsky*

Similarly, John Searle describes the early optimistic ideas about AI (“any sufficiently complex hardware would do as well as what we have in our skulls”) as “hopelessly mistaken” and says that “nothing since the early days has changed my opinion.”⁷³ As if to underscore Searle’s comments, technomag *Red Herring* acknowledged in a 2005 overview article that AI ideas are useful in various business areas but “fall short of a grand ontological vision.” Fair enough, but it was the grand ontological vision that drove AI in the first place.

Science is capable of astonishing achievements, *provided that* scientists understand clearly the nature of the system they are studying. The human brain is not a calculating machine, and a calculating machine cannot answer our questions about the meaning of life. Even science fiction writer Rob Sawyer’s “calculating god”⁷⁴ could not answer our questions. Computers, however cleverly we build them, do not become spiritual machines, nor can they shed light on the spiritual nature of the human.

Humans’ Spiritual Nature

Can humans have a spiritual nature in a universe without purpose or design?

As we have seen, the lines of inquiry that seek to ground human nature in a purely material reality have not succeeded. Evolutionary psychology, for example, fails at precisely the point where uniquely human behavior begins—with genuine altruism. Likewise, primate studies and AI research fail at the very points where we require answers.

However, the failure of current materialist explanations does not demonstrate that a nonmaterialist explanation is true. Indeed, if we seek to

ground the nature of the human in a spiritual as well as a material reality, we face at the outset a serious, perhaps fatal, objection. Regarding the nature of the universe itself, twentieth-century British analytical philosopher Bertrand Russell famously concluded:

Man is the product of causes which had no prevision of the end they were achieving; that his origin, his growth, his hopes and fears, his loves and his beliefs, are but the outcome of accidental collocations of atoms; that no fire, no heroism, no intensity of thought and feeling, can preserve an individual life beyond the grave; that all the labours of the ages, all the devotion, all the inspiration, all the noonday brightness of human genius, are destined to extinction in the vast death of the solar system, and that the whole temple of Man's achievement must inevitably be buried beneath the débris of a universe in ruins—all these things, if not quite beyond dispute, are yet so nearly certain, that no philosophy which rejects them can hope to stand.⁷⁵

In that case, a spiritual nature for the human is impossible in principle. We must shun nonmaterialist explanations of human nature because they cannot possibly be right. An important consequence follows: even if materialist science does not offer satisfactory explanations now, we must stick with its unsatisfactory insights, in the hope that better ones will arrive someday.

Philosopher of science Karl Popper has called this line of thinking “promissory materialism.”⁷⁶ In other words, if we adopt it, we are accepting a promissory note on the future of materialism. Promissory materialism has been immensely influential in the sciences because any doubt about materialism—no matter what the state of the *evidence*—can be labeled “unscientific” in principle.

Gathering Evidence Against Materialism

In the summer of 2005, Guillermo Gonzalez, a forty-one-year-old astronomer at Iowa State University, accidentally discovered the size of the debt of promissory materialism. As an assistant professor of physics and astronomy approaching tenure, he found out one day that 124 fellow faculty members (about 7 percent of the faculty) had signed a statement criticizing him on account of his alleged support for “intelligent design

theory.” (This theory proposes that, on the evidence, the present state of the universe is best interpreted as the product of intelligent causation or design, as well as of law and chance. It does not hold that all events are intelligently caused, but does not rule out intelligent causes in principle, where evidence warrants. One way of understanding this is that the universe is top down, not bottom up. Mind comes first and creates matter. Matter does not come first and create mind.⁷⁷)

What was Gonzalez’s offense? He is a recognized expert in the obscure field of galactic habitability—the ability of a planet to support life as we know it.⁷⁸ He is also the lead author of a book, *The Privileged Planet: How Our Place in the Cosmos Is Designed for Discovery*,⁷⁹ in which he argues, based on his extensive research on various vantage points for astronomy in our solar system, that earth is remarkably convenient for astronomy—situated on the very plane of the ecliptic just off a spiral arm of our galaxy, with the result that humans can actually see deep into the galaxy.

People who are into astronomy get into it very early. It’s such a beautiful science. A lot of people have a deep sense of the infinite and the grandness of the universe. . . .

People have strong convictions that you can’t bring God into science. But I don’t bring God into science. I’ve looked out at nature and discovered this pattern, based on empirical evidence. . . . It obviously calls for a different explanation.⁸⁰

—Astronomer Guillermo Gonzalez

Gonzalez, a Christian, argues that this and similar findings mean that humans were meant to explore the universe. He is quick to stress that all his arguments are scientific—that is, evidence-based, testable, and falsifiable. But that does not pacify critics such as Jim Colbert, an associate professor of ecology, evolution, and organismal biology, who says, “We’re not saying no one should believe in intelligent design. It’s just that you can’t accumulate evidence, so it’s not science.”⁸¹

What emerged clearly from the ensuing controversy was that neither the evidence of earth’s position nor the quality of Gonzalez’s research was an issue in dispute. The attempt to stop him from getting tenure was based, essentially, on promissory materialism.⁸² Any research that uncovers the possibility of purpose, design, or meaning in the universe is perceived as a threat to science, because science is understood as an enterprise that

upholds the view of the cosmos eloquently expressed by Russell. Gonzalez's sin was precisely that he *was* accumulating evidence against that view.

Although the fact that Gonzalez is a Christian predisposes him to think in this way, it is by no means necessary. Rob Sawyer has been keeping abreast of the larger (and growing) controversy, noting "I think there is a legitimate debate going on. It's not fringe stuff." Indeed, although Sawyer does not write from a religious perspective, he likes to rehearse the many examples of delicate fine-tuning of the universe (sometimes called anthropic coincidences)—for example, the fact that if the strength of gravity differed from its known strength by as much as one part in 1×10^{40} , stars like our sun could not exist, and therefore neither could a life-supporting planet like earth.⁸³ In this, he is joined by astrophysicist Paul Davies, who

Is Science a Search for Truth or for Support for Materialism?

Sometimes academic scientists are so convinced that providing support for materialism is the purpose of science that they end up violating conventional civil rights. This happened to Richard von Sternberg, a paleontologist who permitted a peer-reviewed article to be published in his journal, the Smithsonian's *Proceedings of the Biological Society of Washington*, an article suggesting that the explosion of complex life forms that occurred quite suddenly about 525 million years ago might best be explained by intelligent design. Almost all the existing large classifications of animals (phyla) emerged quite suddenly during a few million years, a mere sneeze of geological time. Sternberg was not himself a supporter of the intelligent design hypothesis, but he believed strongly in putting all the options on the table.

The mere suggestion of an origin that included intelligent causation set off a huge uproar, directed not at the author, geologist and intelligent design theorist Steve Meyer, but mainly at editor Sternberg. He was cross-examined about his political and religious beliefs by his employers, removed from his position, and denied access to collections of fossils he needed for his work as a paleontologist. Also, he recounted to the *Washington Post*, when the biological society made a statement disowning Meyer's article, he was counseled not to attend, because, in his words, "I was told that feelings were running so high they could not guarantee

also espouses no particular religious position, but notes that “we can’t avoid some anthropic component in our science, which is interesting, because after three hundred years we finally realize that we do matter.”⁸⁴

In the face of the evidence for fine-tuning, as set out by Gonzalez among many others, the only sturdy argument against purpose and design is the possibility that our universe is an accidental success amid a junk heap of failed universes.⁸⁵ However, we have no way of knowing that other universes exist or that they may have failed.⁸⁶

Dimly, amid storms and uproars, people make their way to taking sides. Given what Tom Wolfe had to say about materialist neuroscience ten years ago (“the notion of a self . . . is already slipping away, slipping away . . . slipping away . . .”),⁸⁷ it was quite a surprise to hear his thoughts in 2005 about Darwinism, the biological theory that underpins it: “Look

me that they could keep order.”⁸⁸ He appealed to the Office of Special Counsel, a federal body that protects the civil rights of government employees, who found that he had had been subjected to retaliation and a misinformation campaign. A December 2006 Congressional report again vindicated Sternberg against many false allegations, accusing senior Smithsonian officials of having “harassed, discriminated against, and retaliated against” him.

It became apparent that Sternberg had violated not a written law but an unwritten one: Intelligent causation could not be considered, irrespective of either the state of the evidence or of whether or not scientists who were in any way associated with it had followed correct procedures in gathering and publishing evidence. Sternberg was supposed to have known better than to publish such a paper *even though* it had passed peer review.

Some argue that such unwritten rules actually hinder the very science they are supposed to protect. Mathematician and ID theorist William Dembski, for example, says, “Materialistic ideology has subverted the study of biological and cosmological origins so that the actual content of these sciences has become corrupted. The problem, therefore, is not merely that science is being used illegitimately to promote a materialistic worldview, but that this worldview is actively undermining scientific inquiry, leading to incorrect and unsupported conclusions about biological and cosmological origins.”

at Darwin. My God, what a powerful theory. Incidentally, I give that one about 40 more years, and it will go down in flames.”⁸⁹

Of course, purpose and design in our universe or in life forms do not demonstrate that humans have a spiritual nature. They do, however, make the idea plausible enough to investigate. Put simply, if Russell is right, we cannot have a spiritual nature and should not attempt to look for one, any more than Gonzalez should look for evidence that earth’s position may be meaningful. But if Gonzalez is right, we may indeed have a spiritual nature, and we can research the question, using the tools of science. The current evidence about the nature of the universe as a whole does not favor Russell’s view of reality over Gonzalez’s⁹⁰ and therefore should not be an impediment to considering the spiritual nature of humans.

The Limits of Materialism

But surely materialism could not be wrong? Great thinkers argue for it!

Materialism is wrong in its assessment of human nature because it is not in accord with the *evidence*. However, a couple of points are worth making about the limitations of materialism as a philosophical *assumption*.

Materialism is a *monistic philosophy*, that is, a philosophy that assumes that everything that exists is fundamentally of only one substance (e.g., matter). As Russell makes clear, it seeks to explain all of reality, from vast galaxy walls of the universe down to the subatomic quarks that underlie our own bodies, from the subtleties of the human mind down to the unconscious mimicry of an orchid.⁹¹ Two important consequences follow. First, in a monistic system, it is hard to know if we are wrong. Monists have nothing to compare their system with. As we have seen, one result is promissory materialism, in which problems with the assumptions of the system are simply deferred to future science; they do not result in a critical examination of the system itself.

Second, a monistic system like materialism can be destroyed by any evidence against it. That weakness is built into the system by its very nature; it cannot be attributed to harsh, unreasonable, or prejudiced critics. As a result, monistic systems tend to be hostile to investigations that provide evidence against the system’s assumptions. Supporters of the system may seek to prevent such investigations. They may also seek to manipulate

definitions so that such investigations are deemed to be outside science, irrespective of the evidence, as Guillermo Gonzalez discovered.

I maintain that the human mystery is incredibly demeaned by reductionism, with its claim in promissory materialism to account eventually for all of the spiritual world in terms of patterns of neural activity. This belief must be classed as a superstition. . . . We are spiritual beings with souls in a spiritual world, as well as material beings with bodies and brains existing in a material world.⁹²

—*Neurologist and Nobel Prize winner*
Sir John Eccles

Keeping these issues in view, we now turn to our key question: What evidence from neuroscience casts doubt on a materialist interpretation of the human mind and spirituality?

Support for the Spiritual Nature of Humans

So far, this book has only shown that materialist presuppositions, far from accounting for the nature of the human, restrict the areas we are permitted to research to certain well-worn, and by now mostly unproductive, areas such as speculations about prehistory, primate studies, and artificial intelligence. Does that mean that science itself, apart from the presuppositions of materialism, has nothing to contribute to the understanding of the spiritual nature of the human? Certainly not! The challenge for science is, rather, to develop hypotheses that take the observed facts seriously enough to go beyond the limitations of materialism.

Here is a key problem that must be addressed. Most of us, asked to give an account of ourselves, think that we have “minds,” which we distinguish from our “brains.” We consider that our minds generate the fundamental choice of action that the circuitry of our brains carries out. For example, a driver faced with an unexpected traffic jam may decide not to curse and hammer the horn, but simply to shrug and turn down a side street. We might describe the driver’s thought process by saying, “Harry made up his *mind* not to get upset, but to just go home another way.” We do not say, “Harry’s brain circuitry caused him to take his hand off the horn and instead steer the car to the right, down a side street.” We assume that Harry

has free will, that he—or something in him—can really decide how he will act.⁹³

As we have seen, a materialist neuroscience cannot account for a mind or for free will in this way. It assumes that Harry and any observers are the victims of an illusion of free will, because materialism has no model for how free will might actually work.

The first dogma which I came to disbelieve was that of free will. It seemed to me that all notions of matter were determined by the laws of dynamics and could not therefore be influenced by human wills.

—*Analytical philosopher Bertrand Russell*
(1872–1970)

Everything, including that which happens in our brains, depends on these and only on these: A set of fixed, deterministic laws. A purely random set of accidents.

—*Artificial intelligence guru Marvin Minsky*

All theory is against freedom of the will; all experience for it.

—*English literary critic Samuel Johnson (1709–84)*

Do All Events Have a Material Cause?

Materialism requires all events to have a *material* cause, which means a cause governed by the physical forces of nature, as understood by classical physics. Inevitably, that means a “deterministic” cause. There is no way for an object to fail to act in accordance with those forces, any more than a billiard ball can fail to shoot off in whatever direction an impact sends it. Very well, let us assume for the present that all events are governed by the physical forces of nature. But do we have a correct *account* of those forces, especially as regards the forces that may be operating within our brains?

Most of us assume, simply because it seems reasonable, that at a fundamental level the material reality of our universe consists of little bits of matter. The Roman poet Lucretius explained reality like that in about 55 C.E.:

All nature as it is in itself consists of two things—bodies and the vacant space in which the bodies are situated and through which they move in different directions.... Nothing exists that is distinct both from body and from vacuity.⁹⁴

Isaac Newton, the brilliant seventeenth-century developer of the laws of gravity, was convinced of a similar idea:

It seems probable to me that God in the Beginning formed Matter in solid, massy, hard, impenetrable, movable Particles, of such Sizes and Figures, and with such other Properties, and in such Proportion to space, as most conduced to the end for which he formed them; and as these primitive Particles being Solids, are incomparably harder than any porous Bodies compounded of them; even so very hard as never to wear or break in pieces; no ordinary Power being able to divide what God himself made one in the first Creation.⁹⁵

As it happens, Lucretius and Newton were mistaken. The fundamental layers of physical reality are nothing like that at all. They are collections of force fields. In the early twentieth century, physicists showed that these force fields, the “quantum” level of our universe, do not necessarily obey the “laws of nature” with which we are familiar.

So what is this fundamental quantum level of our universe like? Electrons (the negative charges of atoms), for example, do not definitely exist in space and time. They are a cloud of probabilities; their existence at any given point is only potential. When they jump from one state of energy to

Can Newton’s Laws Be Broken?

Why do Newton’s laws work so well if he was wrong about the fundamental layers of physical reality? Newton’s laws describe a middle level of reality, between the very small and the very large. At the very small, quantum, level, we must contend with fundamental quantum uncertainty. At the levels of organization that we normally observe, our bodies and other objects contain staggering numbers of packets of matter and energy. In that case, the approximations that Newton’s laws describe can be relied on. Hence, if you drop this book, you can be sure it will fall to the floor. However, if we continue on to a very high level of organization in interstellar space, relativity theory takes over and dispenses with Newton’s certainties again, though in different ways. For example, a triangle between stars might *not* add up to 180 degrees because space and time warp. What we must decide in each case is how much certainty we need and for what purpose.

another, they do not “pass through” the space in between. They simply reappear in a higher or lower state. One way to understand this is to picture a three-way bulb, a light bulb that emits 50, 100, or 150 watts, as the switch is turned, but nothing in between. There is *nothing* in between.⁹⁶ Even more strangely, if we measure these electrons, we make their existence at a given point real, at least for our purposes. So, in a sense, we are creating the thing we want to measure. There is a principle for this called the Heisenberg uncertainty (indeterminacy) principle. It says that subatomic particles do not occupy definite positions in space or time; we can find out where they are only as a series of probabilities about where they might be (we must decide what we want to know).

This area of physics, quantum physics, is the study of the behavior of matter and energy at the subatomic level of our universe. Briefly, the synapses, the spaces between the neurons of the brain, conduct signals using parts of atoms called ions. The ions function according to the rules of quantum physics, not of classical physics.

What difference does it make if quantum physics governs the brain? Well, one thing we can dispose of right away is determinism, the idea that everything in the universe has been or can be predetermined. The basic level of our universe is a cloud of probabilities, not of laws. In the human brain, this means that our brains are not driven to process a given decision; what we really experience is a “smear” of possibilities. But how do we decide between them?

The indeterminacy principle is often discussed as if it represented the difficulty of accurately measuring the locations and trajectories of the particles. But the point is not that it is hard to find out just where, say, an electron is, but that the electron actually has no exact location. Depending on how it's measured, an electron can look specific as a pinpoint or vague as a cumulus cloud.⁹⁷

—*Timothy Ferris, The Whole Shebang*

People had got used to the determinism of the last century, where the present determines the future completely, and they now have to get used to a different situation in which the present only gives one information of a statistical nature about the future. A good many people find this unpleasant. . . . I must say that I also do not like indeterminism. I have to accept it because it is certainly the best that we can do with our present

knowledge. One can always hope that there will be future developments which will lead to a drastically different theory.⁹⁸

—*Quantum theorist Paul Dirac*

One quantum mechanics discovery that may help us understand how we decide is the quantum Zeno effect. Physicists have found that if they observe an unstable elementary particle continuously, it never decays—even though it would almost certainly decay if it were not observed. In quantum physics, it is not possible to separate the observer entirely from the thing observed. They are part of the same system. The physicists are, essentially, holding the unstable particle in a given state by the act of continuing to measure it.⁹⁹ In the same way, experiments have shown that, because your brain is a quantum system, if you focus on a given idea, you hold its pattern of connecting neurons in place. The idea does not decay, as it would if it were ignored. But the action of holding an idea in place truly is a decision you make, in the same way that the physicists hold a particle in place by deciding to continue to observe it.¹⁰⁰

Can the Adult Human Brain Change?

For many years, neuroscientists believed that the adult human brain was essentially finished. It did not and could not change, any more than a billiard ball could, and individual neurons did not regenerate. According to the classical view, in such a fixed system certain mental programs were simply run over and over. Individual decisions did not affect the functioning of the system, but were rather a delusion created by the functioning of the system.

In recent years, however, neuroscientists have discovered that the adult brain is actually very plastic. As we will see, if neural circuits receive a great deal of traffic, they will grow. If they receive little traffic, they will remain the same or shrink. The amount of traffic our neural circuits receive depends, for the most part, on what we choose to pay attention to. Not only can we make decisions by focusing on one idea rather than another, but we can change the patterns of neurons in our brains by doing so consistently. Again, that has been demonstrated by experiments¹⁰¹ and is even used in psychiatric treatments for obsessive compulsive disorder.¹⁰²

So what happens in our brains when we make a decision? According to the model created by H. Stapp and J. M. Schwartz, which is based on the Von Neumann interpretation of quantum physics, conscious effort causes a pattern of neural activity that becomes a template for action.¹⁰³ But the process is not mechanical or material. There are no little cogs and wheels in our brains. There is a series of possibilities; a decision causes a quantum collapse, in which one of them becomes a reality. The cause is the mental focus, in the same way that the cause of the quantum Zeno effect is the physicists' continued observation. It is a cause, but not a mechanical or material one. One truly profound change that quantum physics has made is to verify the existence of nonmechanical causes.¹⁰⁴ One of these is the activity of the human mind, which, as we will see, is not identical to the functions of the brain.

Where Is This Book Going?

An open-minded neuroscience can significantly contribute to a model of mind (that is not a delusion) and tell us some important facts about spiritual/mystical experiences. Along the way, this book will explain in detail why current materialist neuroscientific theories of mind and spiritual/mystical experiences are mistaken.

A Model for Nonmechanical Causes

In the interpretation of quantum physics created by physicist John Von Neumann (1903–1957), a particle only probably exists in one position or another; these probable positions are said to be “superposed” on each other. Measurement causes a “quantum collapse,” meaning that the experimenter has chosen a position for the particle, thus ruling out the other positions. The Stapp and Schwartz model posits that this is analogous to the way in which attending to (measuring) a thought holds it in place, collapsing the probabilities on one position. This targeted attention strategy, which is used to treat obsessive-compulsive disorders, provides a model for how free will might work in a quantum system. The model assumes the existence of a mind that chooses the subject of attention, just as the quantum collapse assumes the existence of an experimenter who chooses the point of measurement.

Chapters Two–Four present and critique popular theories about spiritual experience that support an atheistic worldview. Author Matthew Alper, for example, assumes that human beings are hardwired by evolution to believe in God. In *The “God” Part of the Brain*, Alper claims that human spirituality is not a rational deduction or intuition, but rather represents a genetically inherited trait of our species.

Chapter Two addresses this idea, showing why it is useless for discussing spiritual issues. Chapter Two also looks at the similar “God gene” argument proposed by molecular biologist Dean Hamer (chief of gene structure at the U.S. National Cancer Institute) in a recently published book, *The God Gene: How Faith Is Hardwired into Our Genes*. Hamer believes that humans, “a bunch of chemical reactions running around in a bag,” are governed by their DNA. Like Alper, he claims that human spirituality is an adaptive trait (a trait that promotes survival and the ability to produce fertile offspring). We will see why it makes no scientific sense to speak of a “God gene.”

Chapter Three examines the claim of Jeffrey Saver and John Rabin, of the UCLA–Reed Neurologic Research Center, and others that there is a “God module” in the brain. Such a module, they say, accounts for religious visions, feelings of ecstasy, and related phenomena. Some scientists have focused on epilepsy to research this idea. Vilayanur Ramachandran, director of the Center for Brain and Cognition at the University of California at San Diego, raised the stakes by suggesting that his 1997 study had discovered a “God spot (or module)” in the human brain that could underpin an evolutionary instinct to believe in religion. Popular media, the scientific community, and the academy have been attracted to this idea that religious belief was somehow “hardwired” into the human brain in such a module. My research shows that Ramachandran’s findings simply indicate that the temporal lobes and the limbic system are involved in spiritual/mystical experiences. They do not mean that these areas create the experiences all by themselves. *The Spiritual Brain* demonstrates the role of a number of other regions in the brain.

Chapter Four reviews the work of Dr. Michael Persinger, a neuropsychologist at Laurentian University in Sudbury, Ontario, who has invented a helmet (called the Octopus or God Helmet) that allegedly induces spiritual/mystical experiences by electromagnetically stimulating the temporal lobes of those who wear it. The problem with this research is that, as was

shown by the famous experiments conducted at the Montreal Neurological Institute by Wilder Penfield, it is not possible to consistently generate a specific type of experience by stimulating the human brain.

Chapter Five addresses a key question, “What is the mind?” The materialist view, which is a central dogma of current neuroscience, holds that the mind is a delusion created by the brain. Thus, for current neuroscience, the question does *not* turn on whether there is evidence that some individuals have had a given spiritual experience. By definition, according to current dogma, they *cannot* have had an experience that puts them in contact with a reality beyond themselves because there is no such reality. Therefore, their experience is an illusion created by the brain. But there is evidence that the mind and the brain are not identical, which means that an actual experience of a reality beyond themselves is a real possibility that we will investigate.

Chapter Six introduces studies showing that the mind acts on the brain as a nonmaterial cause. I also introduce a hypothesis for how the mind interacts with the brain. Some interesting new scientific studies conducted by Peter Fenwick, Sam Parnia, Bruce Greyson, and Pim van Lommel on near death experiences (NDE) provide additional support to this view. Also presented are some cases that were investigated by researcher Kenneth Ring, showing that people born blind can see during an NDE, and the case of Pam Reynolds, who was known to be clinically dead when her NDE occurred. Overall, the occurrence of NDEs during cardiac arrest raises questions about the possible relationship between the mind and the brain. Mind and consciousness appear to continue at a time when the brain is nonfunctional and clinical criteria of death have been reached. If this is the case, it is quite plausible that mystics are actually contacting something outside themselves when in a deep mystical state.

Chapters Seven–Nine discuss spiritual and mystical experiences generally. Chapter Seven discusses who has mystical experiences and what triggers them. Although most people do not have such experiences (which undermines a materialist evolutionary explanation for them), the experiences can be triggered in a variety of ways. Many popular and academic beliefs about mystics, in particular, will be examined. *The Spiritual Brain* will look at the work of Sir Alister Hardy, a distinguished zoologist who established the Religious Experience Research Unit (RERU) at Manchester College in Oxford in 1969. The aim of RERU was to collect and clas-

sify contemporary accounts of firsthand religious or transcendent experiences and to investigate the nature and function of these experiences. The findings of an eight-year survey of over three thousand firsthand accounts of mystical experience were later published as *The Spiritual Nature of Man*. The most frequent triggers were prayer, meditation, natural beauty, and participation in religious worship. Hardy's conclusions support the key role of prayer and contemplation in Christian mysticism.

Chapter Eight investigates how spiritual/mystical experiences affect those who have them. One of the significant features of spiritual/mystical experiences is that they generally change the life of the individual. That is, contemporary scientific psychological research examining the relationship between the self, personality, and spirituality indicates that spiritual/mystical experiences can result in profound life changes in goals, feelings, attitudes, and behaviors as well as improved health. In general, spiritual/mystical experiences have positive effects, but the examples of negative effects are interesting in their own right.

Chapter Nine introduces the research project I have conducted with my doctoral student Vincent Paquette. This project was conducted with Carmelite nuns using scientific tools to identify what happens in their brains when they recall and relive *unio mystica*, the mystical union with God (the ultimate goal of the contemplative techniques practiced by Christian mystics). We used two of the most powerful functional brain-imaging technologies available, functional magnetic resonance imaging (fMRI) and quantitative electroencephalography (QEEG). QEEG measures electrical patterns at the surface of the scalp that reflect brain-wave patterns. These can be statistically analyzed and translated into numbers, then expressed as a color map.

What the two neuroimaging studies demonstrate is that the experience of union with God is not solely associated with the temporal lobe. In other words, there is no God spot in the brain located in the temporal lobe. (This is one of the reasons that the electromagnetic stimulation of the temporal lobe with the "God helmet" does not work.) Rather, this experience is implemented via a spatially extended neural circuit encompassing brain regions involved in attention, body representation, visual imagery, emotion (physiological and subjective aspects), and self-consciousness. These findings are more consistent with an actual experience than with a delusion. Chapter Nine also discusses the few other studies

carried out so far in the field of spiritual neuroscience, which significantly increase our knowledge and understanding of the neurobiology of spiritual/mystical experiences. The new knowledge gained in our research project sheds light on the circumstances under which spiritual/mystical experiences are most likely to occur.

Many people in present-day societies long to develop their spiritual side, but they wonder whether it really exists. They do not want to fool themselves, after all. By the time they have finished reading this book, they will see that their spiritual side does indeed exist. But like any faculty, it must be allowed to develop if they would like to see their lives transformed.

Chapter Ten addresses an important philosophical question: Did God create the brain or does the brain create God? On the one hand, spiritual/mystical experiences are significantly influenced by culture. For example, a Christian is unlikely to have a religious experience involving Brahman (Hinduism). Muslims and Jews are unlikely to have religious experiences that involve a triune God (in the Christian sense). However, on the other hand, some aspects of the mystical experience clearly transcend culture. A key characteristic is a state of knowledge, insight, awareness, revelation, and illumination beyond the grasp of the intellect. There is awareness of unity with the Absolute. Perhaps more significantly, people can change profoundly and irreversibly after these experiences. The change is generally interpreted as being for the better because the person becomes more loving and forgiving. This suggests, though it does not prove, that people who have spiritual/mystical experiences actually contact an objectively real force outside of themselves (God) and that the transformative power of spiritual/mystical experiences arises from an authentic encounter with ultimate reality (or God).

A Few Disclaimers

The external reality of God cannot be directly proven or disproven by studying what happens to people's brains when they have mystical experiences. Demonstrating that specific brain states are associated with spiritual/mystical experiences neither shows that such experiences are "nothing but" brain states nor proves that God exists. It shows only that it is reasonable to believe that mystics do contact a power outside themselves.

Consistent with this view, neuroscientific studies of faith experiences should not undermine faith. The fact that the human brain has a neurological substrate that enables it to experience a spiritual state can be construed as the gift of a divine creator or, if you prefer, as contact with the underlying nature or purpose of the universe. Materialist philosophers insist that such a substrate is meaningless and got there purely by chance. But, as pointed out earlier, materialism constrains them to think so. Nothing in the available scientific evidence requires that interpretation.

At the same time, no claim is made here that every activity pursued in the name of religion is good or equal. Consider the following well-known (and now deceased) figures:

Mother Teresa—founder of ministries to the poorest of the poor

Jim Jones—cult leader who led eight hundred followers to suicide

Baha'ullah—founder of a new religious sect encouraging interreligious peace

Mohammed Atta—9/11 suicide bomber

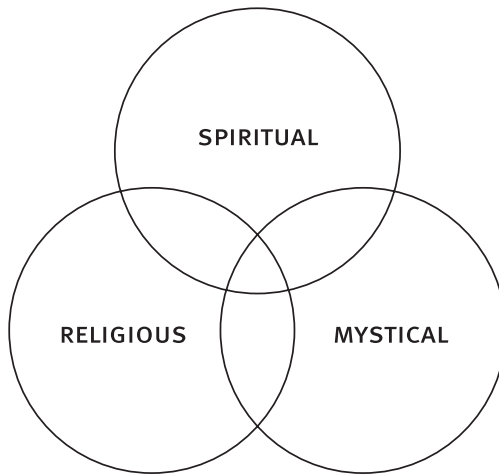
Mahatma Gandhi—founder of a nonviolent civil disobedience movement

David Koresh—killed in 1993, with seventy-five followers, in a stand-off with the FBI

All these figures were motivated in some way by religion. Yet they did very different things, with very different outcomes. A positive case for specific religious beliefs must be made on its own merits and is not the purpose of this book.

Regarding classification, religious, spiritual, and mystical experiences cannot be separated in a completely systematic way. Some experiences fall squarely into one of these categories and do not overlap any of the others, but other experiences overlap two or all three.¹⁰⁵ For example, some individuals have had mystical experiences during the contemplation of nature or art. Should their experiences be called a spirituality or even a religion of nature or art? Some experiencers would accept the designation, but others

would firmly resist it and insist that they have been misunderstood, perhaps even misrepresented. A visual demonstration of this problem might feature three circles whose centers all overlap.



Therefore, it is wise to avoid controversies about terminology and instead focus on what can be learned from observing actual cases. The term RSMEs will often be used in this book to mean “religious, spiritual, and/or mystical experiences.”¹⁰⁶

Neuroscience is a complex subject due to the nature of the human brain—the most complex living structure that we know. Maps of the brain, for example, are three-dimensional maps, not two-dimensional ones. However, technical terminology will be minimized wherever possible without distorting meaning. And now, onward!