

Is There Room for the Soul?

New challenges to our most cherished beliefs about self and the human spirit

By Jay Tolson

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A mind is a tough thing to think about. Consciousness is the defining feature of the human species. But is it possible that it is also no more than an extravagant biological add-on, something not really essential to our survival? That intriguing possibility plays on my mind as I cross the plaza of the Salk Institute for Biological Studies, a breathtaking temple of science perched on a high bluff overlooking the Pacific Ocean in La Jolla, Calif. I have just visited the office of Terry Sejnowski, the director of Salk's Computational Neurobiology Laboratory, whose recent research suggests that our conscious minds play less of a role in making decisions than many people have long assumed. "The dopamine neurons are responsible for telling the rest of the brain what stimuli to pay attention to," Sejnowski says, referring to the cluster of brain cells that produce one of the many chemical elixirs that activate, deactivate, or otherwise alter our mental state. In a deeper way, he explains, evolutionary factors—the need for individual organisms to survive, find food or a mate, and avoid predators—are at work behind the mechanisms of unconscious decision making. "Consciousness explains things that have already been decided for you," Sejnowski says. Asked whether that means that consciousness is only a bit player in the overarching drama of our lives, he admits that it's hard to separate rationalizing from decision making. "But," he adds, "we might overrate the role of our consciousness in making decisions."

Overrated or underrated, consciousness is not being ignored these days. Indeed, during the past 20 years or so it has become the focus of an expanding intellectual industry involving the combined, but not always harmonious, efforts of neuroscientists, cognitive psychologists, artificial intelligence specialists, physicists, and philosophers.

But what, exactly, has this effort accomplished? Has it brought us any closer to understanding how the physical brain is related to the thinking, experiencing, self-aware mind? Is the scientific study of consciousness approaching its own Copernican moment, when the fruits of experimental work yield a compelling, comprehensive theory?

Battle lines. Such questions, and the effort to find their answers, are part of what brought me to La Jolla, home to several prominent centers of consciousness research in addition to Salk. But interesting as the state of the science is, it is not what concerns most owners and users of a mind. There is, indeed, something troubling, if not downright offensive, about the effort to reduce human consciousness to the operations of a 3-pound chunk of wrinkled brain tissue. Such reductionist thinking seems like an assault on the last redoubt of the soul, or, at least, the seat of the irreducible self. Deny or attempt to disprove the immaterial character of the mind, and you elicit some of the same passions that have animated the culture wars over evolution in the classroom, exposing the deep divide between hard-core religious fundamentalists on one side and the equally hard-core scientific fundamentalists on the other.

But if the true believers on both sides of the emerging consciousness debate are likely to shout the loudest on the matter, neither should be allowed to have the last word. There is, in fact, an alternative scenario-one in which the seemingly fixed battle lines of the opposing armies are shown to be drawn according to some rather dubious principles. Not only has advanced neuroscientific research revealed an obdurate mystery at the core of consciousness, but theoretical advances in the natural and physical sciences have greatly complicated the effort to reduce all human phenomena-the mind notably included-to the effects of material causes. And even as cutting-edge science challenges crude materialistic explanations of the phenomenal world, new thinking in philosophy and theology is questioning the assumption of an absolute divide between mind and body, spirit and matter-an assumption that has long sustained many religious conceptions of the soul. Interestingly, these parallel developments in science and religion point to a new picture of reality-or maybe even recall older understandings implicit in traditions as ancient as Judaism or Buddhism-in which subject and object, mind and matter are more interfused than opposed.

Exploring the relationship between the physical brain and consciousness is not simply one of the last great intellectual frontiers. It also sheds light on some of the most vexing life-and-death issues facing us today. The study of consciousness, says Joseph Dial, executive director of the San Antonio-based Mind Science Foundation, which devotes a generous portion of its resources to this field, "has clear clinical applications when you talk about coma and impaired consciousness such as in the Terri Schiavo case. How do

you understand consciousness well enough, how do you understand the self and identity well enough, to determine at what point a person is no longer in possession of a self, is no longer conscious in the way we would suggest other humans are conscious and have an identity?"

Consciousness is so tied up with what we think of as our inner selves, our spiritual being, that many of the greatest minds of history have assigned it to an order of reality entirely different from the rest of the natural, physical world. Plato, most influentially, separated the soul, or psyche, from the material body and argued that this reasoning part of our being was immortal. His idea was so powerful and attractive that it has kept philosophers intimately engaged with it to this day. Then, too, because so many influential Christian theologians were part of this philosophical tradition, Platonic ideas have left a lasting imprint on Christian beliefs. The body may die, many Christians hold, but the soul lives on, presumably extending into eternity those qualities that we associate with our conscious minds and our sense of selfhood.

The experimental science that began to emerge in the 17th century would eventually challenge many of the everyday assumptions of the Christian West, including the notion of an Earth-centered cosmos. But few of the great men of early modern science viewed themselves as foes of religion. Few questioned the special status of the soul or its boon companion, the mind. In fact, prominent among the shapers of the scientific worldview was the French mathematician and philosopher René Descartes, whose most enduring contribution to modern thought was his argument that reality consisted of two entirely different substances: material substance (*res extensa*) and thinking substance (*res cogitans*). But how did these two different substances interact? According to Descartes, the bodily organs sent perceptions and other information via the brain to the mind, located in the pineal gland in the middle of the head. Reflecting upon these data, the mind then made decisions and directed the body's responses, in words or deeds. This dualistic picture of the body-mind relationship would later come to be attacked as the "ghost in the machine" argument. But for centuries, Christians and others found Cartesian dualism a reassuring and reasonable explanation.

Rats and mazes. It would not be long, though, before philosophers and scientists, particularly in the new field of psychology, would turn in earnest to the problem of

consciousness, bringing to it not just the experimental methods of investigation but a philosophical conviction that all phenomena were reducible to their more fundamental parts and that the interactions of these parts were governed by discoverable "laws of nature." Following the path of many 19th-century German psychologists, the great Harvard philosopher and scientist William James carried the study of consciousness to impressive lengths, most notably in his 1890 book, *Principles of Psychology*.

But something curious happened within a generation of that book's publication. Psychology quite suddenly dropped the investigation of consciousness. Dissatisfied with the reliance on introspection-how do you make an objective science out of people's subjective reports on their private experiences?-psychologists followed the lead of researchers like Ivan Pavlov and John Watson and turned to the observable results of consciousness: behavior. Or at least most did. For those less enchanted by the business of running rats through mazes there was the siren song of Sigmund Freud's theory of the unconscious mind. For more than half a century, varieties of behaviorism and psychoanalytic theory dominated the field of psychology, banishing the subject of consciousness to the realm of the occult or mere philosophy.

Slowly, however, developments conspired to bring the banished subject back. The invention of program-controlled computers in the 1940s gave birth to artificial intelligence, a branch of computer science dedicated to building machines to accomplish tasks requiring intelligent behavior. At the same time, the effort to create artificial intelligence encouraged a whole new field of psychology concerned with finding universal principles for different mental processes: cognitive psychology.

Also crucial to the rise of the scientific study of consciousness was the very sort of technology so frustratingly unavailable to earlier neuroscientists (including the young Freud), technology that could show what the brain was actually doing when someone experienced the color red or remembered a phone number. A raft of new brain-imaging and scanning technologies, including computed tomography (CT) scans and positron emission tomography (PET) scans, magnetic resonance imaging (MRI) and functional magnetic resonance imaging (fMRI), and magnetoencephalography (MEG), came to fill this need. These instruments enabled researchers to observe brain structure and activity in a variety of noninvasive ways, while the newest gadget in the arsenal, transcranial

magnetic stimulation (TMS), actually allows the researcher to disrupt activity in the cortex underlying specific mental tasks. Well before such devices were available, however, in the late 1940s, a Canadian psychologist named Donald Hebb put forth a remarkably resilient hypothesis. According to Hebb, groups of neurons that fire together tend to form what he called "cell-assemblies," the activities of which persist even after the event that triggered their firing is no longer present. These assemblies, in effect, come to represent the triggering event. The neurophysiological basis of thought, Hebb concluded, was the sequential activation of various groups of cell-assemblies.

Variants and refinements of this hypothesis, particularly the notion that neurons that fire together wire together, have been at the center of the research agendas of top cognitive neuroscientists during the past two decades. The most ambitious of these scientists-call them, if you will, the hard-core demystifiers-came to believe quite strongly that most of the mysteries of the mind, if not all of them, are reducible to the biochemical mechanisms underlying these neural networks. These scientists have been a formidable lot, including at least a couple of Nobel laureates who moved to the study of consciousness after doing major work in other fields. One of them, Gerald Edelman, winner of the 1972 prize for his work in immunology, is the founder and director of the Neurosciences Institute, which sits to the west of the Salk Institute on the same La Jolla mesa. Edelman launched the institute in 1981 as part of the Rockefeller Institute in New York City but brought it to La Jolla in 1993, where he also chairs the neurobiology department of the Scripps Research Institute, directly across the street from Neurosciences. A man as conversant with philosophy, literature, and music as he is with science-his early passion was the violin, but he feared he lacked the right stuff to perform-Edelman went into medicine, and then research. As he explains when we meet in his office, Darwin's theory of natural selection is what guided his groundbreaking research on antibody structures, and it is what underlies his theory of neuronal group selection in his work on consciousness. "I wanted to bring Darwin's selectional process to neurons," he says.

Edelman's many books on consciousness explore the various ways that neuronal circuits get established. In the developmental stage of the brain, some neuronal assemblies, or maps, are formed according to genetic rules. Experience then reinforces or weakens these assemblies-or gives rise to new ones-according to how efficiently they respond to

signals from the world or the body. The last process, re-entry, is the most difficult to explain, Edelman says, but it is also the most important, since it integrates the activities of various assemblies through what he calls "ongoing parallel signaling between separate brain maps along massively parallel anatomical connections." The binding together of the neuronal activities of maps associated with, say, the perception of an object and those associated with, say, memory, yields an integrated yet highly differentiated experience: a "scene" of primary consciousness that researchers call a quale.

But does the biochemistry underlying these qualia (the plural of quale) adequately account for the experience itself, not to mention aspects of higher-order consciousness that we associate with a sense of self and language? Edelman appears to be of two minds. "We evolved structures that invented language," he says. Yet once humans acquired syntax, Edelman adds, "all bets are off." Biology, he seems to suggest, can take us only so far in understanding the symbol-using mind. "It's not totally reductive," he says. At the same time, among the work being done by the some 36 researchers in Edelman's institute is an ongoing effort to build brain-based devices that perform a task-picking up or avoiding different kinds of objects-not according to an elaborately prescriptive program but by learning from experience, altering, creating, strengthening, and sometimes replacing the synthetic "neural" pathways within its program through success or failure at picking up the right kind of blocks. "Brain-based devices will happen if consciousness is a physical, natural process," Edelman says, clearly implying that it is at least a possibility.

Fuzziness. Another Nobel laureate who turned to consciousness research expressed far less ambivalence about the ability of science to explain the whole mystery. That scientist was Francis Crick, the discoverer, along with James Watson, of the double helical structure of DNA. For roughly two decades after that 1953 breakthrough, Crick helped pioneer molecular and developmental biology. But in 1976, Crick moved from Cambridge University to the Salk Institute to work on a subject that had fascinated him since the early 1950s: the biological basis of consciousness. Not long after, he teamed up with Christof Koch, a promising young German-educated scientist with a degree in physics and an interest in neurons, visual processing, and rock climbing. Together they launched the quest for what they came to call the neural correlates of consciousness,

which they defined as "the minimal set of neuronal events that gives rise to a specific aspect of a conscious percept."

The title and first sentence of Crick's 1994 book, *The Astonishing Hypothesis: The Scientific Search for the Soul*, made their ambitious agenda clear: "The Astonishing Hypothesis is that 'You,' your joys and your sorrows, your memories and your ambitions, your sense of personal identity and free will, are in fact no more than the behavior of a vast assembly of nerve cells and their associated molecules."

Although Crick died in 2004, Koch has continued to work on the subject in his laboratory at the California Institute of Technology in Pasadena. In his own book, *The Quest for Consciousness*, he sounds even more confident than his former mentor that focused work on neurons will soon yield not just the correlates but the causes of consciousness. As he demonstrated during the recent 10th annual conference of the Association for the Scientific Study of Consciousness in Oxford, England, Koch can sometimes come across as an affable taskmaster, not quite humorless but still Teutonically firm in telling his colleagues, some 300 cognitive scientists and philosophers on this occasion, where the real investigating should be done.

That domineering tendency surfaces during a debate between him and another prominent consciousness researcher, Susan Greenfield, a professor of pharmacology at Oxford and the director of the Royal Institution of Great Britain in London. Koch, a bit of a showman with his red-dyed hair, yellow shirt, purple tie, and red running shoes, reminds the audience that the great moral of 20th-century biology is specificity, indeed, specific molecular machinery. Dismissing fuzzy holistic approaches, he states his belief that "there are very specific neurons that subserve consciousness." The real challenge, he insists, is to develop genetic techniques to selectively activate and deactivate specific groups of neurons to see how they are related to different conscious states.

Greenfield, no shrinking violet herself, makes it clear that she finds Koch's agenda much too restrictive. She is interested in the broader problem of the gap between consciousness and unconsciousness, or, really, the continuum between the two states. "I suggest that consciousness is continuously variable," she says, "that there are varying degrees of consciousness." Greenfield emphasizes the importance of the neuronal

assembly-the nets of neurons that extend over wide areas of the brain-and particularly the neuromodulating chemistry that activates these assemblies, bringing them into concerted focus for less than a second, until they are supplanted by the activation of other (possibly closely related or associated) neuronal assemblies. The neuromodulators are the underlying chemistry of mood, emotions, and feelings, and, as Greenfield has written in her book, *The Private Life of the Brain*, "emotions are the most basic form of consciousness."

It is at moments like this that the definitional fuzziness of the enterprise can hit you full force. Are the two debaters really talking past each other? Are they even talking about the same thing? David Galin, a neuropsychiatrist and professor emeritus at the University of California-San Francisco, makes the point that researchers are often in such a hurry to explain consciousness in terms of their pet theories that they don't adequately examine just what they are trying to explain. "People treat consciousness as a thing," he says, "or as the system that generates the qualia or as the central mechanism that directs how it is employed-and those are all different things."

States of experience. At least some of the philosophers involved with the modern study of consciousness have been aware of this problem from the earliest years of the enterprise. One of them, David Chalmers, now at the Australian National University, is widely known within the field for a speech he gave in 1994 at the first of a series of ongoing biannual conferences on consciousness held in Tucson, Ariz. (Out of these conferences would come both *The Journal of Consciousness Studies* and the Center for Consciousness Studies at the University of Arizona, a center that Chalmers would come to direct in 1997 and that is now directed by Stuart Hameroff, a professor of anesthesiology at the same university.)

Chalmers created a stir at Tucson I by trying to clarify the "hard problem" of consciousness: the problem, as he put it, of experience itself. "When we think and perceive there is a whirl of information-processing," Chalmers declared, "but there is also a subjective aspect." This aspect, he continued, "is experience. When we see, for example, we *experience* visual sensations: the felt quality of redness, the experience of dark and light, the quality of depth in a visual field Then there are bodily sensations, from pains to orgasms; mental images that are conjured up internally; the felt quality of

emotion, and the experience of a stream of conscious thought. What unites all of these states is that there is something it is like to be in them. All of them are states of experience."

The easier questions for Chalmers were things like the ability to discriminate among assorted stimuli or to report upon mental states. But subjectivity arising out of matter: that to Chalmers was a mystery so seemingly insoluble that he wrote a whole book (*The Conscious Mind: In Search of a Fundamental Theory*) arguing that consciousness had to be considered a fundamental category like space, time, or gravity-explicable only by special, psychophysical laws.

Some cognitive theorists, including Tufts University philosopher Daniel Dennett, have accused Chalmers of making many difficult but surmountable problems into one mighty, insurmountable one. Explain all the little problems, Dennett insists, and you solve the big one-or dissolve it. Dennett is a genial figure, but he can be a bulldog of physical reductivism, quick to sniff out and attack anyone he thinks might be sneaking back to Cartesian dualism. He also enjoys a certain *enfant terrible* status for his most recent book, *Breaking the Spell: Religion as Natural Phenomenon*, which enrages many believers with its Darwinian dissection of the religious impulse.

Dennett exudes confidence in his own position: that consciousness is about "fame in the brain," to use his now famous phrase. At any one moment, Dennett argues, there are many potential conscious states, many contending neuronal assemblies, vying for celebrity, their big moment under the lights. But only one of these "multiple drafts" wins the competition, perhaps selected by the kind of Darwinian survival-enhancing mechanisms that Salk's Sejnowski and others study. The big mistake, according to Dennett, is to think that there is some homunculus of a self sitting in the theater of the brain and observing, or even directing, the ongoing show. "This is our old nemesis, the Audience in the Cartesian Theater," Dennett wrote in his 1991 book, *Consciousness Explained*.

When I ask Dennett if he feels that his ideas have been vindicated by research during the past 15 years, he answers in the unwavering affirmative: "The idea of fame in the brain and parallel competition seems to be an idea that works pretty well," he says. "Now we

can begin to talk about what the conditions of the competition are, where they occur, why and how they occur."

The more you talk to Dennett, though, the more you sense that what he is really interested in, once all the neurophysiological conditions of the competition have been worked out and explained, is higher-order consciousness. "Language changes everything," Dennett says, sounding a lot like Edelman. But when I ask whether that means that meaning is created by symbol-wielding consciousness, Dennett insists that it does not. "This is what I've meant over the years when I've said that the brain is a syntactic engine mimicking a semantic engine." By that, Dennett presumably means that consciousness produces orderly, grammatical representations of something out there in the world that is meaningful, but it does not create meaning. It is not necessary to meaning.

Which of course raises the question of what Dennett means by meaning. He explains by describing his fundamental disagreement with another leading philosopher of consciousness, John Searle, author of *The Rediscovery of Mind*: "Once we understand how there can be a machine that tracks meaning, an organism that tracks meaning," says Dennett, "then we can start asking what more is special about consciousness. This is exactly the other way around from, say, John Searle, who says there is no meaning without consciousness, that we have to do consciousness first, and that nothing can mean anything if it weren't for consciousness. I say, 'Oh no, on the contrary, there is meaning in microorganisms where there is no consciousness, because it's the appropriate response to information in the service of life-that's where meaning comes in.'"

Survival machines. If that's what meaning fundamentally comes down to-the sum of appropriate responses to information in service to life-it is easy to see why so many people view the study of consciousness as a potentially dispiriting project. If consciousness, particularly higher-order consciousness, exists only to respond more effectively to information in service to life, then we are nothing more than Darwinian survival machines. Other notions of value, purpose, freedom, and individuality-notions as important to many secular humanists as to religious people-are reduced to, at best,

reassuring illusions of possible survival value. Other, more religiously grounded notions of spirit and soul get even shorter shrift in this reductionist view.

But need the findings and insights of the study of consciousness lead to such a dispiriting conclusion? For two reasons, it would seem not. One reason lies in science itself—specifically, in a sophisticated critique of the reductive materialism that came to dominate modern experimental science during its so-called classical phase from the 17th century to the early 20th century. That critique emerges from frontier work in many areas, particularly physics, suggesting that the search for ultimate causality in smaller and smaller bits of matter is finally a bootless enterprise. The further one goes down the scale of physical reality, the less material matter appears to be. In fact, the further one goes down, the more reality seems to consist of nonmaterial information, pure potentialities of matter or energy but not quite either. Quantum mechanics has demonstrated the flux of particle and wave at subatomic levels, suggesting that the only fixity at such levels comes from the act of observing the object and arresting it at one or another stage of its being.

This point about the role of the observer raises particularly interesting questions about the power of human consciousness not just to define but to influence physical reality (including the physical brain), a point that has been explored by, among others, Henry Stapp, a physicist at Lawrence Berkeley National Laboratory in Berkeley, Calif. His argument, elaborated in his book *Mind, Matter and Quantum Mechanics*, proposes that conscious experience is not a mere product of underlying brain activity but an interactive event in which the attention and intention of the observing mind also have effects on the brain. To some biological reductionists, this notion of top-down (or mind-brain) effects is heresy, but its intellectual appeal reaches well beyond quantum physicists.

Not only quantum mechanics but a number of new fields such as the science of complexity put into question the whole enterprise of explaining reality in terms of bottom-up causality alone. As Galin points out, that kind of thinking only reversed the old, prescientific hierarchical conception of top-down causality, an explanation that attributed ultimate causality to a divine being or prime mover. In thinking about a phenomenon like consciousness, many today argue that it might be useful to move

beyond the hierarchical model of causality and consider whether causality moves in both directions, up and down, between different levels of complex systems or organizations. It might be useful also to think of the mind as what philosopher Philip Clayton, a professor at Claremont Graduate University, calls an emergent property, a complex system that is more than the sum of its parts and that has effects on the systems that support it. One of the things that distinguish the "moreness" of mind, according to Clayton (and Stapp would agree), is its unique ability to represent, know, and interpret the objects of its own awareness, an ability that makes it possible for a human being to make decisions and initiate actions and not just to be acted upon, or determined, by a lengthy chain of survival-related factors. This is not to say that the mind is not strongly concerned with, or shaped by, the exigencies of survival. But for Clayton, the mind is more than the sum of the parts that support it because it is a semantic machine and not just the elaborately embodied computer, or syntactical machine, that Dennett says it is. It is not, in other words, a machine that merely responds to external stimuli or underlying physical factors that subserve it. Mind-at least higher-order consciousness-is, by this reasoning, very much involved in creating meaning, largely if not entirely through its ability to assert the existence of things through language.

If the fundamental levels of reality are more informational than material, as quantum physics suggests, then consciousness may be the interface between the fundamental quantum world of information and the "classical" physical world that is more accessible to our senses. That, at least, is a theory developed by Oxford physicist Roger Penrose and Hameroff. Penrose came first to this idea while wrestling with the problem of how we understand mathematics if understanding is not just following a rule (in the way a computer does) but requires understanding the meaning of mathematical concepts. To answer this, Penrose proposed that consciousness was a quantum computation within the brain, an infinitesimal collapse of quantum information into classical information that takes place at the level of the neurons. Impressed by Penrose's argument, Hameroff approached him with the suggestion that the site of this collapse might be at the more microscopic level of the microtubule, a computerlike protein structure inside the dendrites of every neuron and, indeed, every cell.

Hard-line. Although the theory is very far from being proved-and many neuroscientists, including Koch, scoff at it as being completely untestable-Hameroff has published a list of 20 testable predictions, and he claims that some have been confirmed. More broadly, though, the line of inquiry that Penrose and Hameroff have opened, and which has been differently explored by other physicists like Stapp, suggests that consciousness is far more than a sophisticated survival machine or even a highly agile embodied computer. Instead, the mind's resistance to simple reductive explanations lends support to the notion that it is a profoundly complex emergent system whose capacity for intentional acts and creative discoveries connects it with the underlying order of reality, an order analogous, Hameroff suggests, to the world of forms or ideas that Plato believed stood behind our shadowy and ephemeral world of appearances.

Within religion itself there is also fresh thought about the implications of the new science of the mind for core religious principles and beliefs. Malcolm Jeeves, an honorary professor of psychology at the University of St. Andrews, is one of many believing scientists who think the Christian concept of the soul should be relieved of its Cartesian and Platonic overlays. "The immortality of the soul is so often talked about that it is easy to miss that the Jewish view did not support it," Jeeves says. "Furthermore, the original Christian view was not the immortality of the soul but the resurrection of the body." But Platonism did creep in, Jeeves acknowledges, winning over such influential Christian theologians as Augustine and John Calvin. In Jeeves's view, the new science of consciousness, by showing the inseparable links between mind and body, restores the original Christian conception of the unity of the person. As many Christian theologians now say, human beings do not have souls; they *are* souls. But Jeeves is realistic in thinking that it will take decades for many of his fellow Christians to accept this way of viewing the soul. And that acceptance will not be made easier by the hard-line reductivism of people like Dennett and Crick who, Jeeves says, "commit the fundamental error of nothing-buttery."

But grant Dennett and many other cognitive scientists their view that the self is not a spectator in the theater of consciousness but the composite of multiple drafts related to and constituting the biography of that particular individual. If this view is true, where is

the self or identity on which even a broad-minded religious believer might base his notion of the soul?

Here Christians and others might turn to the wisdom of Buddhism, in which the self is correctly understood not as an entity or substance but as a dynamic process. As Galin writes in a collection of essays on Buddhism and science, this process is "a shifting web of relations among evanescent aspects of the person such as perceptions, ideas, and desires. The Self is only misperceived as a fixed entity because of the distortions of the human point of view." The Buddhist concept of *anatman* does not suggest that the self is nonexistent but rather asserts that it cannot be reduced to an essence.

Galín proposes that rehabilitating the notion of spirit may be the best way to a new understanding of the self in a post-dualist age. The experience of spirit, he argues, is itself part of the human capacity to experience implicit organization, hidden order, deeper and ineffable connectedness in what we see or otherwise encounter, whether a magnificent work of architecture like Notre Dame or a spectacular vista such as the Grand Canyon. Experiencing spirit is finding unity and wholeness in something, and Galin suggests that we view the self as spirit in that sense: the organization-or even the emergent property-of all of a person's subsystems, not just one more subsystem.

In recent years, the scientific study of consciousness has taken bold, if not always steady, steps in the direction of understanding the experience of wholeness and human spirituality in general. One prominent researcher, Andrew Newberg, a professor of nuclear medicine at the University of Pennsylvania, directs his university's recently founded Center for Spirituality and the Mind, a cross-disciplinary program devoted in part to the fledgling field of "neurotheology." In one respect, this venture marks yet another return to the legacy of William James, whose later work included his masterful *Varieties of Religious Experience*. The findings of Newberg and his late colleague, Eugene D'Aquili, do not yet rise to the Jamesean level, but they do point in a promising direction. They even suggest that if religion can learn something valuable about the unity of body and mind from science, then science might be able to relearn something from religion about the deepest purposes of our minds.

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