immaterial evidence

In his recent book, *The Universe in a Single Atom*, the Dalai Lama argues for the immateriality of mind. **B. ALAN WALLACE** explains why this just may make perfect sense. Artwork by **JAMES KERR**

ALL THE GREAT REVOLUTIONS in science have been catalyzed by sophisticated observations of natural phenomena. In the sixteenth and seventeenth centuries, decades of empirical studies of celestial and terrestrial physical phenomena by Tycho Brahe and Galileo laid the foundation for Newton's discovery of the laws of classical mechanics. In the nineteenth century, Darwin's decades of painstaking empirical observations of biological phenomena enabled him to formulate his theory of evolution. In the early twentieth century, physics underwent a second revolution in quantum mechanics and relativity theory that was also based on increasingly precise and sophisticated observations of physical phenomena.

The scientific study of the mind began more than a century ago, but it has yet to undergo a single revolution comparable to those in physics and biology. In large part, the fundamental assumptions of cognitive scientists today are the same ones widely held in the late nineteenth century, based on the physics of that era. Mainstream cognitive scientists, including psychologists and neuroscientists, express enormous confidence that consciousness is physical and that all mental processes can in principle be explained purely in terms of biological processes in the brain. This overwhelming consensus exists despite the fact that there is (1) no scientific definition of consciousness, (2) no objective, scientific means of detecting its presence, (3) no scientific knowledge of the neural correlates of consciousness, and (4) no scientific understanding of what it is about electrochemical events in the brain that enables them to generate, or even influence, subjectively experienced mental states. Clearly scientists have some other basis for insisting that the mind must be physical, and that is primarily the belief that consciousness is an emergent property of the brain, just as life is an emergent property of inorganic chemicals.

For the physicalist theory of consciousness to be meaningful, we must have a clear idea of what we mean by the term "physical." Does this refer only to matter, and if so, how is that defined? Physicists in the late nineteenth century, when the scientific study of the mind began, regarded matter as stuff reducible to small particles and endowed with mass and spatial location. But twentieth-century physics, especially quantum mechanics, undermined this notion, replacing discrete particles of matter with the theory that all configurations of mass-energy consist of oscillations of immaterial, abstract quantities in empty space. At the most fundamental level, matter isn't made of matter. Classical physics also assumed that space and time had no causal role in the material world, but the theory of general relativity demonstrates that spacetime causally influences matter, just as matter influences spacetime. Contemporary physicists also include information as a fundamental constituent of reality, and it is just as causally efficacious and just as immaterial as spacetime. Since nature already includes not only mass-energy, but also spacetime and information among its fundamental constituents, why not consider consciousness, too, as a basic

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element of the universe? Distinguished mainstream physicists such as John Archibald Wheeler, Roger Penrose, and Andre Linde, and mathematician George F. R. Ellis, are seriously considering this provocative question, while mainstream cognitive scientists continue to rely on nineteenth-century physics.

Cognitive scientists study the mind by way of its behavioral and neural physical correlates, and their work would be a lot simpler if quantum mechanics should prove to be irrelevant to the study of the mind-brain problem. But Anton Zeilinger, one of the foremost experimentalists in the foundations of quantum mechanics, declares that the implications of quantum mechanics are so far-reaching that they require a completely novel approach in our view of reality and in the way we see our role in the universe. Quantum effects in the brain can't be counted out. For, according to Zeilinger, there is no limit in principle to the internal complexity, size, or temperature of a system to show quantum effects.

No. 10, *2001–02, oil and beeswax on panel, 11x11 inches*

When we directly observe mental phenomena, such as thoughts, mental images, and emotions, they don't appear to have any of the characteristics attributed to matter, such as mass and spatial location. There is ample evidence that specific neural processes localized in the brain are *necessary* for the causal generation of specific mental phenomena. *But there is no empirical evidence that any brain process is equivalent to any mental process*. Many cognitive scientists believe that mental events are equivalent to emergent, higher-order levels of brain activity, but so far this is an untested hypothesis. No one knows if mental events are equivalent to anything but themselves, and apart from a commitment to the ideology of materialism, there are no empirical grounds for reducing them to anything "physical," whatever that means.

Whatever the nature of mental phenomena may be, there can be little doubt that they influence the brain, as indicated by the growing field of neuroplasticity. And, as George Ellis points out, there can be no doubt that brain functioning is causally affected by abstractions, such as the value of money, the rules of chess, and the theory of the laser. Those abstractions are not physical, so why should we insist that the mind is physical, especially when all observations of mental phenomena suggest otherwise?

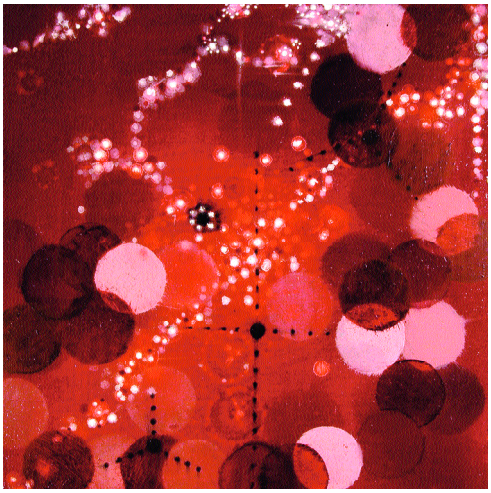
COGNITIVE SCIENTISTS have yet to develop any sophisticated methods for observing mental phenomena directly. Such a mode of firsthand observation is dismissed, or at least marginalized, as mere "introspection." And introspection, it is widely believed, was tried in the late nineteenth century and failed, so there's no reason to try it again. If at first you don't succeed, give up!

The problem with refusing to make introspection the primary means of studying the mind, as proposed by the American pioneer of psychology William James, is that it is only by means of first-person experience, or introspection, that we have any direct evidence for the existence of mental phenomena, including consciousness. Robots can perform complicated kinds of behavior without being conscious, and computers store information and solve problems without being conscious. So when it comes to the scientific study of the mind, to probe the unique qualities of states of consciousness, it makes sense to focus our attention primarily on those mental states and processes themselves, and not just on their physical correlates.

Thus cognitive scientists—despite their misgivings about introspection—are compelled to include first-person observations and reports of subjective experience in their research; otherwise they would have no direct evidence of their existence. But these tasks are commonly left to untrained subjects who are paid a menial fee for their unskilled labor. While psychologists and neuroscientists are required to complete years of undergraduate and graduate education in the study of the physical correlates of

mental phenomena, they leave the primary job of observing mental phenomena themselves to amateurs. Imagine astronomers leaving the responsibility of observing celestial phenomena to stargazers relying on unaided vision, while the scientists confined themselves to data analysis! This approach is alien to all branches of natural science, and I suspect this oversight in the scientific study of the mind is a major reason why there has been no groundbreaking revolution in this field of science.

One of the major, unchallenged assumptions in the mind sciences is that all mental behavior can in principle be understood in terms of neurobiology. This belief is embedded in the larger reductionist ideology that biology can be reduced to physics and physics can be reduced to mathematics. But mathematical theories alone do not define, predict, or explain the emergence of a physical universe. The laws of physics are discovered only on the basis of rigorous observations of physical phenomena. Physical theories alone do not define, predict, or explain the emergence of living organisms in the universe. Physics by itself cannot explain, for example, any behavior that is adaptive and depends on context, such as beaver dam-building and the dances of bees. Likewise, biological theories alone do not define, predict, or explain the emergence of mental phenomena in living organisms. In light of the history of science, the laws of mental phenomena will be discovered only through a deep and thorough investigation of the broadest range of mental phenomena.



No. 2, *2001–02, oil and beeswax on panel, 11x11 in.*

Despite the many empirical shortcomings and theoretical illusions of knowledge that permeate the cognitive sciences, many people assume that no other discipline—especially one that may be deemed *religious*—could contribute to the scientific study of the mind. But Buddhism is one of several great contemplative traditions that has developed rigorous means of observing mental phenomena directly, and it has done so by first developing a "telescope of the mind," namely highly focused, refined attention developed through the practice of *samadhi.* The possibility of training the attention is only recently being considered by the scientific community; the applicability of refined, focused attention to the rigorous examination of states of consciousness—from common, everyday levels, to the most subtle that can be achieved only through years of rigorous training—awaits research. And this may provide the missing ingredient for the first revolution in the cognitive sciences.

One of the criteria for a theory to be deemed "scientific" is that it can be put to the empirical test so that it is either validated or refuted. Current mainstream methods for scientifically studying the mind are largely based on the examination of the physical correlates of mental phenomena as they manifest in behavior and brain activity. As long as cognitive scientists confine themselves to such research, it is hard to imagine how they could ever put their own physicalist assumptions about the mind to the test, for all their research is based on and conforms with the assumption that the mind is physical! So the theory that the "real" nature of mental phenomena (contrary to their "misleading appearances") is physical doesn't stand the test of being scientific. Much as religious fundamentalists try to present their creationist theory of intelligent design as a scientific theory, Neo-Darwinists try to present their physicalist theory of the biological nature of the mind as a scientific theory. But neither theory lends itself to empirical validation or refutation using current methods of scientific inquiry, so neither one is scientific. When a theory poses as being scientific but isn't, then it's pseudo-science.

The principle of Occam's Razor states, "It is vain to do with more assumptions what can be done with fewer assumptions." Imagine that all physicalist assumptions about the nature of the mind and consciousness were abandoned, letting scientists restrict themselves to what they actually know about mind-behavior and mind-brain interactions. Would this "close shave," opening the door to mutual collaboration with contemplative means of investigating consciousness, leave science any poorer? Or would it rather encourage cognitive scientists and contemplatives alike to broaden their methods of empirical inquiry, while helping them to challenge their own untested theoretical assumptions? Only experience will tell. ▼