

Survival of Bodily Death  
An Esalen Invitational Conference  
May 22 to 27, 2005

Quantum Physics and the Psycho-physical Nature of Reality  
Henry Stapp

On Tuesday afternoon U.C. Berkeley quantum physicist **Henry Stapp** brought his perspective to bear on the nature of the human mind and the survival hypothesis.

#### Quantum Physics and the Fallacy of Causal Closure

Stapp started his presentation by giving an update on his forthcoming book *The Mindful Universe*. He discussed a few of the sections in which he responds to recent books by Daniel Dennett and John Searle. Both Dennett's book *Freedom Evolves* and Searle's book *Mind* are based on the premises of classical—not quantum—physics. Stapp pointed out that both of these thinkers assume the causal closure of the physical, by which is meant that the physical world at all times is completely determined for all times by the physical laws. At any given moment, the physical world (e.g., the locations and velocities of all particles) is thus closed off from "external" causal influence. The result of this classical view is that any so-called mental or volitional input is viewed as essentially redundant, or unnecessary. Stapp emphasized that the physics of the 20th century, quantum mechanics, has departed in dramatic and significant ways from the ideas of classical physics. Stapp mentioned briefly some of the faulty reasoning that is apparent in Searle's book. For example, he noted that by the end of Searle's argument, he does not even reconcile the basic points and premises that he started the book with—and this is coming from one of America's leading philosophers! Stapp said that the main point Searle ends with is that the familiar Cartesian concepts most philosophers employ must be revised because they are causing so much conceptual confusion. Overall, Stapp highlighted the strange fact that two of the most prominent philosophers today, Dennett and Searle, are still acting as if they were largely ignorant of the fundamental facts of quantum theory. Stapp's view, by contrast, maintains that orthodox quantum theory leads naturally to the view that consciousness is efficacious in the physical world. Mind does indeed influence matter. Thus, the physical world cannot be causally closed-off from mind.

#### From Heisenberg and Von Neumann to Stapp

Stapp turned next to discuss some of the basic features of his interpretation of quantum theory. Many of his comments built upon his presentation from the 2004 Survival meeting, so the reader is welcome to look at that summary for further background information to supplement the description given here. Also, please note that further essays by Stapp himself can be accessed at his extensive and helpful website: <http://www-physics.lbl.gov/~stapp/stappfiles.html>

Stapp started by explaining the nature of the historical breakthroughs that occurred in quantum theory in the mid-1920s. At that time, Werner Heisenberg made a monumental theoretical leap when he replaced numbers with ordered actions in the mathematical formalisms to describe quantum experiments. Previously, such things as the location of a particle and its velocity were represented theoretically by ordinary numbers, which have commutative properties (meaning that the order of operations in the math does not matter: one can do the operations either forward or backward and get the same result). But Heisenberg discovered that quantum events could be described by a matrix algebra that was non-commutative, meaning that the order of operations did in fact matter and could not be reversed without disrupting the outcome. As he was describing the historical origins of contemporary quantum theory, Stapp emphasized that already in the 1920s (when the theory was formulated) the mathematical equations employed to describe the results of experiments always required a prober. In other words, the original, or "orthodox," descriptions of quantum theory always involved an actor who probes nature for information. Thus nature could no longer be objectively described without input from a conscious probing experimenter or scientist. What we know about nature is thus always in response to our own conscious and free interaction with her. This is one of the key features that separates quantum physics from classical physics. In classical physics, nature is assumed to be describable objectively, while in quantum theory the subject is nontrivially involved. This is what makes Dennett's and Searle's recent books strangely anachronistic and essentially out of touch with contemporary reality.

Turning next to his own work, Stapp said that his interpretation of quantum mechanics has built upon the work of the highly regarded mathematician John von Neumann, who provided a mathematically rigorous formulation of quantum mechanics in his seminal work *Mathematical Foundations of Quantum Mechanics* (published in German in 1932 and then translated into English in 1955). Stapp emphasized that von Neumann's work addressed the relationship of mind and matter by bringing both the psychologically described and physically described aspects of scientific experiments together in the most mathematically precise language possible.

Stapp said that there are three core components to von Neumann's formulation of quantum mechanics:

- Process 1: The action of a human agent (the probing of nature)
- Process 2: The mechanics of quantum events (e.g., the Schrödinger equation)
- Process 3: The feedback from nature (the outcome of a probing action)

Stapp gave an overview of the way these three processes are involved in quantum experiments. Many of his comments built upon and reviewed ideas from his 2004 presentation, so the reader is encouraged to read that summary for further explanation. During his presentation in 2005, Stapp added some new features to his overall model that are important to note.

#### Process 4 and William James's Stream of Consciousness

In 2005 Stapp described yet another part of his theory, process 4. This involves the conscious choice on the part of some agent that results in the physical action described in mathematical terms by von Neumann's process 1. That is, von Neumann's process 1 corresponds to an actual physical act, but what Niels Bohr called the "choice on the part of the experimenter" is the psychological decision that precipitates (or accompanies) the physically describable act. This choice is called process 4.

One of the key points Stapp made was that the von Neumann laws of orthodox quantum mechanics allow human volitional effort to influence the brain process and thereby bodily actions. Stapp, together with neuroscientist Mario Beauregard and psychiatrist Jeffrey Schwartz, have applied this idea in order to explain many empirical discoveries. (For details, see their jointly written article, "Quantum Physics in Neuroscience and Psychology: A New Model with Respect to Mind/Brain Interaction.")

After describing Process 4, Stapp drew some parallels between his own work and that of the early William James. Stapp said that the thrust of James's idea was to describe human identity in terms of a stream of consciousness or flow of thoughts, as opposed to a static entity like the transcendental ego of Kant. Stapp suggested that James's attempt to account for human identity—the sense of being an "I"—is ultimately much more simple and coherent than models that propose there is some ontological entity underlying our experience of selfhood. In this respect, Stapp's view is not only like James's but also like Whitehead's. All of them see human identity as a collection of events, rather than as a persisting entity. At this point in his presentation, Stapp and Eric Weiss exchanged a few comments to the effect that Whitehead described human identity as a "society of occasions." It is the "society" part of this phrase that accounts for the way that our individual identities hang together as a whole or gestalt. There isn't a static thing to be found but rather a complex society of processural events. This is what the early William James was hinting at with his notion of "thoughts without a thinker." Stapp added that in James's writings there are passages in which James was groping to discover some kind of "fantastic law of clinging" by which thoughts are coherently held together and thus experienced as an "I" or typical human identity.

#### The Natural Selection of Intentionality

In response to a question from Michael Murphy about evolution, Stapp said that natural selection could operate on organisms with more or less effective abilities to choose. For example, single-celled organisms long ago were making intentional decisions (even if only dimly intentional) that were similar to what von Neumann described in Process 1 terms. The organisms that were more effective in those decisions survived and proliferated. Thus, the causal effectiveness of intentionality has been carefully honed by natural selection over several millions of years, stretching from single cells up through plants, animals, and humans.

#### Data and Theory Building

As he concluded, Stapp suggested that this conference group should focus next on deciding what specific data is sufficiently solid and reputable to be included in a theory of survival. For example, some of the data in Dean Radin's experiments and some of the experiments described in Ed Kelly's book *Irreducible Mind* need to be rigorously evaluated and ranked. After that process has occurred, then an appropriate theory could be constructed to account for that overall data set. In fact, since the May 2005 conference, Stapp has been working with Eric Weiss to construct a preliminary theory that accounts for some of the most reliable and replicable data for survival. At the upcoming 2006 meeting, they hope to move forward with their initial ideas.

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