

# SCIENCE'S CONCEPTION OF HUMAN BEINGS AS A BASIS FOR MORAL THEORY

by *Henry P. Stapp*

*Abstract.* Niels Bohr stated, and Werner Heisenberg reiterated, that “in the great drama of existence we ourselves are both actors and spectators.” Their emphasis stems from the fact that the entry of human beings into physics as actors constitutes the most fundamental philosophical departure of twentieth-century basic physics from its eighteenth- and nineteenth-century forerunners. Those earlier theories claimed that our human conscious thoughts are mere witnesses to, or by-products of, essentially mechanically determined brain processes. In stark contrast, certain conscious decisions that are made by human beings, but that are not determined by any known law, statistical or otherwise, enter irreducibly into orthodox contemporary physical theory. These actions are required to counteract effects of Heisenberg’s Uncertainty Principle, which ordains that the physically described process of nature, acting alone, produces not a physical world of the kind we experience but rather a continuous smear of potential possible worlds of the kind we know. This contradiction between theory and experience is resolved in orthodox contemporary physical theory by bringing certain effects of our conscious human choices into the dynamics in essentially the way that we intuitively feel that our conscious intentions affect the physical world, namely, via the effects of our intentional efforts on our physically described bodies. The moral implications of this profound change in physics are discussed.

*Keywords:* foundations of quantum mechanics; human values; philosophy of quantum mechanics; science and religion.

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## HUMAN FREEDOM

“In the great drama of existence we ourselves are both actors and spectators,” Niels Bohr proclaimed several times, and this was reiterated by Werner Heisenberg.

This assertion might seem neither profound nor surprising; even a mechanical robot that moves and senses light signals is both actor and spectator. However, Bohr’s meaning is both profound and surprising. It refers to what is, from the standpoint of philosophy, the most radical innovation wrought by the replacement of classical mechanics with quantum mechanics. It concerns an important change in the role of the human being as *actor* that goes far beyond anything that classical mechanics can allow.

The huge disparity between classical mechanics and quantum mechanics is heralded by the fact that classical dynamics is specified by one single physical process, which never acknowledges the existence of our psychologically described thoughts and feelings, whereas quantum dynamics involves four processes, which are described in a combination of the languages of mathematics and psychology. These four processes affect the human being in different ways. To understand the nature and role of human beings in a world governed by quantum laws one must understand the nature of these four processes.

John von Neumann, in his rigorous formulation of quantum mechanics, gave the names Process 1 and Process 2 to two of these processes.

Process 2 is the quantum mechanical counterpart of the single dynamical process of classical mechanics. Like its classical counterpart, Process 2 is strictly deterministic. In relativistic quantum field theory this Process 2 is also local, involving mathematical properties assigned to points in space at instants of time, and the causal rules are microscopic—they connect localized properties to neighboring localized properties.

Process 2 incorporates Heisenberg uncertainties. Consequently, it generates, in the brain of each person, a physical state that corresponds not to one single stream of consciousness—of the kind each of us actually experiences—but to a continuous “smear” of possible streams of conscious experiences. The central interpretational problem in quantum theory is therefore this: How are these continuous smears of possible streams of consciousness reduced to the streams of consciousness that we actually experience?

Orthodox quantum theory achieves this reduction by introducing into the physically described Process 2 evolution three other kinds of processes. The first is called by von Neumann a Process 1 *intervention*. Each actually occurring Process 1 intervention is a *probing action* described in purely physical terms. However, and this is the key point, orthodox quantum theory gives *neither a physical cause nor a statistical probability* for a Process 1 intervention to occur. In particular, these interventions are *not* determined by the deterministic, physically described Process 2.

Second, according to Bohr and Heisenberg, and in actual scientific practice, the choice of which Process 1 action occurs, and when it occurs, is specified by a free choice on the part of the experimenter. I call this “free choice on the part of the experimenter” Process 4.

Third, there is the kind of process that Paul A. Dirac calls a choice on the part of nature. It is a selection of some particular outcome of the freely chosen Process 1 probing action. This choice is called Process 3, and it is a random choice.

This brings us to the main point. The adjectives *random* and *free* are highly significant. A *random* choice is one that is constrained by statistical conditions. This entry of randomness into quantum mechanics has been extensively discussed by physicists and philosophers. *Free* signifies something altogether different. Within the mathematical machinery of orthodox quantum theory the choice of which Process 1 probing action will actually occur is constrained by no conditions whatever, statistical or otherwise. Moreover, this choice is treated in actual scientific practice as a conscious choice on the part of a human being—the “free choice on the part of the experimenter.”

Thus, in orthodox theory these Process 4 choices (of which probing action will actually occur) are free in the double sense that they are *not* specified by the physically described aspects of the situation but *are* specified, in actual scientific practice, by a free choice on the part of the experimenter.

It is, of course, conceivable that these Process 4 choices will eventually be explained in purely physical terms. However, any such explanation must go substantially beyond the presently understood deterministic physical Process 2. On the other hand, there is no hint or suggestion within orthodox quantum mechanics that a purely physical explanation of Process 4 is possible and no rational reason why such a reversion to nineteenth-century concepts is either demanded or warranted.

I conclude that a major advance in physics has presented us with a science-based conception of nature in which our physical actions are influenced by our thoughts and feelings in ways not ultimately controlled by mindless mechanical processes. This shattering of the shackles of nineteenth-century materialist physics opens the way to the construction of science-based ethical theories of a kind incompatible with the mechanistic conception of nature that dominated science from the time of Isaac Newton until the dawn of the twentieth century.

#### QUANTUM WHOLENESS AND SPIRITUAL-SECULAR DYNAMICS

In 1935 Albert Einstein, together with two young colleagues, Boris Podolsky and Nathan Rosen, published a paper that focused attention on a paradoxical feature of quantum theory. The theory appears to require this:

*What is experienced by one person must depend, in certain situations, upon what a faraway and seemingly disconnected person freely decides to do.* An intense scrutiny of this puzzling situation by physicists has made clear that the structure of quantum mechanics is profoundly compatible with the idea that the Process 4 choices can be consistently regarded as free choices. But this element of freedom entails a deep level of interconnectedness of the conscious experiences of persons situated in far-apart regions.

This nonlocal connectedness has been endlessly discussed by physicists and philosophers and is known to be strictly incompatible with any ordinary—that is, local mechanical—idea of how the world operates. The subtle connectivity revealed by these purely secular scientific studies between the experiences associated with physically separated persons seems to demand the existence of a reality that can provide the needed connections. But these connections go beyond anything that classical materialism can accommodate. What seems to be called for is a pervading immaterial global reality that is informed by our thoughts and can subtly act back upon far-away other persons.

This general idea of a global immaterial—say spiritual—presence is probably the core intuitive idea of all religions, both East and West. But then purely secular studies of certain paradoxical features of empirical phenomena have led to conclusions about the nature of reality that, on one hand, seem incompatible with the materialist conception of nature, and, on the other hand, are suggestive of the existence of a pervading “spiritual” presence of the kind that lies at the heart of all religions.

#### RATIONAL SCIENCE-BASED MORAL THEORY

Deterministic materialism is inhospitable to rational moral theory.

In the first place, a materialist striving to maintain high moral standards is placed in the irrational position of acting as if one’s conscious choices can make a difference in the course of physical events, while believing that they cannot possibly do so, because the entire course of physical events is mechanically fixed at the birth of the universe.

In the second place, any belief in one’s own intrinsic deep connectedness to the community of human beings, and to nature itself—which might provide a basis for values extending beyond one’s own bodily and psychological self—must be dismissed as a delusion by the rational classical materialist.

But rationality and respect for science does not entail accepting local deterministic materialism or even materialism with only random interventions. Orthodox contemporary physics includes not only deterministic features and random features but also causally efficacious human free choices. Moreover, it yields a conception of nature that must accommodate certain subtle immaterial connections between various physically disconnected parts.

This conception of nature, and of our place within it, arises from the orthodox interpretation of quantum mechanics. There are other interpretations, but the orthodox interpretation is the one that is directly supported by empirical evidence and the one that all others must in the end sustain, insofar as its predictions continue to be validated in the ever-more-refined conditions under which they are being tested.

This orthodox science-based conception of human beings as actors who are free to act efficaciously upon the physical world, and who are linked together by an immaterial presence, is in line with the inner core of all religions, and it buttresses, from a secular perspective, the communal values that religions spawn.

The valued community includes all human beings, not merely coreligionists. Acceptance of this science-based conception of nature, and of ourselves, allows the construction of a moral theory that captures the positive aspects of religious ethical teaching while evading both the negativities directed at non-coreligionists and the destitution of mechanistic materialism. The sense of separateness, isolation, and powerlessness that issues from the nineteenth-century image of man as automaton is replaced by a conception of efficacious creative human selves imbedded in an encompassing community endeavor and adventure. This conception of nature, and of ourselves, provides a rational foundation for exercising our mind-based freedom of action in accord with values that give weight to the good of the whole.

#### NOTE

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